Offset Handbook

for

Regional Greenhouse Gas Initiative (RGGI) Model Rule Offset Subpart XX-10

and

Model Offset Consistency Applications and Model Monitoring and Verification Reports

Version 1.1

May 13, 2015

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1. Purpose and Organization of Offset Handbook

The purpose of this Offset Handbook is to explain Regional Greenhouse Gas Initiative (RGGI) Model Rule provisions for offset projects (Subpart XX-10) and the award of carbon dioxide (CO_2) offset allowances, and the documentation required in model offset project Consistency Applications and model Monitoring and Verification (M&V) Reports.

The Offset Handbook is organized as follows:

- Plain English summary of Model Rule provisions for offset projects and the award of CO_2 offset allowances
- Step-by-step guide to the submission and review of offset project Consistency Applications and M&V Reports, and the award of CO_2 offset allowances
- Category-specific explanation and information by offset project category

This Offset Handbook has been prepared for informational purposes only. This Offset Handbook does not constitute formal guidance or an official interpretation by any individual RGGI participating state regarding its CO_2 Budget Trading Program. Each RGGI participating state may have its own documents containing guidance and/or interpretation regarding its CO_2 Budget Trading Program. Each RGGI participating state retains the authority to make determinations and interpretations regarding its CO_2 Budget Trading Program in accordance with relevant statutory or regulatory provisions.

The requirements for offset projects in RGGI participating states are specified in state CO_2 Budget Trading Program regulations. In making decisions regarding offset project eligibility, consistency determinations, and the award of CO_2 offset allowances to project sponsors, each RGGI participating state bases all review and determinations on the relevant provisions of its respective CO_2 Budget Trading Program. In the case of any actual or apparent inconsistency between RGGI participating state CO_2 Budget Trading Program provisions and this Offset Handbook, the respective participating state's CO_2 Budget Trading Program provisions are controlling.

RGGI state CO_2 Budget Trading Program regulations are based on a RGGI Model Rule (see http://www.rggi.org/docs/ProgramReview/_FinalProgramReviewMaterials/Model_Rule_FINAL.pdf). For simplicity, this Offset Handbook refers to specific RGGI Model Rule provisions and requirements. The reader should note that this is done for informational purposes only and that each participating state's individual CO_2 Budget Trading Program regulations are controlling.

II. "Plain English" Summary of RGGI Model Rule Subpart XX-10: CO_2 Emissions Offset Projects

This summary addresses Subpart XX-10 of the Model Rule, which contains offset project requirements, the application and review process for offset projects, requirements for the accreditation of independent verifiers, and the award of CO_2 offset allowances. The summary also addresses definitions related to offsets at sections XX-1.2 and XX-10.2 of the Model Rule, which places limitations on the use of CO_2 offset allowances for compliance by regulated CO_2 budget sources.

Purpose. Model Rule section XX-10.1 states the purpose of Model Rule Subpart XX-10, which is to establish the requirements for awarding CO_2 offset allowances. It specifies that the regulatory agency will award CO_2 offset allowances to sponsors of CO_2 emissions offset projects or CO_2 emissions credit retirements that have reduced or avoided atmospheric loading of CO_2, CO_2-equivalents or sequestered carbon as demonstrated in accordance with the provisions of Model Rule Subpart XX-10. The requirements of Model Rule Subpart XX-10 seek to ensure that awards of CO_2 offset allowances represent CO_2 equivalent emission reductions or carbon sequestration that is real, additional, verifiable, enforceable, and permanent using the Model Rule's standards-based approach to these criteria (as opposed to a project-based approach).[1] Model Rule section XX-10.1 also specifies that CO_2 offset allowances may be used for compliance purposes by any CO_2 budget source (a regulated power plant), subject to the compliance limitations at Model Rule subsections XX-6.5(a)(3).

Definitions. Model Rule section XX-10.2 defines many key words and phrases applicable to offsets. Some other relevant terms are defined in Model Rule section XX-1.2. Key definitions include the following:

- offset project: includes all equipment, materials, items, or actions directly related to the reduction of CO_2 equivalent emissions or the sequestration of carbon specified in a Consistency Application

- project commencement: for an offset project involving physical construction, other work at an offset project site, or installation of equipment or materials, project commencement is the date such activity begins. For an offset project that involves implementing a management activity or protocol, project commencement is the date such activity is first implemented or such protocol first utilized

- project sponsor: is the CO_2 authorized account representative (natural person not corporate entity) for the general account of the offset project or CO_2 emissions credit retirement

General Requirements. Eligible types of offset projects are established at Model Rule subsection XX-10.3(a). The five categories of offset projects that may be eligible for the award of CO_2 offset allowances include the following:

[1] A "standards-based" approach prescribes requirements that apply to a category of offset projects. A project-based approach specifies a process that must be used for the evaluation of each offset project, but does not prescribe specific requirements that a project must meet.

(1) Landfill methane (CH_4) capture and destruction (Model Rule subsection XX-10.5(a))

(2) Reduction in emissions of sulfur hexafluoride (SF_6) from equipment in the electricity transmission and distribution sector (Model Rule subsection XX-10.5(b))

(3) Sequestration of carbon due to reforestation, improved forest management, or avoided conversion (Model Rule subsection XX-10.5(c))(DE, ME, MD, MA, NH, RI, VT) or conversion of land from non-forested to forested (CT and NY)

(4) Reduction or avoidance of CO_2 emissions by reducing combustion of natural gas, oil, or propane in an existing or new commercial or residential building due to end-use energy efficiency (Model Rule subsection XX-10.5(d))

(5) Avoided methane emissions from agricultural manure management and organic food waste through use of an anaerobic digester and capture and destruction of methane (Model Rule subsection XX-10.5(e))

Model Rule subsection XX-10.3(a) also establishes eligible locations for offset projects. Projects may be located in one or more RGGI participating states or in other U.S. jurisdictions that have established Memoranda of Understanding (MOUs) with regulatory agencies in all RGGI participating states to provide oversight support related to offset projects in such jurisdictions (Model Rule subsection XX-10.3(a)(2)).

Model Rule subsection XX-10.3(c) specifies the following general additionality requirements that apply to all offset projects (and emissions credit retirements, as applicable):

- No CO_2 offset allowances will be awarded for an offset project undertaken in order to comply with any local, state, or federal law, regulation, or administrative or judicial order (Model Rule subsection XX-10.3(c)(1));

- Offset projects with electricity generation components are not eligible for the award of CO_2 offset allowances, unless the legal rights to all attribute credits that will be generated by the offset project and that may be used for compliance with a renewable portfolio standard or other regulatory requirement are transferred to the regulatory agency or its agent (Model Rule subsection XX-10.3(c)(2));

- No CO_2 offset allowances will be awarded for offset projects that receive funding or other incentives from any system benefit fund (i.e., any fund collected directly from retail electricity and natural gas ratepayers) or that are funded from the proceeds of CO_2 allowance auctions (Model Rule subsection XX-10.3(c)(3));

- No CO_2 offset allowances will be awarded to offset projects or emissions credit retirements that are awarded credits or allowances under any other mandatory or voluntary greenhouse gas program (Model Rule subsection XX-10.3(c)(4)).

Model Rule subsection XX-10.3(d) establishes allocation, or crediting, periods for offset projects. The regulatory agency may award CO_2 offset allowances for an initial 10-year

allocation period for any offset project type. This 10-year allocation period may be extended once for an additional 10 years, subject to reapplication requirements, for a total period of 20 years. For afforestation offset projects, the regulatory agency may award CO_2 offset allowances for an initial 20-year allocation period, which may be extended twice, subject to reapplication requirements, for a total period of 60 years. For reforestation, improved forest management, or avoided conversion offset projects, the regulatory agency may award CO_2 offset allowances for an initial 25-year allocation period. At the end of the initial 25-year allocation period, or any subsequent crediting period, the regulatory agency may award CO2 offset allowances for a subsequent 25-year allocation period,

Model Rule subsections XX-10.3(e) through (f) establish the following additional requirements that apply to all offset projects:

- The project sponsor must provide the regulatory agency with access to an offset project site to inspect for compliance with Model Rule Subpart XX-10. If the project is not in a RGGI participating state, the project sponsor must provide access to the cooperating agency in the state where the project is located. (Model Rule subsection XX-10.3(e))

- If at any time the regulatory agency determines that a project sponsor has not complied with Model Rule Subpart XX-10, the regulatory agency may revoke and retire any and all CO_2 offset allowances in the project sponsor's general account and may revoke any approvals it has issued for an offset project. (Model Rule subsection XX-10.3(f))

Consistency Application Process. The application process for an offset project or emissions credit retirement to qualify for the award of CO_2 offset allowances is specified at Model Rule section XX-10.4.

The first step for both offset projects and emissions credit retirements is for the project sponsor to establish a general account in the CO_2 allowance tracking system, through the process specified at Model Rule subsection XX-6.2(b) (see Model Rule subsection XX-10.4(a)). All offset project and emissions credit retirement submissions to the regulatory agency must be from the authorized account representative (a "natural person" as opposed to an organization) for the general account of the project sponsor. In effect, the authorized account representative and the project sponsor are the same natural person.

The second step for both offset projects and emissions credit retirements is for the project sponsor to submit a Consistency Application in the approved form to the regulatory agency. The Consistency Application provides documentation about the offset project or emissions credit retirement to provide for regulatory agency review in order to determine whether the offset project or emissions credit retirement meets regulatory requirements at Model Rule sections XX-10.3, XX-10.4, and XX-10.5. Offset projects that receive a "consistency determination" are qualified for the award of CO_2 offset allowances, pending documentation of emission reductions or carbon sequestration through submission and regulatory agency approval of a periodic Monitoring and Verification Report. Emissions credit retirements that receive a consistency determination are awarded CO_2 offset allowances for the emissions allowances or credits that are retired, on a short ton of CO_2-equivalent basis.

Consistency Application Deadlines. Model Rule subsection XX-10.4(b) specifies Consistency Application submittal deadlines. For offset projects involving reforestation, improved forest management, or avoided conversion, a Consistency Application must be submitted within one year of project commencement, except for projects that have been awarded credits by a voluntary greenhouse gas reduction program as described at Model Rule Section XX 10.5(c)(10). For all other offset projects, a Consistency Application must be submitted within six months of project commencement (a term defined at Model Rule section XX-10.2). Failure to meet these deadlines will result in the denial of the Consistency Application. There are no comparable deadlines for submitting Consistency Applications related to emissions credit retirements.

Consistency Application Contents. A Consistency Application must be submitted in a format prescribed by the regulatory agency. Model Rule subsection XX-10.4(c)(1) specifies the contents of a Consistency Application for an offset project, as follows:

(1) The project sponsor's name, address, e-mail, telephone number, fax number and general account number;
(2) A description of the offset project, as required by the relevant provisions at Model Rule section XX-10.5;
(3) A demonstration that the offset project meets all applicable requirements in Model Rule Subpart XX-10;
(4) An emissions baseline determination, as required by the relevant provisions at Model Rule section XX-10.5;
(5) A description of the greenhouse gas emissions or carbon sequestration quantification, monitoring, and verification procedures to be used, as required by the provisions at Model Rule Subpart XX-10;
(6) A signed copy of the following statement:
"The undersigned project sponsor recognizes and accepts that the application for, and the receipt of, CO_2 offset allowances under the CO_2 Budget Trading Program is predicated on the project sponsor following all the requirements of Model Rule Subpart XX-10. The undersigned 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. I understand that eligibility for the award of CO_2 offset allowances under Model Rule Subpart XX-10 is contingent on meeting the requirements of Model Rule Subpart XX-10. I authorize the [REGULATORY AGENCY] or its agent to audit this offset project for purposes of verifying that the offset project, including the monitoring and verification plan, has been implemented as described in this application. I understand that this right to audit shall include the right to enter the physical location of the offset project. I submit to the legal jurisdiction of [RGGI PARTICIPATING STATE].";
(7) A signed statement and certification report from the project sponsor attesting that all offset projects for which the project sponsor has been awarded CO_2 offset allowances are in compliance with the requirements of the CO_2 Budget Trading Program in all RGGI participating states;
(8) A verification report and certification statement signed by a state-accredited independent verifier (see Model Rule section XX-10.6 for accreditation requirements). The certification statement attests that the independent verifier has reviewed the entire Consistency Application and evaluated the following:

- The adequacy and validity of information provided to demonstrate that the offset project meets the applicable requirements at Model Rule section XX-10.3 (general requirements) and Model Rule section XX-10.5 (category-specific requirements)
- The adequacy and validity of information provided to demonstrate baseline emissions, in accordance with the applicable requirements at Model Rule section XX-10.5
- The adequacy of the monitoring and verification plan, in accordance with the applicable requirements at Model Rule section XX-10.5
- Any other evaluations and statements that may be required by the regulatory agency

(9) The names of any other voluntary or mandatory programs to which greenhouse gas emissions data for the offset project have been or will be reported; and

(10) For offset projects located outside a RGGI participating state, a demonstration of compliance with the cooperating regulatory agency's requirements in the state or United States jurisdiction where the offset project is located.[2]

Verification of Consistency Application. Prior to submission to a state regulatory agency, the entire Consistency Application for an offset project must be reviewed, evaluated, and certified by an independent, state-accredited verifier. The Model Rule contains no similar verification requirement for Consistency Applications for emissions credit retirements.

Submission of Consistency Application. A Consistency Application must be submitted to the applicable regulatory agency in the state where the offset project is located. If the offset project is located in multiple participating states, the Consistency Application must be submitted to the applicable regulatory agency in the state where the majority of CO_2-equivalent emissions reductions or carbon sequestration is projected to occur. A Consistency Application for an offset project or emissions credit retirement may be submitted to only one participating state. (See Model Rule subsection XX-10.4(d).) If an offset project is located outside of the RGGI participating states, and in state with an MOU with the RGGI participating states, a Consistency Application may be submitted to any of the applicable RGGI participating states.

Agency Review of Consistency Application. Model Rule subsection XX-10.4(e) describes the process for regulatory agency review of a Consistency Application. After receiving a submission, the regulatory agency will notify the applicant within 30 days whether the Consistency Application is complete and ready for review. After a completeness determination, the regulatory agency may request additional information from the project sponsor if required to complete review of the Consistency Application. Within 90 days of the completeness determination, the regulatory agency will determine whether the application is consistent with the General Requirements (Model Rule section XX-10.3), Application Process (Model Rule section XX-10.4), and the applicable offset project standards (Model Rule section XX-10.5). If the project is found consistent with these regulatory requirements, the regulatory agency will issue a consistency determination. An offset project that receives a consistency determination is qualified for the award of CO_2 offset allowances. If the offset project is found inconsistent with any of these regulatory requirements, the regulatory agency will inform the project sponsor of the project's deficiencies.

[2] At this time, offset projects may be located only in a RGGI participating state. See Model Rule subsection XX-10.3(a) for more information.

Category-Specific Offset Project Standards. Model Rule section XX-10.5 specifies detailed requirements for each of the five categories of eligible offset projects. For each category of offset project, these standards specify category-specific eligibility requirements, including category-specific benchmarks and performance standards to evaluate project additionality; the contents of the project description that must be included in the Consistency Application; the emissions baseline determination (if applicable); calculation of emissions reductions or sequestration; and monitoring and verification requirements.

Landfill Methane Capture and Destruction Projects (Model Rule subsection XX-10.5(a))

Landfill gas offset projects capture and destroy methane from landfills, preventing the emission of methane to the atmosphere.

Eligibility

Model Rule subsection XX-10.5(a)(1) requires that landfill methane capture and destruction offset projects must occur at landfills that are not subject to federal New Source Performance Standards for municipal solid waste landfills (40 CFR 60, Subparts Cc and WWW).

Project Description

The Consistency Application must provide a project description that includes the following information as part of a detailed narrative of the offset project actions (Model Rule subsection XX-10.5(a)(2)):

- Documentation that the project meets eligibility requirements;
- Owner and operator of the offset project;
- Location and specifications of the landfill where the offset project will occur, including waste in place;
- Owner and operator of the landfill where the offset project will occur; and
- Specifications of the equipment to be installed and a technical schematic of the offset project.

Emissions Baseline

The emissions baseline represents the potential fugitive landfill emissions of methane, as represented by the methane collected and metered for thermal destruction. Baseline emissions are determined on an ongoing basis during the offset project allocation period, and are monitored during each reporting period. Model Rule subsection XX-10.5(a)(3) provides the formula for determining baseline CO_2-equivalent emissions. A ten-percent oxidation factor discount is applied to collected methane to represent the estimated portion of collected methane that would have eventually oxidized to CO_2 through the landfill cap if, in the absence of the offset project, the methane had not been collected.

Calculating Emissions Reductions

The CO_2-equivalent emissions reduction is equal to baseline methane emissions during the reporting period multiplied by a combustion efficiency factor (0.98) and the global warming potential for methane (23). Model Rule subsection XX-10.5(a)(4) provides the formula for calculating CO_2-equivalent emissions reductions.

Monitoring and Verification

Model Rule subsection XX-10.5(a)(5) specifies monitoring and verification (M&V) requirements. A landfill methane capture and destruction project must continuously monitor landfill gas capture, including flow rate and methane concentration. Landfill gas composition must be confirmed through landfill gas sampling and independent laboratory analysis using applicable U.S. EPA laboratory test methods.

The M&V plan is required as part of the Consistency Application. The M&V plan must include provisions for ensuring that measuring and monitoring equipment is maintained, operated, and calibrated based on manufacturer specifications.

Annual M&V reports must include monthly landfill gas volumetric flow rate and methane concentration data, including documentation that the methane was supplied to the combustion source.

Projects to Reduce Emissions of Sulfur Hexafluoride (SF_6) (Model Rule subsection XX-10.5(b))

SF_6 offset projects prevent emissions of SF_6 from equipment in the electricity and distribution sector through SF_6 leak detection and repair, capture and storage, recycling, and/or destruction.

Eligibility

Eligible SF_6 offset projects must involve incremental actions to reduce SF_6 emissions at transmission and/or distribution entities (a term defined at Model Rule section XX-10.2) from a specified baseline. These actions must be consistent with guidance from the High-voltage switchgear and controlgear - Part 303: Use and handling of sulphur hexafluoride (SF_6) and the Electric Power Research Institute, pursuant to Model Rule subsection XX-10.5(b)(1)(i). Eligible projects must also occur at a transmission and/or distribution entity that has an entity-wide SF_6 emissions rate that is lower than a specified emissions performance standard. This performance standard is based on average 2004 SF_6 emissions rates for U.S. EPA SF_6 Partnership utilities, by U.S. region. The SF_6 emissions performance standard does not apply if the project sponsor demonstrates that the project is being implemented at a transmission and/or distribution entity that serves a predominantly urban service territory, and two of the following factors prevent optimal management of SF_6:

- Entity is comprised of older than average transmission and distribution equipment in relation to the national average age of equipment;
- Majority of the entity's electrical load is served by underground equipment, and poor accessibility of such equipment precludes management of SF_6 emissions through regular ongoing maintenance;
- A substantial portion of equipment cannot be taken out of service as it would impair system reliability;
- Required equipment purpose or design for a substantial portion of equipment results in inherently leak-prone equipment.

Project Description

The Consistency Application must provide a project description that contains a detailed narrative of project actions, including the following:

- Documentation that the project meets eligibility requirements;
- A description of the transmission and/or distribution entity, including its service territory;
- Owner and operator of the transmission and/or distribution entity.

Emissions Baseline

Baseline emissions are determined based on entity-wide SF_6 emissions for the calendar year immediately preceding the calendar year in which the Consistency Application is submitted. For example, if the Consistency Application is submitted in 2015, then the baseline year would be 2014.

SF_6 emissions are determined through a mass-balance method. The transmission and/or distribution entity must track and account for all SF_6 use throughout its service territory in pounds of SF_6, including all electric transmission and distribution assets and all SF_6-containing and SF_6-handling equipment owned and/or operated by the entity (Model Rule subsection XX-10.5(b)(3)). Model Rule subsection XX-10.5(b)(3)(i) specifies the mass-balance method and Model Rule subsection XX-10.5(b)(3)(ii) specifies how emissions are calculated, including all of the SF_6-related actions and equipment that must be tracked and accounted for. Baseline emissions are represented in short tons of CO_2-equivalent.

Calculating Emissions Reductions

Emissions reductions represent the annual entity-wide reductions in SF_6 emissions for the reporting transmission and/or distribution entity relative to entity-wide SF_6 emissions during the baseline year. Emissions reductions are represented in short tons of CO_2-equivalent. Model Rule subsection XX-10.5(b)(4) specifies how SF_6 emissions reductions are calculated.

Monitoring and Verification

An M&V plan is required as part of the Consistency Application. The M&V plan must include an inventory management and auditing protocol and a process for quality assurance and quality control of inventory data (Model Rule subsection XX-10.5(b)(6)(iii)).

Annual M&V Reports must demonstrate annual entity-wide SF_6 emissions reductions and provide documentation to support emissions reduction calculations (Model Rule subsections XX-10.5(b)(3)(i)-(iii)). M&V Reports also must include the following documentation:

- Entity-wide log of facilities which procure and disburse SF_6, including the weight of cylinders before shipment and after return to each facility;
- Cylinder logs maintained and kept with each cylinder used to fill equipment or reclaim SF_6 from equipment;
- Current entity-wide inventory of all SF_6 equipment and all other SF_6-related items, such as cylinders, gas carts, and other storage containers.

Projects to Sequester Carbon through Reforestation, Improved Forest Management, or Avoided Conversion (Model Rule subsection XX-10.5(c)) (DE, ME, MD, MA, NH, RI, VT) and Projects to Sequester Carbon through Afforestation (NY and CT) (http://www.ct.gov/deep/lib/deep/air/regulations/mainregs/22a-174-31a.pdf ; http://www.dec.ny.gov/regs/47190.html)

Forest offset projects increase removals of CO_2 from the atmosphere, or reduce or prevent emissions of CO_2 to the atmosphere, through increasing and/or conserving forest carbon stocks. Reforestation offset projects sequester carbon by restoring tree cover on land that that currently has no, or minimal, tree cover. Improved forest management offset projects sequester carbon through management activities that maintain or increase carbon stocks on forested land relative to baseline levels of carbon stocks. Avoided conversion offset projects prevent the conversion of privately owned forestland to a non-forest land use by dedicating the land to continuous forest cover through a conservation easement or transfer to public ownership. Afforestation offset projects sequester carbon through the conversion of land from a non-forested to a forested condition.

Eligibility

Reforestation

Reforestation offset projects must occur on land that has had less than 10 percent tree canopy cover for at least 10 years immediately preceding project commencement, or has been subject to a Significant Disturbance that has removed at least 20 percent of the land's above-ground live biomass in trees.

Improved Forest Management

Improved forest management offset projects must occur on land that has greater than 10 percent tree canopy cover.

Avoided Conversion

Avoided conversion offset projects must occur on land that is suitable for conversion and has received a real estate appraisal that demonstrates the alternative land use has a higher market value than forestland.

Afforestation

To be eligible, afforestation offset projects must occur on land that has been non-forested for at least the 10 years immediately preceding project commencement. (CT and NY)

All forest projects must be managed according to sustainable forestry practices and be designed to promote/maintain native forests through the use of mainly native species and by avoiding the introduction of invasive, non-native species. If commercial timber harvests are planned or initiated within the Project Area, the Project Sponsor must demonstrate that the Forest Owner(s) employs and demonstrates sustainable long-term harvesting practices on all of its forest landholdings, including the Project Area.

Project Description

The project description in the Consistency Application must include the following information (Model Rule subsection XX-10.5(c)(2)):

- The owner(s) of the land within the offset project boundary.
- A detailed map of the land within the offset project boundary and areas adjacent to the offset project boundary.
- A list of the assessment areas by acreage within the project boundary (reforestation, improved forest management and avoided conversion projects only).
- A list of plant species to be planted or established via natural regeneration, and a forest management plan (afforestation projects only).
- A copy of the permanent conservation easement, if applicable.
- If a project is not located in a RGGI participating state, a written legal opinion confirming the enforceability of the permanent conservation easement, from either an attorney licensed to practice in the state or U.S. jurisdiction where the offset project is located or from the cooperating regulatory agency in that state or jurisdiction.

Carbon Sequestration Baseline – Reforestation, Improved Forest Management and Avoided Conversion

The baseline is an estimate of what would have occurred in the absence of a forest project. To establish baseline onsite carbon stocks, the carbon stock changes in each of the forest project's required onsite carbon pools (identified in the RGGI U.S. Forest Projects Protocol Sections 5.1 to 5.3) must be modeled over 100 years. Modeling must be based on inventoried carbon stocks at the time of the Forest Project's offset project commencement (or when first inventoried as is allowed for reforestation projects). Onsite carbon stocks are inventoried following the requirements in the RGGI U.S. Forest Projects Protocol Appendix and methods in Appendix B. Baseline onsite carbon stocks are estimated over 100 years at the time of the forest project's commencement.

In conjunction with modeling baseline onsite carbon stocks, a forecast of any harvesting that would have occurred in the baseline must be developed and converted to an average annual harvesting volume. From this, the amount of carbon that would have been transferred each year (on average) to long-term storage in wood products can be determined. Baseline harvesting is forecasted following the requirements in the RGGI U.S. Forest Projects Protocol Section 6 and carbon stored in wood products must be calculated following the requirements and methods in the RGGI U.S. Forest Projects Protocol Appendix C.

Carbon Sequestration Baseline – Afforestation

The existing sequestered carbon within the offset project boundary is calculated prior to project commencement and represents the project carbon sequestration baseline. No more than 12 months prior to project commencement, baseline carbon sequestration must be determined based on measurements from the following four carbon pools within the project boundary ():

- Live above-ground tree biomass,
- Live below-ground tree biomass,
- Soil carbon, and
- Dead organic matter, coarse woody debris.

If the baseline for the dead organic matter carbon pool is zero, or near zero, then measurement of this carbon pool during the subsequent allocation (crediting) period for the

offset project is optional. Carbon content also may be calculated for two optional carbon pools: live above-ground, non-tree biomass and dead organic matter (forest floor) ().

Carbon content must be calculated individually for each carbon pool within the offset project boundary. To increase the accuracy of measurement and verification, the project area must be divided into homogeneous sub-populations based on vegetation and tree species and site factors, such as soil type, elevation, slope, age class, etc.

CT and NY state regulations specify the method for measurement and calculation of carbon sequestration, including formulas, requirements for statistical confidence levels, a method for determining the minimum number of sampling plots, and requirements for following current forestry good practices for measuring carbon sequestration.

Calculating Net Carbon Sequestration – Reforestation, Improved Forest Management and Avoided Conversion

For each year, total net GHG reductions and GHG removal enhancements are calculated by summing a forest project's intended (primary) and unintended (secondary) effects as defined in Section 5 of the RGGI U.S. Forest Projects Protocol. If the result is positive, then the forest project has generated GHG reductions and/or GHG removal enhancements in the current year. If the result is negative, this indicates a reversal has occurred except as specified below (see Section 7).

For any given year, the primary effect is calculated by:

a. Taking the difference between actual onsite carbon stocks for the current year and actual onsite carbon stocks for the prior year
b. Subtracting from (a) the difference between baseline onsite carbon stocks for the current year and baseline onsite carbon stocks for the prior year
c. Adding to (b) the calculated difference between actual and baseline carbon in harvested wood products for the current year

Requirements and methods for quantifying primary and secondary effects are provided in Section 6 of the RGGI U.S. Forest Projects Protocol for each type of forest project. Secondary effects will almost always be negative (i.e. they will reflect an increase in GHG emissions caused by the offset project).

A Reversal Risk Adjustment is also applied to the number of CO_2 Offset Allowances awarded to a project based on the risk that an unintentional reversal will occur (including natural disturbances such a fires, pest infestations, or disease outbreaks). Each forest project's Reversal Risk Adjustment is determined by a project-specific reversal risk rating, as described in Section 7.2 and Appendix D of the RGGI U.S. Forest Projects Offset Protocol. The Reversal Risk Adjustment therefore acts as a general mechanism to address unintentional reversals.

Calculating Net Carbon Sequestration – Afforestation

Carbon sequestration is determined using a base-year approach, where net carbon sequestered is measured as a net increase in carbon relative to the base year. To account for potential losses of sequestered carbon, the calculated net change in carbon stock is discounted by ten percent, unless the project sponsor retains long-term insurance approved by the regulatory agency to account for any lost sequestered carbon for which CO_2 offset allowances

were awarded. Using this stock-change approach, CO_2 offset allowances are awarded based on the net amount of carbon sequestered during each reporting period.

Monitoring and Verification

Project Sponsors must submit an Offset Project Data Report each year according to the reporting schedule in State RGGI Regulations. The total carbon stock within the project boundary must be calculated no less frequently than every five years, except that the first M&V report for reforestation projects must be submitted within twelve years of project commencement. (Model Rule subsection XX-10.5(c)(5)). M&V Reports must include data from direct measurement of carbon content for all plots used to determine carbon content for the baseline and reporting period (Model Rule subsection XX-10.5(c)(5)(i)). The Consistency Application must include an M&V plan that specifies carbon measurement procedures, the designation of sub-populations within carbon pools, determination of a minimum number of sampling plots, and environmentally sustainable forestry management practices to be followed if timber is harvested. In order to harvest timber within the offset project boundary, certification of forest management practices must be obtained from the Forest Stewardship Council (FSC), Sustainable Forestry Initiative (SFI), American Tree Farm System (ATFS), or other similar organizations approved by the regulatory agency.

Carbon Sequestration Permanence – Reforestation, Improved Forest Management and Avoided Conversion

Permanence of forest project GHG reductions and removals is addressed through three mechanisms:

1. The requirement for all offset projects to monitor onsite carbon stocks, submit annual Offset Project Data Reports, and undergo third-party verification of those reports with site visits at least every six years for the duration of the project life.
2. The regulatory obligation for all intentional reversals of GHG reductions and GHG removal enhancements to be compensated for through retirement of other CO_2 Allowances.
3. The use of project-specific Reversal Risk Adjustments to address the risk of reversals of GHG reductions and GHG removal enhancements due to unintentional causes (including natural disturbances such a fires, pest infestations, or disease outbreaks).

While any forest project may record a conservation easement to reduce its reversal risk rating and associated Reversal Risk Adjustment, only avoided conversion projects are required to record a conservation easement with a provision to maintain the Project Area in forest cover or transfer the Project Area to public ownership.

Carbon Sequestration Permanence – Afforestation

To address carbon sequestration permanence, the land where the offset project is located must be placed under a legally binding permanent conservation easement approved by the regulatory agency. The easement must stipulate that the land will be maintained in a forested state in perpetuity, that the carbon density on the land will remain at or above the levels achieved at the end of the offset crediting period, and that the land will be managed in accordance with environmentally sustainable forestry practices.

Projects to Reduce or Avoid CO_2 Emissions from Building Sector Natural Gas, Oil, or Propane End-Use Combustion through End-Use Energy Efficiency (Model Rule subsection XX-10.5(d))

Building sector end-use energy efficiency offset projects reduce on-site combustion of fossil fuels through improvements to building energy efficiency.

Eligibility

End-use energy efficiency offset projects can be implemented at existing commercial or residential buildings or new buildings under limited conditions. To be eligible, a new building must either be designed to replace an existing building on the offset project site or be designed to be a zero-net-energy building (a term defined at Model Rule section XX-10.2).

An eligible offset project must use one or more of the following energy conservation measures (ECMs) specified at Model Rule subsection XX-10.5(d)(1)(i):

- Improvements in the energy efficiency of space heating and hot water such as reducing fossil fuel consumption through use of solar or geothermal energy;
- Improving heating distribution systems;
- Installing or improving energy management systems;
- Improving hot water distribution systems and reducing demand for hot water;
- Improving the thermal performance of the building envelope and/or reducing air leakage;
- Improving the passive solar performance of buildings and using renewable energy for active heating systems; and
- Switching to a less carbon-intensive fuel.

End-use energy efficiency projects must meet certain prescriptive and/or performance standards depending on the type of ECMs implemented (Model Rule subsection XX-10.5(d)(1)(ii)). Offset projects must meet installation best practice standards for heating, ventilation, and cooling (HVAC) equipment. If an offset project involves a new building or a whole-building retrofit (a term defined at Model Rule section XX-10.2), the buildings must meet prescribed whole-building energy performance standards.

ECMs must have a demonstrated market penetration rate (a term defined at Model Rule section XX-10.2) of less than 5 percent.

Project Description

The Consistency Application must provide a project description that contains a detailed narrative of project actions, including the following (Model Rule subsection XX-10.5(d)(2)):

- Documentation that the project meets eligibility requirements;
- Location and specifications of the building(s) where offset project actions will occur;
- Owner and operator of the building(s);
- The parties implementing the offset project, including lead contractor(s), subcontractors, and consulting firms;
- Specifications of equipment and materials to be installed as part of the offset project; and

- Building plans and offset project technical schematics.

Emissions Baseline

Model Rule subsection XX-10.5(d)(3) specifies the procedures for determining baseline CO_2 emissions for the building applications to be targeted by offset project ECMs. The emissions baseline is determined based on energy use for the applications to be targeted by each eligible ECM, derived from historic fuel use data, multiplied by an emissions factor and oxidation factor. Energy use for the building application to be targeted by each eligible ECM must be isolated through separate metering or energy simulation modeling. Model Rule subsection XX-10.5(d)(3)(ii) specifies how baseline energy use is determined, and Model Rule subsection XX-10.5(d)(3)(iii) specifies how baseline CO_2 emissions are determined.

Calculating Emissions Reductions

Model Rule subsection XX-10.5(d)(4) specifies how CO_2 emissions reductions are determined. Emissions reductions are based on annual energy savings by fuel type for each eligible ECM, relative to baseline energy use by the building applications targeted by the eligible ECM. Energy savings are multiplied by an emissions factor and oxidation factor to derive CO_2 emissions reductions. In determining both baseline energy use and reporting period energy use, the following must be done:

- ECMs (or the applications to be targeted by ECMs) must be isolated;
- Any interactions between ECMs (or the applications to be targeted by ECMs) must be accounted for;
- Adjustments must be made to account for any differing conditions (e.g., weather, changes in building occupancy or function).

Monitoring and Verification

The Consistency Application must include an M&V plan. All offset project documentation, including the Consistency Application and M&V Reports must be signed by a Professional Engineer.

M&V protocols for energy measurement and verification are specified at Model Rule subsection XX-10.5(d)(5) for existing commercial buildings, new commercial buildings, and all residential buildings (Model Rule subsections XX-10.5(d)(5)(i)(a)-(c)). Model Rule subsection XX-10.5(d)(5)(ii) specifies how each eligible ECM is to be isolated, through separate metering of energy use or energy simulation modeling. The sum of energy savings must be adjusted to account for any interaction of ECMs. Measurements must be based on actual energy usage data. Energy simulation modeling may be used only to determine the relative percentage contribution to total fuel usage (for each respective fuel type) of the building application targeted by the ECM. Model Rule subsection XX-10.5(d)(5)(iii) specifies how energy savings are calculated. Model Rule subsection XX-10.5(d)(5)(iv) specifies that projects consisting of similar measures implemented in multiple residential buildings, may use representative sampling to determine aggregate baseline energy use and energy savings. Sampling protocols must assure at least 95% confidence in reported values being within 10% of the true value. If sampling is used, a sampling plan must be certified by a state-accredited independent verifier.

Annual M&V Reports must be submitted. The independent verifier must perform a site audit as part of the first M&V Report to document project implementation, unless the project saves less than 1500 MMBtu of energy per year. For projects that save less than 1500 MMBtu of energy per year, the project sponsor must provide equipment specifications and invoices to the independent verifier to document project implementation.

Projects to Capture and Destroy Methane Emissions from Agricultural Manure Management Operations (Model Rule subsection XX-10.5(e))

Agricultural manure management offset projects capture and destroy methane from agricultural manure and organic food waste using anaerobic digesters.

Eligibility

To be eligible, an agricultural manure management offset project must capture and destroy methane (through the use of an anaerobic digester) that would have been generated from uncontrolled anaerobic storage of manure or organic food waste. Eligibility requirements include the following:

- Manure must constitute a majority of the digester's feedstock on an annual basis (Model Rule subsection XX-10.5(e)(1)(ii));
- Only food waste that would have been stored in anaerobic conditions in the absence of the project may be used as feedstock for the digester (Model Rule subsection XX-10.5(e)(1)(i)).

The general additionality provisions of Model Rule subsections XX-10.3(d)(2) and (3) do not apply to agricultural manure management offset projects if either of the following applies:

- The project is located in a state in which the market penetration rate of anaerobic digester projects is 5% or less (as determined by the formula provided at Model Rule subsection XX-10.5(e)(1)(iii)(a)).
- The project is located at a farm with 4,000 or fewer dairy cows or equivalent animal units (based on an average weight of 1,400 pounds per dairy cow).[3] If the project is a regional-type digester, annual manure input to the digester is designed to be less than the effluent from 4,000 or fewer dairy cows or equivalent animal units (based on a weight of 1,400 pounds per cow). (Model Rule subsection XX-10.5(e)(1)(iii)(b))

Project Description

The Consistency Application must include a project description that contains a detailed narrative of project actions and demonstrates that the project meets the eligibility requirements (Model Rule subsection XX-10.5(e)(2)). The project description must include the following information:

- Owner and operator of the offset project;
- Location and specifications of the facility where the offset project will occur;

[3] To meet this criterion if the project involves a regional anaerobic digester, total annual manure input to the anaerobic digester must be less than the average annual manure produced by a farm with 4,000 or fewer dairy cows or equivalent animal units.

- Owner and operator of the facility where the offset project will occur;
- Specifications of the equipment to be installed and a technical schematic of the offset project; and
- 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.

Emissions Baseline

The emissions baseline is determined based on the potential methane emissions that would have been produced under uncontrolled anaerobic storage conditions and released directly into the atmosphere in the absence of the project. Model Rule subsections XX-10.5(e)(3)(i)-(iii) specify procedures and formulas for determining baseline methane emissions. These procedures rely on site-specific information and consider the uncontrolled anaerobic storage scenario and local weather.

Calculating Emissions Reductions

Emissions reductions are determined based on the potential CO_2-equivalent methane emissions that would have been produced in the absence of the offset project under site-specific uncontrolled anaerobic storage conditions. Model Rule subsections XX-10.5(e)(3)(i)-(iii) specify the procedures and formulas for calculating potential methane emissions. Emissions reductions may not exceed the potential methane emissions of the anaerobic digester, as represented by the annual monitored methane that is produced by the digester.

If the offset project is a regional anaerobic digester that uses manure and/or organic food waste from multiple locations, any CO_2 emissions caused by transporting manure or food waste to the digester site must be subtracted from the emissions reduction calculation. Model Rule subsections XX-10.5(e)(4)(i) and (ii) specify how to calculate these deductions, taking into account the associated CO_2 emissions of fuel used to transport manure and organic food waste from off-site to the anaerobic digester.

Monitoring and Verification

Agricultural manure management offset projects must employ a metering system that monitors biogas volumetric flow rate and methane concentration (Model Rule subsection XX-10.5(e)(5)). If the project involves a digester receiving manure and/or organic food waste from multiple sources, the project sponsor must keep monthly records of manure and/or organic food waste received from each supplier, and each source must be sampled monthly to measure the percentage of volatile solids present before digestion (Model Rule subsections XX-10.5(e)(5)(i) and (ii)). Sampling of manure and/or organic food waste also must be performed for digester influent generated on-site, in order to monitor influent total solids and volatile solids. Independent laboratory analysis of the biogas methane composition must be performed quarterly, using applicable U.S. EPA test methods (Model Rule subsection XX-10.5(e)(5)(iv)).

The M&V plan included as part of the Consistency Application must include a quality assurance and quality control program for biogas metering equipment (Model Rule subsection XX-10.5(e)(5)(iii)). Model Rule subsection XX-10.5(e)(5)(iii) specifies applicable monitoring requirements for influent flow into the digester, influent total solids concentration, influent volatile solids concentration, and average monthly ambient temperature.

Annual M&V Reports must include monthly biogas volumetric flow rate and methane concentration data (Model Rule subsection XX-10.5(e)(5)). To demonstrate CO_2-equivalent emissions reductions, M&V Reports must also document required monitoring for each manure and/or organic food waste source, including influent flow into the digester, influent total solids concentration, influent volatile solids concentration, and average monthly ambient temperature for the location where the influent was generated.

Accreditation of Independent Verifiers. The contents of both offset project Consistency Applications and M&V Reports must be evaluated and independently verified by a state-accredited independent verifier. Model Rule section XX-10.6 addresses the accreditation of independent verifiers and the conduct and responsibilities of accredited independent verifiers.

Verifier Requirements

To become accredited, prospective verifiers must meet minimum requirements and organizational qualifications.

Model Rule subsection XX-10.6(a)(1) specifies minimum verifier requirements. Each accredited verifier must demonstrate knowledge of: utilizing engineering principles, quantifying greenhouse gas emissions, developing and evaluating air emissions inventories, auditing and accounting principles, knowledge of information management systems, knowledge of the requirements of Model Rule Subpart XX-10, and such qualifications as may be required by the regulatory agency to provide competent verification services for eligible offset categories at Model Rule section XX-10.5.

Model Rule subsection XX-10.6(a)(2) specifies organizational requirements. Verifiers must have no direct or indirect financial relationship with any offset project developer or project sponsor (beyond a contract for the provision of verification services). Verifiers must employ staff with professional licenses and experience appropriate to the offset project categories for which they provide verification services. Verifiers must hold one million dollars of professional liability insurance. A verifier must demonstrate that it has implemented an adequate management protocol to identify potential conflicts of interest with regard to an offset project, offset project developer, or project sponsor, or any other party with a direct or indirect financial interest in an offset project. The management protocol must provide for the remedy of any such conflicts of interest prior to the provision of verification services.

A prospective verifier may be required to successfully complete a training course, workshop, or test developed by the regulatory agency prior to submitting an application for accreditation.

Application for Accreditation

The verifier should submit an application for accreditation to the state regulatory agency that will be reviewing the offset project Consistency Application or M&V Report for which the verifier will provide verification services. However, a participating state may recognize the accreditation of another participating state (Model Rule subsection XX-10.6(d)). Therefore, a verifier may ultimately become accredited in more than one participating state through submission of an accreditation application to a single state.

Model Rule subsection XX-10.6(b) specifies the contents of an application for accreditation, which include: documentation that the verifier has at least two years of experience

related to relevant minimum requirements specified at Model Rule subsection XX-10.6(a)(1); documentation that the verifier has successfully completed any required training course, workshop, or test; a sample of at least one work product that provides supporting evidence that the verifier meets minimum requirements and organizational requirements at Model Rule subsections XX-10.6(a)(1)-(2); documentation of professional liability insurance; and documentation of an adequate management protocol to identify and remedy any potential conflicts of interest issues that may arise in the course of providing verification services.

The regulatory agency will approve or deny a complete application for accreditation within 45 days after submission. Upon approval of an accreditation application, a verifier is accredited for a period of three years.

Conduct of Accredited Verifiers

Prior to engaging with a project sponsor to provide verification services for an offset project, an accredited verifier must disclose all relevant information to the regulatory agency to allow for evaluation of potential conflicts of interest with regard to an offset project. The verifier must disclose information concerning its ownership, past and present clients, related entities, and any other facts or circumstances that have the potential to create a conflict of interest(Model Rule subsection XX-10.6(e)(1)). In addition, verifiers have an ongoing obligation to disclose to the regulatory agency any facts or circumstances that may create a conflict of interest with respect to an offset project, offset project developer, or project sponsor (Model Rule subsection XX-10.6(e)(2)).

If the regulatory agency determines that a verifier has a conflict of interest related to an offset project, offset project developer, or project sponsor, it may reject a verification report and certification statement submitted as part of Consistency Application or M&V Report. This would result in the application or report being considered incomplete.

The regulatory agency may revoke the accreditation of a verifier at any time for cause, for the following: failure to fully disclose any issues that may lead to a conflict of interest situation with respect to an offset project, offset project developer, or project sponsor; the verifier is no longer qualified due to changes in staffing or other criteria; negligence or neglect of responsibilities under Model Rule Subpart XX-10; and intentional misrepresentation of data or other fraud.

Award and Recordation of Allowances. Model Rule subsection XX-10.7(a) describes how offset allowances will be awarded and recorded. Following the issuance of a consistency determination for an offset project and the approval of an M&V Report for the project, the regulatory agency will award one CO_2 offset allowance for each ton of demonstrated reduction in CO_2 equivalent emissions or ton of sequestered CO_2. Similarly, following the issuance of a consistency determination for an international emissions credit retirement and the occurrence of a stage two trigger event, the regulatory agency may award offset allowances upon retirement of the credits in RGGI-COATS (Model Rule subsection XX-10.3(b)). All CO_2 offset allowances are recorded in the Project Sponsor's general account (Model Rule subsection XX-10.7(a)(2)). The Model Rule does not specify procedures or timetables for recordation of allowances.

M&V Report Submissions. M&V Reports may be submitted only for offset projects that have received a consistency determination from a regulatory agency. M&V Reports must be submitted to the regulatory agency that issued the consistency determination. Model Rule subsection XX-10.7(b) specifies deadlines for the submission of M&V Reports for an offset

project. An M&V Report must be submitted within six months following the completion of the last calendar year during which the offset project achieved CO_2 equivalent reductions or sequestration of CO_2 for which the project sponsor seeks the award of CO_2 offset allowances. For all offset project categories except forest projects, M&V Reports must be submitted annually; for the forest offset category, M&V Reports must be submitted no less frequently than every five years (these requirements are referenced in the respective offset project standards at Model Rule section XX-10.5).

M&V Report Contents. The M&V Report must include the following information (Model Rule subsection XX-10.7(c)):

- The project sponsor's name, address, e-mail address, telephone number, fax number, and account number;

- The CO_2 emissions reduction or sequestration determination for the reporting period, including a demonstration that the project sponsor complied with the required quantification, monitoring, and verification procedures at Model Rule section XX-10.5 and those specified in the M&V plan contained in the approved Consistency Application for the offset project;

- A statement (described at Model Rule subsection XX-10.7(c)(3)) signed by the project sponsor, attesting that the offset project is in compliance with Model Rule section XX-10, the project sponsor holds legal rights to the offset project (or represents a party that does), and authorizing the regulatory agency to audit the offset project;

- A certification signed by the project sponsor certifying that all offset projects for which the project sponsor has received offset allowances are in compliance with the applicable requirements of the CO_2 Budget Trading Program in all RGGI participating states;

- A verification report and certification statement signed by a state-accredited independent verifier that documents that the verifier has reviewed and evaluated the M&V Report based on the requirements at Model Rule section XX-10.5 and in the M&V plan contained in the Consistency Application for the offset project, and any applicable guidance issued by the appropriate regulatory agency;

- Disclosure of any voluntary or mandatory programs to which greenhouse gas emissions data related to the offset project has been or will be reported; and

- For offset projects located outside a RGGI participating state, a demonstration that the project sponsor has complied with all requirements of the cooperating regulatory agency in the U.S. state or jurisdiction where the offset project is located.

Verification of M&V Report. Prior to submission to the regulatory agency, the entire M&V Report must be reviewed, evaluated, and certified by an independent state-accredited verifier.

Agency Review of M&V Report. An M&V Report must be submitted in an approved form and must be determined by the regulatory agency to be complete for the purpose of commencing review. The regulatory agency will approve or deny a complete M&V Report within 45 days following receipt of a complete M&V Report. A complete M&V Report is one that is in an approved form and is determined by the regulatory agency to be complete for the purposes of commencing regulatory review. Issuance of a completeness determination does not prevent the regulatory agency from requesting additional information if necessary to enable the regulatory agency to complete its review of an M&V Report.

III. Steps to Apply for the Award of CO_2 Offset Allowances from Offset Projects

This part of the Offset Handbook presents a step-by-step guide to the submission and review of offset projects and the award of CO_2 offset allowances from offset projects. These requirements were developed to ensure that offset projects represent CO_2-equivalent emissions reductions or carbon sequestration that is real, additional, verifiable, enforceable, and permanent. Applying for the award of CO_2 offset allowances involves a two-step process. The sponsor of a proposed offset project ("project sponsor") must submit a Consistency Application to demonstrate that the project meets the relevant state regulatory requirements. Consistency Applications must be submitted to the RGGI participating state where the majority of CO_2-equivalent emissions reductions or carbon sequestration is expected to occur. Projects that have been deemed consistent with state regulatory requirements must submit ongoing M&V Reports demonstrating the achievement of CO_2-equivalent emissions reductions or carbon sequestration prior to any award of CO_2 offset allowances by a RGGI participating state.

III.1 Develop Plan and Schedule Based on Detailed Study of State Regulations, Forms and Instructions[4]

Individuals seeking the award of CO_2 offset allowances for offset projects under state CO_2 Budget Trading Program regulations should start with the following steps:

(1) Study in detail the applicable state CO_2 Budget Trading Program regulations, including definitions and eligibility criteria, to assess whether the contemplated project would meet regulatory requirements. Contact the appropriate state regulatory agency with questions.

(2) Develop a plan and schedule that identifies critical path items and timing for the submission of an offset project Consistency Application and required periodic M&V Reports.

Study Regulations and Application Materials

Applicable state CO_2 Budget Trading Program regulations govern offset project eligibility, project emissions quantification (determination of emissions baseline and emissions reductions), monitoring and reporting, and the award and use of CO_2 offset allowances. Offset project sponsors should understand that regulatory requirements addressing project eligibility are designed to ensure that CO_2 offset allowances are awarded only to those offset projects that are “additional” -- projects that would otherwise not have been undertaken in the absence of the CO_2 Budget Trading Program. To avoid having to evaluate additionality on a case-by-case basis, the Model Rule includes both generic and category-specific eligibility requirements for offset projects. Projects that cannot satisfy those requirements will not qualify for the award of CO_2 offset allowances. Links to state regulations are available at http://rggi.org/states/state_regulations.

Project sponsors also should clearly understand the methods that must be used to quantify project emissions or carbon sequestration baselines and determine emissions

[4] This discussion focuses on the aspects of offset projects directly related to state CO_2 Budget Trading Program regulations and does not discuss other project elements such as feasibility studies; options for roles in project development, finance, and construction; and safety, environmental, interconnection, siting, and construction permits and licenses.

reductions or carbon sequestration. Project sponsors also should familiarize themselves with monitoring and verification requirements.

Project sponsors should study Consistency Application and M&V Report materials for the category of offset project they are contemplating. These materials include detailed instructions that explain project documentation that must be provided to demonstrate project eligibility and emissions reductions or carbon sequestration achieved by a project.

Develop Plan and Schedule

If it appears to a project sponsor that the contemplated offset project could satisfy regulatory requirements, the project sponsor should develop a plan and schedule that dovetails with the regulatory requirements and project documentation requirements contained in state application materials. For example, an offset project Consistency Application is due within six months after the offset project is commenced[5] and the initial M&V Report is due annually within six months after completion of the last year for which CO_2 offset allowances are sought.[6] Thus, for a project commenced July 1, 2015, the Consistency Application is due by January 1, 2016. Assuming that the project sponsor plans to seek the award of CO_2 offset allowances for the first year of project operation (i.e., July 1, 2015 through June 30, 2016), then the initial M&V Report would be due on or before January 1, 2017. Time must be scheduled for making arrangements to retain an independent state-accredited project verifier and to allow the accredited verifier to review and evaluate the Consistency Application and/or M&V Report prior to its submission to the applicable state regulatory agency. Project sponsors should note that state regulatory agencies have up to 30 days after submission of the Consistency Application to determine whether it is complete.[7] Similarly, the state regulatory agency has up to 90 days to arrive at a consistency determination.[8] Thus, depending on the completeness and quality of the Consistency Application, a minimum of four months could elapse before a project sponsor receives an evaluation of offset project consistency from a state regulatory agency. This timeline could lengthen if a Consistency Application is deemed incomplete and requires follow-up from the project sponsor.

Project Location

An offset project must be located in a RGGI participating state, or be located in a state that has entered into an MOU with the RGGI states, as described in the paragraph below.[9] Project sponsors should take their questions to the environmental regulatory agency in the state where the offset project is located. Should a project sponsor decide to pursue a project located in more than one participating state, Model Rule subsection XX-10.3(a)(2)(i) indicates that the regulatory agency to which the Consistency Application must be submitted is the one for the participating state where the larger part of the emissions reductions or carbon sequestration due to the offset project is projected to occur.

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[5] This requirement applies to offset projects commenced on or after January 1, 2009.

[6] For afforestation offset projects, total carbon stock must be calculated not less than every five years.

[7] Because timeframes for state regulatory agency review may differ by state, project sponsors should consult applicable state regulations.

[8] Because timeframes for state regulatory agency review may differ by state, project sponsors should consult applicable state regulations.

[9] A participating state is a state that has promulgated a CO_2 Budget Trading Program regulation. The participating states currently consist of CT, DE, MA, MD, ME, NH, NY, RI, and VT.

Project sponsors contemplating an offset project located outside a participating state, should note that such a jurisdiction must enter into a memorandum of understanding (MOU) with all RGGI participating states in order for an offset project located in that jurisdiction to be eligible under state CO_2 Budget Trading Program regulations. Execution of such an MOU is at the discretion of the RGGI participating states and any counterpart jurisdiction. As of April 2015, the RGGI participating states have not been approached by any other jurisdictions interested in executing an offset MOU, and there are no active efforts to negotiate such an MOU with another jurisdiction.

III.2 Enter into Necessary Agreements with Other Parties

Project sponsors who decide to proceed with an offset project may need to make arrangements or enter into agreements with a variety of parties, as applicable, including the following:

- Independent, state-accredited verifier(s) to review the offset project Consistency Application and M&V Reports. The same verifier may be used for evaluating both the Consistency Application and subsequent M&V Reports, but this is not required.

- Owners and operators of land and/or facilities where the offset project will occur and owners of the equipment and material used as part of the offset project. Note that both the Consistency Application and M&V Report require the project sponsor to attest that he or she or the organization she/he is employed by (the project sponsor organization) holds the legal rights to the offset project, or has been assigned rights to the offset project by the party(ies) that holds such rights. If the project sponsor or project sponsor organization does not own the land or facilities where the offset project will occur or equipment or material used as part of the offset project, several issues require agreement among applicable parties in order for the project sponsor to make the above assertion. These include assignment of ownership rights to greenhouse gas emissions reductions or carbon sequestration achieved by the offset project, including rights to CO_2 offset allowances awarded for the project, access to and use of property and/or facilities, and effects of various contingencies. These issues are typically addressed through a contract called an emissions reduction purchase agreement (ERPA).[10]

- Project developers, contractors, and consultants engaged to implement the offset project. Agreements with these parties typically address performance terms and conditions, contingencies, insurance, and performance assurance. In addition, note that both the Consistency Application and M&V Report require the project sponsor to attest that he or she or the organization she/he is employed by (the project sponsor organization), holds the legal rights to the offset project, or has been assigned rights to the offset project by the party(ies) that holds such rights. Agreements with implementing parties, depending on their roles, may need to include assignment of rights to the offset project and any CO_2 offset allowances awarded for the project.

- Attorneys to negotiate and draft a variety of contracts that, among other items, address who will hold the legal rights to the offset project and any CO_2 offset

[10] For more information about ERPAs, consult the International Emissions Trading Association, at http://www.ieta.org.

allowances awarded for the project. For offset projects with an electric generation component, all attribute credits, except CO_2 offset allowances, related to the offset project must be assigned through contract to the state regulatory agency (attribute credit transfer agreement).[11] For afforestation offset projects, an attorney may be needed to facilitate placement of the land where the offset project is located under a permanent conservation easement.

The project sponsor should allow sufficient time to negotiate and resolve relevant issues with these parties prior to submission of an offset project Consistency Application. Although the Consistency Application and M&V Report require identification of the independent, state-accredited verifier that has reviewed the application or submittal materials, the Model Rule does not require project sponsors to submit copies of contracts or agreements with the parties listed above as part of a Consistency Application or M&V Report. However, documents demonstrating assignment of rights to an offset project and any CO_2 offset allowances awarded for the project should be made available to the independent verifier as part of its review. These documents also may be requested by the state regulatory agency in the course of Consistency Application review in order to verify attestations made by the project sponsor.

Engagement with Independent, Accredited Verifier(s)

Both the Consistency Application and each M&V Report must include a certification statement and verification report from a state-accredited independent verifier. The verifier must be accredited by the RGGI participating state where the offset project is located. A participating state may recognize the accreditation of a verifier by another RGGI participating state. State-accredited verifiers are listed at http://www.rggi.org/offsets/verification/accredited_verifiers.

In addition to being accredited, the verifier also must disclose any facts or circumstances that may give rise to a conflict of interest with regard to an offset project sponsor, offset project developer, or any other party with a direct or indirect financial interest in the offset project for which the verifier is providing verification services. The responsibility for determining a potential conflict of interest lies with both the accredited verifier and the state regulatory agency. Prior to engaging in verification services for an offset project sponsor, the verifier must disclose all relevant information about potential conflicts of interest to the regulatory agency to allow for an evaluation of potential conflict of interest with respect to the offset project, offset project sponsor, offset project developer, or other parties involved in the implementation of the offset project. This is accomplished through the filing by the verifier of a Pre-Engagement Conflict of Interest Disclosure to the state regulatory agency that will be reviewing the Consistency Application or M&V Report. The accredited verifier must disclose the proposed verification engagement and any information concerning its ownership, related entities, past and current clients, and any other facts or circumstances that have the potential to create a conflict of interest with respect to the offset project. If the verifier, for example, is an owner or affiliate of the project developer or project sponsor, or, conversely, if the project developer or project sponsor is an owner or affiliate of the verifier, or if there are other financial or non-financial relationships among the parties, there may be a potential conflict of interest. Unless the regulatory agency allows for a potential conflict to be remedied, it may be necessary for the project sponsor to choose a different verifier. The Model Rule does not specify a timetable for the regulatory agency to complete its evaluation of a verifier's independence with respect to an offset project verification engagement. Thus, project sponsors should include in their project

[11] Not all RGGI participating states permit offset projects with electric generation components. Projects sponsors should consult applicable state regulations.

schedules adequate time for the verifier's independence to be evaluated by the regulatory agency.

If the verifier is both appropriately accredited and free of conflicts of interest (i.e., independent), it can conduct its review and evaluation of the offset project Consistency Application and/or M&V Report. Notwithstanding regulatory agency approval to proceed with an offset project verification engagement, the regulatory agency may reject a verification report and certification statement if it subsequently determines that the accredited verifier in fact had a conflict of interest related to the offset project, offset project developer, project sponsor, or other party involved in the implementation of the offset project.

Agreements with Owners and Operators of Land or Facilities Where Offset Projects Will Occur

Project sponsors may need to enter into agreements with other parties for offset projects where the project sponsor does not own the land or the facilities (e.g., solid waste landfills, electricity transmission and distribution assets, buildings, manure digesters) where the offset project will occur.

The Model Rule requires that the project sponsor holds the legal rights to the offset project or has been granted the right (e.g., power of attorney) to act on behalf of a party that holds the legal rights to the offset project. The project sponsor also is required in the Consistency Application to attest that he or she or the project sponsor organization (the employer of the project sponsor) holds such rights or has been granted the right to act on behalf of a party that holds such rights. A project sponsor or project sponsor organization acting as an agent for a party claiming to hold the legal rights to an offset project should conduct reasonable inquiries to confirm that the party does in fact hold such rights. In such a case, the project sponsor is responsible for conducting any negotiations with the party that holds the rights to the offset project and obtaining written documentation assigning the project sponsor as the agent for the party holding such rights.

The Model Rule also requires the project sponsor to authorize the reviewing state regulatory agency or its agent (e.g., contractor) to audit the offset project, including the right to enter the physical location of the project. The project sponsor is responsible for conducting any negotiations with owners or operators of the land or facility where the offset project is located and obtaining any documentation of permission to enable such on-site audits to be performed by the regulatory agency.

Engagements with Project Developers, Contractors, and Consultants

The Model Rule leaves legal arrangements that specify engagements among project developers, contractors, consultants, and independent verifiers as the responsibility of the project sponsor. Agreements with these parties typically address performance terms and conditions, contingencies, insurance, and performance assurance. In addition, both the Consistency Application and M&V Report require the project sponsor to attest that he or she or the organization she/he is employed by (the project sponsor organization), holds the legal rights to the offset project, or has been assigned rights to the offset project by the party(ies) that holds such rights. Agreements with implementing parties, depending on their roles, may need to include assignment of rights to the offset project and any CO_2 offset allowances awarded for the project.

Note that for building energy-efficiency offset projects, all project documentation submitted as part of an offset project Consistency Application and M&V Report must be reviewed and signed by a Professional Engineer (PE), identified by license number. The Model Rule does not prohibit the project sponsor from using its in-house PE or its regular consulting PE to perform such a function.

Engagements with Attorneys

The project sponsor is free to use its in-house or outside legal counsel in drafting necessary project legal documents and documentation, as appropriate. For projects that may involve complex arrangements between owners, operators, and project sponsors, the use of independent counsel is recommended to ensure that legally binding agreements exist to document that the project sponsor holds, or has been assigned by appropriate parties, legal rights to the offset project. For afforestation offset projects, project sponsors should consider use of independent counsel with special expertise in the execution of conservation easements, as placement of land within the offset project boundary under a permanent conservation easement is a key category-specific project eligibility requirement.

III.3 Commence the Project

Once all arrangements have been made with the parties who will be involved in the development and implementation of the offset project, the next step is to implement the project. When considering the timing of project implementation, offset project sponsors should note that a Consistency Application must be submitted within six months of project commencement.[12] This provides a level of assurance that the project is being initiated with the intent of seeking to qualify for the award of CO_2 offset allowances. Project sponsors should allow enough time to compile a substantial portion of the project documentation that will be required in the Consistency Application prior to project commencement, in order to allow enough time for review of project documentation by a state-accredited independent verifier and timely submission of the Consistency Application.

"Project commencement" is a defined term in the Model Rule, and means the date that project activity began for an offset project involving physical construction, other work at an offset project site, or installation of equipment or materials. For an offset project that involves the implementation of a management activity or protocol, project commencement is the date on which that activity is first implemented or that protocol is first utilized. Date of project commencement does not include the point in time where project planning or feasibility studies may have begun.

"Offset project" also is a defined term in the Model Rule, and includes all equipment, materials, items, or actions directly related to the anticipated reduction of greenhouse gas emissions or sequestration of carbon that will occur as a result of the offset project and that are specified in the offset project Consistency Application. Equipment, materials, items, or actions unrelated to offset project greenhouse gas emissions reductions or carbon sequestration, but that occur at the same location as the offset project, are not considered part of an offset project.

III.4 Designate Project Sponsor and Authorized Account Representative for RGGI General Account

The offset project developer must designate an individual person to represent the offset project for all applications and submittals to the state regulatory agency. This same person

[12] This requirement applies to offset projects commenced on or after January 1, 2009.

must also be the Authorized Account Representative (AAR) for the general account in the RGGI CO_2 Allowance Tracking System (RGGI-COATS) into which any awarded CO_2 offset allowances will be transferred. This natural person is referred to as the offset "project sponsor". This person must be legally empowered to represent the offset project by the party that holds the legal rights to the offset project. This party that holds the rights to the offset project may be the project sponsor himself or herself, the institutional employer of the project sponsor (project sponsor organization), or a third party that has designated the project sponsor as its agent to legally represent it with respect to the offset project. The project sponsor must make a number of legal attestations in filings with the state regulatory agency.

Offset project developers should consult the following references for details about how to open a general account in RGGI-COATS:

- RGGI-COATS User's Guide for Version 2.2 (July 23, 2009)
- RGGI-COATS Frequently Asked Questions (FAQs) (April 23,2009)

These resources are available at http://www.rggi-coats.org, under the reference section.

Before the Consistency Application can be completed, the project sponsor must establish a general account and obtain an offset project ID code through the RGGI CO_2 Allowance Tracking System (RGGI COATS). The project sponsor identified in the Consistency Application must be the same as the Authorized Account Representative for the RGGI COATS general account identified in the Consistency Application. For information about establishing a RGGI COATS general account and offset project ID code, consult the RGGI COATS User's Guide, available at http://www.rggi-coats.org.

III.5 Provide Consistency Application Information and Documentation

A Consistency Application must be submitted to allow the state regulatory agency to determine if an offset project is eligible under state CO_2 Budget Trading Program regulations and qualifies for the award of CO_2 offset allowances. An offset project that receives a consistency determination from the state regulatory agency is qualified for the award of CO_2 offset allowances during the offset project's allocation period, based on demonstrated greenhouse gas emissions reductions or carbon sequestration documented in periodic M&V Reports.

The contents of the model Consistency Application are specified by Model Rule subsection XX-10.4(c)(1). A Consistency Application must be submitted in a format prescribed by the state regulatory agency (Model Rule subsection XX-10.4(c)(3)).[13] Official state Consistency Applications may be accessed through http://www.rggi.org/offsets/process/application_materials. These official state-specific forms are based on model forms, also available for reference at http://www.rggi.org/model_applications.

There is a separate model Consistency Application packet for each eligible offset project category. Each application packet is comprised of an instruction packet and the application forms. The model Consistency Application consists of three parts, each comprised of specified forms and required documentation that must be submitted directly or as an attachment to a form.

[13] If a state requires only electronic submission of an offset application via RGGI COATS then the original signed documents must be available upon request.

The model Consistency Application typically consists of a coversheet and nine additional forms[14] divided into three parts, as follows.

Part 1. General Information Forms

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

Part 2. Category-Specific Information and Documentation Forms

- Form 2.1 – Project Description
- Form 2.2 – Demonstration of Eligibility
- Form 2.3 – Emissions/Sequestration Baseline[15]
- Form 2.4 – Monitoring and Verification Plan

Part 3. Independent Verification Form

- Form 3.1 – Independent Verifier Certification Statement and Report

Consistency Application forms have numeric identifiers. The numerical identification has two elements: the first number indicates whether the form belongs to Part 1 (General Information), Part 2 (Category-Specific Information), or Part 3 (Independent Verification). The second number denotes a specific form. Table 1 displays the organization of the Consistency Application forms by offset project category, with the appropriate forms listed for each category.

Each category-specific model Consistency Application packet includes detailed instructions that address the required information and documentation that must be submitted for each of the forms. In addition, the forms include many embedded instructions.

Official state Consistency Applications and state-specific instructions for each eligible offset category are available through http://www.rggi.org/market/offsets/process/application_materials

[14] The number of forms differs by offset category in some instances, as shown in Table 1.

[15] Not required for landfill methane or agricultural manure projects.

Table 1
Organization of Consistency Application Forms

	Landfill Methane Projects	Sulfur Hexafluoride Projects	Reforestation, Improved Forest Management and Avoided Conversion Projects (DE, ME, MD, MA, NH, RI, VT)	Afforestation Projects (CT and NY only)	End-Use Energy Efficiency Projects	Agricultural Manure Projects
Coversheet	1.1	1.1	1.1	1.1	1.1	1.1
General Information	1.2	1.2	1.2	1.2	1.2	1.2
Attestations	1.3	1.3	1.3	1.3	1.3	1.3
Project Sponsor Agreement	1.4	1.4	1.4	1.4	1.4	1.4
Disclosure of GHG Emissions Data Reporting	1.5	1.5	1.5	1.5	1.5	1.5
Project Description	2.1	2.1	2.1	2.1	2.1	2.1
Demonstration of Eligibility	2.2	2.2	2.2	2.2	2.2	2.2
Emissions/Sequestration Baseline	N/A	2.3	2.3	2.3	2.3	N/A
Monitoring and Verification Plan	2.3	2.4	2.4	2.4	2.4	2.3
Reversal Risk Rating/Carbon Sequestration Permanence	N/A	N/A	2.5	2.5	N/A	N/A
Verifier Certification Statement and Report	3.1	3.1	3.1	3.1	3.1	3.1

III.5.1 General Information Forms

The general information forms in Part 1 of the model Consistency Application provide means for applicants to demonstrate satisfaction of regulatory requirements that apply to all eligible offset categories.

Form 1.1 – Coversheet

Form 1.1, the Coversheet, is an essential part of the Consistency Application. To aid project sponsors in identifying all the information and required material that must be submitted as part of the Consistency Application, Form 1.1 constitutes a coversheet checklist of required forms for a complete application. If a required form is not submitted, the Consistency Application will not be considered complete for commencement of review by the state regulatory agency.

Form 1.2 – General Information

The general information form provides for the submission of four sets of information: (1) general summary information about the offset project, (2) information about the offset project sponsor and project sponsor organization, (3) information about the RGGI-COATS general account held by the project sponsor, and (4) information about the state-accredited independent verifier and its point of contact for the project. For emission credit retirements, no information is required for an independent verifier, as one is not required.

Detailed instructions for completing the general information form are provided in the Consistency Application. Note that the project sponsor must open a general account in RGGI-COATS before all the information required to complete the general information form, including RGGI-COATS account number, can be provided.

Form 1.3 – Attestations

Form 1.3 provides for project sponsor certifications that must be made to demonstrate that an offset project or emissions credit retirement conforms with the four general additionality requirements for offset projects and emission credit retirements stipulated by Model Rule subsections XX-10.3(c)(1), XX-10.3(c)(2), XX-10.3(c)(3), and XX-10.4(c)(4), respectively:

1. The offset project is not required pursuant to any local, state, or federal law, regulation, or administrative or judicial order. This general additionality provision addresses “regulatory additionality”, ensuring that the offset project is not being driven by a government mandate.

2. The offset project has not and will not be awarded credits or allowances under any other mandatory or voluntary greenhouse gas program. Similar to item number one above, this general additionality provision addresses credit-based incentives that may be provided through other market-based incentive programs other than the CO_2 Budget Trading Program, and functionally requires an offset project to “pick a market” from which it seeks incentives. This provision precludes an offset project from seeking greenhouse gas credits or allowances from multiple mandatory or voluntary programs.

3. The offset project has not and will not receive any funding or other incentives from system benefit programs or programs funded through CO_2 Budget Trading Program CO_2 allowance auction proceeds. A system benefit fund is defined as any fund collected directly from retail electricity or natural gas ratepayers. This general additionalty provision addresses other programmatic financial incentives that may be driving implementation of an offset project and that are funded by energy ratepayers directly through charges on their energy bills or indirectly through the operation of the CO_2 Budget Trading Program.

4. The offset project does not include an electric generation component, or if the offset project does include an electric generation component, legal rights to any and all attribute credits generated from the operation of the offset project that may be used for compliance with a renewable portfolio standard (RPS) or other regulatory requirement, have been or will be transferred to the state regulatory agency. An attribute credit transfer agreement, if applicable, must be attached to the form. This general additionality provision addresses credit-based incentives that may be provided through other market-based incentive programs other than the CO_2 Budget Trading Program, and functionally requires an offset project to "pick a market" from which it seeks incentives.

These general additionality requirements apply to all eligible categories of offsets and serve to exclude from eligibility those projects that would otherwise have occurred due to regulatory requirements or consent or administrative orders, incentives provided through market transformation programs that are funded by electricity or natural gas ratepayers or proceeds from the auction of CO_2 allowances, or incentives provided through other market-based programs such as state renewable portfolio standards.

The concept of additionality attempts to address whether incremental greenhouse gas emissions reductions or carbon sequestration will be achieved from an offset project that would not otherwise have occurred in the absence of the RGGI offsets program. Additionality is the key criterion for ensuring that offset projects result in "real" emissions reductions or sequestration in the context of a cap-and-trade program. Since every CO_2 offset allowance awarded for an emissions reduction or sequestration from an offset project allows an additional ton of CO_2 to be emitted from an emissions source subject to a state CO_2 Budget Trading Program, maintaining the integrity of the emissions cap is predicated on providing reasonable assurance that offset projects are achieving emissions reductions that would not otherwise have occurred in the absence of the offset provisions of RGGI. This presumes that offsets must involve actions that are unlikely to occur under a business-as-usual scenario and are being implemented primarily in response to anticipated financial incentives that will be provided through the sale of CO_2 offset allowances. Evaluating additionality is difficult, since it requires a counterfactual assessment based on assumptions about what would likely have occurred in the absence of the offset project. Despite the problematic nature of determining additionality, the environmental integrity of emissions offsets, and by extension the environmental integrity of the cap-and-trade system, presumes that best practical efforts are made to account for additionality.

In addition to the general additionality provisions addressed at Model Rule section XX-10.3, the category-specific provisions at Model Rule section XX-10.5 contain benchmarks and performance standards designed to address project additionality for each category of project activities.

Form 1.3 also requires the project sponsor to make three further general attestations. First, the project sponsor must certify that the Consistency Application has not been filed in more than one RGGI participating state, in whole or in part. Model Rule subsection XX-10.4(d) prohibits such filings. The Model Rule does not prohibit registration of an offset project with another offset program, but such activity is highly discouraged, because once an offset project has been awarded a credit or allowance under another program it is ineligible for the award of CO_2 offset allowances under state CO_2 Budget Trading Program regulations. If such a project has submitted a Consistency Application to a RGGI participating state and received a consistency determination, and subsequently is awarded credits or allowances under another voluntary or mandatory offset program, the project would immediately be in non-compliance with state regulations. Such action could result in revocation of any approvals granted to the offset project and revocation and retirement of any and all CO_2 offset allowances in the project sponsor's RGGI-COATS general account. The project sponsor and project sponsor organization could also be subject to additional state-specific compliance and enforcement penalties.

Second, the project sponsor must certify that all offset projects for which the project sponsor, project sponsor organization, or an affiliate of the project sponsor organization has been awarded CO_2 offset allowances are in compliance with all applicable CO_2 Budget Trading Program regulations in participating states, as required by Model Rule subsection XX-10.4(c)(1)(vii):

> "All offset projects for which the project sponsor or project sponsor organization has received CO_2 offset allowances, if any, under the project sponsor's or project sponsor organization's ownership or control (or under the ownership or control of any entity which controls, is controlled by, or has common control with the project sponsor or project sponsor organization) are in compliance with all applicable requirements of the CO_2 Budget Trading Program in all participating states."

This compliance requirement applies not only to offset projects under the project sponsor's or project sponsor organization's direct ownership or control but also to offset projects owned or controlled by an affiliate, parent, subsidiary, or partner of the project sponsor organization.

Third, the project sponsor must certify that she or he is authorized to submit the Consistency Application on behalf of the project sponsor organization (the project sponsor's employer, if the project sponsor as an individual is not acting as the project developer), that he or she has personally reviewed the entire application and inquired of those individuals with primary responsibility for obtaining information in the application, and that the application and its attachments are true, accurate, and complete.

Form 1.4 – Project Sponsor Agreement

Form 1.4 requires the project sponsor to sign a "project sponsor agreement" in which the project sponsor certifies that he or she holds the legal rights to the offset project or is authorized to act on behalf of another party that holds such rights. The project sponsor also authorizes the state regulatory agency to audit the offset project, including granting the regulatory agency the right to enter the physical location of the offset project. Finally, as part of the agreement, the project sponsor submits to the legal jurisdiction of the state to which the Consistency Application is submitted. The wording for the project sponsor agreement is specified by Model Rule subsection XX-10.4(c)(1)(vi):

> "The undersigned project sponsor recognizes and accepts that the application for, and the receipt of, CO_2 offset allowances under the CO_2 Budget Trading Program is predicated on the project sponsor following all the requirements of Model Rule Subpart XX-10. The undersigned 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. I understand that eligibility for the award of CO_2 offset allowances under Model Rule Subpart XX-10 is contingent on meeting the requirements of Model Rule Subpart XX-10. I authorize the [REGULATORY AGENCY] or its agent to audit this offset project for purposes of verifying that the offset project, including the monitoring and verification plan, has been implemented as described in this application. I understand that this right to audit shall include the right to enter the physical location of the offset project. I submit to the legal jurisdiction of [RGGI Participating State]."

The Model Rule requires that the project sponsor hold the legal rights to the offset project or has been granted the right (e.g., power of attorney) to act on behalf of a party that holds the legal rights to the offset project. A project sponsor acting as an agent for a party claiming to hold the legal rights to an offset project should conduct reasonable due diligence to confirm that the party does in fact hold such rights. The project sponsor is responsible for conducting any negotiations and obtaining written documentation assigning the project sponsor as the agent of the party that holds the rights to the offset project.

By signing the project sponsor agreement, the project sponsor gives the state regulatory agency or its agent (e.g., contractors) permission to audit the offset project and verify that the project and the M&V plan have been implemented as described in the Consistency Application. Also, the project sponsor permits the regulatory agency or its agent to physically inspect the offset project site as part of the audit, and agrees, if requested, to make all documentation related to the offset project available for inspection. The project sponsor is responsible for conducting any negotiations with owners or operators of the land or facility where the offset project is located and obtaining any documentation of permission to enable such on-site audits to be performed.

Finally, the project sponsor agrees to be subject to the personal and subject matter jurisdiction of the participating state to which the Consistency Application is submitted.

Form 1.5 – Disclosure of Greenhouse Gas Emissions Data Reporting

Form 1.5 provides for the disclosure of any voluntary or mandatory programs other than the CO_2 Budget Trading Program, for which greenhouse gas emissions data for the offset project have been or will be reported, as required at Model Rule subsection XX-10.4(c)(1)(ix). For each program for which data have been or will be reported, the project sponsor must provide the program name, the program type (voluntary or mandatory), program contact information (website or street address), the categories of emissions data reported, the frequency of reporting, when the reporting began or will begin, and reporting status (prior, current, future). The project sponsor must disclose future reporting related to current commitments made to voluntary programs (e.g., U.S. Department of Energy 1605(b) program, U.S. Environmental Protection Agency Climate Leaders program, or any other voluntary or mandatory offset program) as well as future reporting mandated by current statutes, regulations, or judicial or administrative orders.

III.5.2 Category-Specific Information and Documentation Forms

The Part 2 forms in a model Consistency Application provide means for applicants to demonstrate compliance with the category-specific requirements for offsets at Model Rule section XX-10.5. Requirements are specified for each of the eligible offset project categories at the following subsections of the Model Rule:

- Landfill methane capture and destruction, Model Rule subsection XX-10.5(a) ("landfill methane projects");
- Reduction in emissions of sulfur hexafluoride (SF_6), Model Rule subsection XX-10.5(b) ("sulfur hexafluoride projects");
- Sequestration of carbon due to reforestation, improved forest management, or avoided conversion, Model Rule subsection XX-10.5(c) ("forest projects")
- Sequestration of carbon due to afforestation, ("afforestation projects")(CT and NY only);
- Reduction or avoidance of CO_2 emissions from natural gas, oil, or propane end-use combustion due to end-use energy efficiency, Model Rule subsection XX-10.5(d) ("end-use energy efficiency projects");
- Avoided methane emissions from agricultural manure management, Model Rule subsection XX-10.5(e) ("agricultural manure management projects");

The Part 2 forms individually address project description, demonstration of project eligibility, determination of project emissions or sequestration baseline (if applicable to the offset category), and specification of the project M&V plan.

III.5.2.1 Project Description

Form 2.1 addresses the requirement at Model Rule subsection XX-10.4(c)(1)(ii) for information describing the offset project. The instructions in the Consistency Application for each offset project category detail the information that must be included in the project description.

III.5.2.2 Demonstration of Project Eligibility

A project sponsor must demonstrate that an offset project meets the eligibility and other requirements at Model Rule sections XX-10.3 and 10.5 in order for the project to qualify for the award of CO_2 offset allowances.

The Model Rule incorporates general and category-specific standards and requirements for offset project eligibility. The general eligibility requirements in Model Rule section XX-10.3 include a list of eligible types of offset projects and geographic location requirements for eligible offset projects (see Model Rule subsections XX-10.3(a)(1) and (a)(2), respectively). Other requirements in Model Rule section XX-10.3 are not specifically described as eligibility requirements, but have similar functions. For example, the general additionality requirements listed in Model Rule subsection XX-10.3(d) restrict or set conditions on the qualification of an offset project for the award of CO_2 offset allowances based on whether the project is required by law, regulation, or administrative or judicial order; whether the project has an electric generation component and assigns rights to all attribute credits generated by the project to the regulatory agency; whether the project receives certain types of funding or other incentives; and whether the project will receive credits or allowances under any other mandatory or voluntary

greenhouse gas program. Consistency Application Form 1.3 allows a project sponsor to demonstrate conformance with the Model Rule subsection XX-10.3(d) general "additionality" requirements via a certification. Demonstrations of conformance with other general requirements of the Model Rule are made using Forms 1.4 (Project Sponsor Agreement) and 1.5 (Disclosure of Greenhouse Gas Emissions Data Reporting). These requirements are addressed in detail at Section III.5.1 of this Offset Handbook.

Each type of offset project also has category-specific eligibility and other requirements, which are specified by category at Model Rule subsections XX-10.5(a) through (e) for eligible project categories. These requirements address category-specific eligibility, as well as determination of project baseline emissions or carbon sequestration, methods for determination of project emissions reductions or carbon sequestration, and monitoring and verification requirements.

Each category-specific Consistency Application contains detailed instructions explaining the documentation that must be provided to demonstrate that an offset project meets the eligibility requirements of Model Rule sections XX-10.3 and 10.5. To confirm that submitted documentation is complete and valid, the Model Rule requires that an independent, state-accredited verifier evaluate and report on the adequacy and validity of the information supplied by the project sponsor in the Consistency Application to demonstrate that the offset project meets the applicable eligibility requirements of Model Rule sections XX-10.3 and 10.5. Demonstration of conformance with category-specific eligibility requirements is made using Form 2.2.

III.5.2.3 Determine Project Emissions/Sequestration Baseline

If applicable to the offset project category, the Consistency Application must include a determination of the greenhouse gas emissions or carbon sequestration baseline for the offset project, as required by Model Rule section XX-10.5, which contains specific baseline quantification and documentation requirements for applicable types of offset projects. The Consistency Application for each applicable offset project category contains detailed instructions for the provision of documentation required to demonstrate the project baseline.

The project baseline is required to be demonstrated in the Consistency Application for sulfur hexafluoride, reforestation, improved forest management, or avoided conversion, afforestation, and end-use energy efficiency projects, because the award of CO_2 offset allowances is determined based on the documented difference in CO_2-equivalent (CO_2e) emissions or carbon sequestration during the reporting year and the baseline year. Determination of the project baseline in the Consistency Application is not required for landfill gas and agricultural manure management offset projects, because baseline emissions for these categories of projects are documented in the project M&V Report for each reporting year. For landfill gas projects that capture and destroy methane, emission reductions are measured and quantified directly without comparing reporting year emissions to emissions in a baseline year. This is clearly stated in Model Rule subsection XX-10.5(a) for landfill methane capture and destruction projects, which specifies that the emissions baseline is represented by the methane collected and metered for thermal destruction. For avoided methane emissions from agricultural manure management projects, baseline methane emissions are estimated annually based on site-specific factors and weather conditions associated with uncontrolled anaerobic storage of agricultural manure and food waste in the absence of the offset project. These baseline emissions represent the maximum amount of potential emission reductions due to the use of an

anaerobic digester, with project emissions reductions representing the lesser of the emissions baseline or the methane generated by the anaerobic digester for thermal destruction.

III.5.2.4 Prepare M&V Plan

To ensure that offset projects are real and verifiable, the Model Rule includes M&V requirements for each offset project category, as part of the category-specific requirements at Model Rule section XX-10.5. The Consistency Application must include a M&V plan that explains in detail how emissions reductions or carbon sequestration are to be monitored and verified in accordance with the requirements at Model Rule section XX-10.5. The M&V plan is a key component of the Consistency Application that must be evaluated by an independent, state-accredited verifier. Requirements for the M&V plan are specified by offset project category at Model Rule subsections XX-10.5(a)(5), (b)(5), (c)(5), (d)(5), and (e)(5) in varying degrees of detail. The Consistency Application instructions for each project category specify in detail the contents that must be documented in the M&V plan submitted as part of the Consistency Application.

III.5.2.5 Accredited Independent Verifier Review and Evaluation of Consistency Application

Prior to submission to a state regulatory agency, the Consistency Application must be reviewed, evaluated, and certified by an independent, state-accredited verifier. Model Rule subsection XX-10.4(c)(1)(viii) specifies that a Consistency Application must include a verification report, as well as a certification statement signed by a state-accredited independent verifier, stating that the verifier has reviewed the entire application and evaluated the following:

(a) The adequacy and validity of information supplied by the project sponsor to demonstrate that the offset project meets the applicable eligibility requirements of Model Rule sections XX-10.3 and XX-10.5.

(b) The adequacy and validity of information supplied by the project sponsor to demonstrate baseline emissions pursuant to the applicable requirements at Model Rule section XX-10.5.

(c) The adequacy of the M&V plan submitted pursuant to the applicable requirements at Model Rule section XX-10.5.

(d) Such other evaluations and statements as may be required by the regulatory agency.

The project sponsor should ensure that the verifier report and certification statement clearly addresses each of these required evaluations.

Independent Verifier Certification Statement and Report

Form 3.1 of the model Consistency Application provides the means for a project sponsor to submit a verification report and certification statement from an accredited independent verifier in compliance with Model Rule requirements for the review and evaluation of the entire Consistency Application by a verifier.

As part of Form 3.1, the verifier must sign the following certification statement:

"I certify that the accredited independent verifier identified above reviewed the Consistency Application, including all forms and attachments, in its entirety, including a review of the following:

(a) The adequacy and validity of information supplied by the project sponsor to demonstrate that the offset project meets the applicable eligibility requirements of [Model Rule sections XX-10.3 and XX-10.5 (offset category subpart)], including the required documentation that must be provided in the Consistency Application.

(b) The adequacy of the M&V Plan in accordance with the applicable requirements of [Model Rule section XX-10.5 (offset category subpart)] including the required documentation that must be provided in the Consistency Application.

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

The independent verifier's report must be provided as an attachment to Form 3.1 and must document the following:

1. The verifier has reviewed the entire Consistency Application and evaluated the contents of the application in relation to the applicable requirements of Model Rule Subpart XX-10.

2. 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 Model Rule sections XX-10.3 and XX-10.5.

3. The verifier has evaluated the adequacy of the M&V plan submitted pursuant to Model Rule section XX-10.5.

The Consistency Application instructions specify that the verifier report must include the following contents, in the order listed below:

- Cover page with report title and date
- Table of contents
- List of acronyms and abbreviations
- Executive summary
- Description of objective of report
- Identification of the client, including name, address, and other contact information
- Identification of the offset project
- Description of evaluation criteria (applicable regulatory provisions and documentation requirements specified in Consistency Application)
- Description of the review and evaluation process, including any site visits and interviews
- Identification of individuals performing the verification work, including the verification team leader and key personnel, and contact information for the team leader
- Description of the materials provided to the verifier by the project sponsor
- Evaluation conclusions and findings, including level of assurance provided

III.6 Initiate State Agency Review of Consistency Applications

III.6.1 Submission Instructions

An offset project sponsor must submit a Consistency Application to apply for the qualification of an offset project for the award of CO_2 offset allowances. A fully completed Consistency Application, including the coversheet, all forms, and related attachments must be received by the regulatory agency in the RGGI participating state (in the manner specified by each state) where the offset project is located. If the offset project is located in more than one RGGI participating state, the Consistency Application must be submitted to the regulatory agency in the participating state where the larger amount of the emissions reductions or carbon sequestration due to the offset project is projected to occur. A separate Consistency Application must be submitted for each offset project, although under certain circumstances project activities at multiple locations may be represented as a single offset project, as specified in category-specific Consistency Application instructions.

Official state Consistency Applications and state-specific instructions for each eligible offset category are available through http://www.rggi.org/offsets/process/application_materials. Detailed submission instructions are included in each official application packet.

If the project sponsor is uncertain about any aspect of a Consistency Application form, documentation requirements, or application instructions, the project sponsor should contact state regulatory agency staff prior to submitting an application for review to either an independent verifier or the regulatory agency. Contact information for state offset program leads is available through http://www.rggi.org/offset_contacts.

III.6.2 Regulatory Agency Review

Regulatory agency review of a Consistency Application occurs in two phases. First, the regulatory agency determines whether the Consistency Application is administratively complete. The agency has 30 days following receipt of the application to determine completeness.[16] The completeness review involves checking that all required forms have been submitted and that all required documentation that must accompany the forms has been provided in the form prescribed in the application instructions. This review process may entail requests from the regulatory agency for additional information. In no event does a completeness determination by the regulatory agency prevent the agency from requesting additional information from the project sponsor if required to evaluate the consistency of the offset project.

Within 90 days after issuing a completeness determination,[17] the regulatory agency will issue a determination of whether the offset project is "consistent" with Model Rule sections XX-10.3, XX-10.4, and XX-10.5. A consistency determination constitutes "qualification" of the offset project for the award of CO_2 allowances, pending regulatory agency approval of documentation of actual greenhouse gas emissions reductions or carbon sequestration achieved by the project as demonstrated through submission of a periodic M&V Report. A consistency determination addresses only the offset project's qualification for the award of CO_2 offset allowances under the state CO_2 Budget Trading Program and does not abrogate any applicable federal, state, and/or local requirements (e.g., permits, permit modifications) that may be required to implement and

[16] This time period may vary depending on applicable state requirements.

[17] This time period may vary depending on applicable state requirements.

operate the facilities or equipment related to an offset project. For offset projects determined by the regulatory agency to be inconsistent with Model Rule requirements, the regulatory agency will inform the project sponsor of the project's deficiencies.

III.7 Perform Project Monitoring and Verification (M&V) and Submit M&V Report

Monitoring and verification (M&V) for a qualified offset project must conform with Model Rule section XX-10.5 requirements for the applicable offset project category and the M&V plan submitted as part of the project Consistency Application. For all offset project categories except afforestation, the conduct of project M&V should start when the offset project is commenced.

Only offset projects that have received a consistency determination from a state regulatory agency may submit an M&V Report. An M&V Report is submitted periodically to the regulatory agency by the project sponsor to demonstrate and document greenhouse gas emissions reductions or carbon sequestration achieved by the offset project during the reporting period. The regulatory agency awards CO_2 offset allowances based on the CO_2-equivalent greenhouse gas emissions reductions or carbon sequestration achieved by the project, as documented in an approved M&V Report. Except for forest projects, M&V Reports must be submitted annually; for forest projects, M&V Reports must be submitted not less than every five years.

The required contents of the model M&V Report are specified at Model Rule subsection XX-10.7(c), and required documentation is specified in the category-specific M&V Report forms and instructions. Some of the required contents of the model M&V Report, as specified at Model Rule subsection XX-10.7(c) are identical or similar to the required contents of the Consistency Application specified at Model Rule subsection XX-10.4(c)(1), as Table 2 illustrates.

Table 2
Contents of M&V Report Compared to Contents of Consistency Application

Model Rule subsection	M&V Report	Consistency Application
XX-10.7(c)(1)	Project sponsor information	Identical to Model Rule subsection XX-10.4(c)(1)(i)
XX-10.7(c)(2)	Determination of emission reduction/ sequestration	Not applicable to Consistency Application
XX-10.7(c)(2)	Demonstration of compliance with required quantification, monitoring, and verification procedures	Similar to Model Rule subsection XX-10.4(c)(1)(v), which requires explanation of procedures for quantification, monitoring, and verification
XX-10.7(c)(3)	Project sponsor statement of compliance, legal rights, authorization for audit and access, and jurisdiction	Similar to Model Rule subsection XX-10.4(c)(1)(vi)
XX-10.7(c)(4)	Project sponsor certification regarding offset projects for which allowances have been received	Identical to required project sponsor certification in Model Rule subsection XX-10.4(c)(1)(vii)
XX-10.7(c)(5)	Independent accredited verifier report and certification on review and evaluation of M&V Report	Similar to independent accredited verifier report and required certification in Model Rule subsection XX-10.4(c)(1)(viii)

XX-10.7(c)(6)	Greenhouse gas emissions data reporting disclosure	Identical to required disclosure in Model Rule subsection XX-10.4(c)(1)(ix)

M&V Report forms have numeric identifiers. The numerical identification has two elements: the first number indicates whether the form belongs to Part 1 (General Information), Part 2 (Category-Specific Information), or Part 3 (Independent Verification). The second number denotes a specific form. Table 3 displays the organization of the M&V Report forms by offset project category, with the appropriate forms listed for each category.

Table 3
M&V Forms by Offset Project Category

	Landfill Methane Projects	Sulfur Hexafluoride Projects	Forest Projects	End-Use Energy Efficiency Projects	Agricultural Manure Projects
Coversheet	1.1	1.1	1.1	1.1	1.1
General Information	1.2	1.2	1.2	1.2	1.2
Attestations	1.3	1.3	1.3	1.3	1.3
Project Sponsor Statement	1.4	1.4	1.4	1.4	1.4
Disclosure of GHG Emissions Data Reporting	1.5	1.5	1.5	1.5	1.5
Demonstration of Conformance with M&V Plan	2.1	2.1	2.1	2.1	2.1
Determination of Emissions Reductions/Sequestration	2.2	2.2	2.2	2.2	2.2
Verifier Certification Statement and Report	3.1	3.1	3.1	3.1	3.1

111.7.1 M&V Report Forms

The model M&V Report consists of a coversheet and seven additional forms divided into three parts, as follows:

Part 1. General Information Forms

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

Part 2. Category-Specific Information and Documentation Forms

- Form 2.1 – Demonstration of Conformance with M&V Plan
- Form 2.2 – Determination of Emissions Reductions/Sequestration

Part 3. Independent Verification Form

- Form 3.1 – Independent Verifier Certification Statement and Report

Each category-specific model M&V Report includes detailed instructions addressing the information and documentation that must be submitted for each form. The forms also contain many embedded instructions.

Official state M&V Report forms and state-specific instructions for each eligible offset category are available throughhttp://www.rggi.org/offsets/process/application_materials.

III.7.2 General Information Forms

The general information forms in Part 1 of the model M&V Report provide means for applicants to demonstrate satisfaction of regulatory requirements that apply to all eligible offset categories.

Form 1.1 – Coversheet

Form 1.1, the Coversheet, is an essential part of the M&V Report. To aid project sponsors in identifying all the information and required material that must be submitted as part of the M&V Report, Form 1.1 constitutes a coversheet checklist of required forms for a complete M&V Report. If a required form is not included, the M&V Report will not be considered complete for commencement of review by the state regulatory agency.

Form 1.2 – General Information Form

The general information form provides for the submission of four sets of information: (1) general summary information about the offset project, (2) information about the offset project sponsor and project sponsor organization, (3) information about the RGGI-COATS general account held by the project sponsor, and (4) information about the state-accredited independent verifier and its point of contact for the project. For emission credit retirements, no information is required for an independent verifier, as one is not required. Detailed instructions for completing the general information form are provided in the M&V Report.

Form 1.3 – Attestations

Form 1.3 requires the project sponsor to sign a certification statement that addresses the requirements at Model Rule subsections XX-10.7(c)(4) and XX-10.7(d). The required certification by the project sponsor confirms in writing that offset projects for which the project sponsor has been awarded CO_2 offset allowances are in full compliance with all applicable requirements of the CO_2 Budget Trading Program in all participating states.

Form 1.3 requires the offset project sponsor to certify the truth of the following statement:

> "All offset projects for which the project sponsor has received CO_2 offset allowances, under the project sponsor's or project sponsor organization's ownership or control (or under the ownership or control of any entity which controls, is controlled by, or has common control with the project sponsor or project sponsor organization) are in compliance with all applicable requirements of the CO_2 Budget Trading Program in all participating states."

This compliance requirement applies not only to offset projects under the project sponsor's or project sponsor organization's direct ownership or control but also to offset projects owned or controlled by an affiliate, parent, subsidiary, or partner of the project sponsor organization.

The project sponsor also must certify that the entire contents of the M&V Report, including all forms and attachments, are true, accurate, and complete.

Form 1.4 – Project Sponsor Statement

Form 1.4 requires that the project sponsor sign a specified project sponsor statement. This statement is similar, but not identical, to the project sponsor agreement submitted as part of Form 1.4 of the Consistency Application.

The required wording for the project sponsor's signed statement is specified by Model Rule subsection XX-10.7(c)(3). By signing this certification, the project sponsor gives the regulatory agency or its agent permission to audit the offset project and verify that the project and the M&V plan have been implemented as described in the Consistency Application. Also, the project sponsor permits the regulatory agency or its agents to physically inspect the offset project site as part of the audit, and agrees, if requested, to make all documentation related to the offset project available for inspection:

> "The undersigned project sponsor hereby confirms and attests that the offset project upon which this M&V Report is based is in full compliance with all of the requirements of Model Rule Subpart XX-10. The project sponsor holds the legal rights to the offset project, or has been granted the right to act on behalf of a party that holds the legal rights to the offset project. The project sponsor understands that eligibility for the award of CO_2 offset allowances under Model Rule Subpart XX-10 is contingent on meeting the requirements of Model Rule Subpart XX-10. The project sponsor authorizes the regulatory Agency or its agent to audit this offset project for purposes of verifying that the offset project, including the M&V Plan, has been implemented as described in the Consistency Application that was the subject of a consistency determination by the regulatory agency. The project sponsor understands that this right to audit shall include the right to enter the physical location of the offset project and to make available to the regulatory agency or its agent any and all documentation relating to the offset project at the regulatory agency's request. The project sponsor submits to the legal jurisdiction of [RGGI participating state]."

The Model Rule requires that the project sponsor holds the legal rights to the offset project or has been granted the right (e.g., power of attorney) to act on behalf of a party that holds the legal rights to the offset project. A project sponsor acting as an agent for a party claiming to own the legal rights to an offset project should conduct reasonable due diligence to confirm that the party does in fact hold such rights. The project sponsor is responsible for conducting any negotiations and obtaining written documentation assigning the project sponsor as the agent of the party that holds the rights to the offset project.

By signing this agreement, the project sponsor gives the state regulatory agency or its agent (e.g., contractors) permission to audit the offset project and verify that the project and the M&V plan have been implemented as described in the Consistency Application. Also, the project sponsor permits the regulatory agency or its agents to physically inspect the offset project site as part of the audit, and agrees, if requested, to make all documentation related to

the offset project available for inspection. The project sponsor is responsible for conducting any negotiations with owners or operators of the land or facility where the project is located and obtaining any documentation of permission to enable such on-site audits to be performed.

Finally, the project sponsor agrees to be subject to the personal and subject matter jurisdiction of the participating state to which the Consistency Application was submitted.

Form 1.5 – Disclosure of Greenhouse Gas Emissions Data Reporting

Form 1.5 provides for the disclosure of any voluntary or mandatory programs other than the CO_2 Budget Trading Program, for which greenhouse gas emissions data for the offset project have been or will be reported, as required at Model Rule subsection XX-10.4(c)(1)(ix). For each program for which data have been or will be reported, the project sponsor must provide the program name, the program type (voluntary or mandatory), program contact information (website or street address), the categories of emissions data reported, the frequency of reporting, when the reporting began or will begin, and reporting status (prior, current, future). The project sponsor must disclose future reporting related to current commitments made to voluntary programs (e.g., U.S. Department of Energy 1605(b) program, U.S. Environmental Protection Agency Climate Leaders program, or any other voluntary or mandatory offset program) as well as future reporting mandated by current statutes, regulations, or judicial or administrative orders.

III.7.3 Category-Specific M&V Information and Documentation Forms

The forms in Part 2 of the model M&V Report provide the means for a project sponsor to demonstrate that offset project M&V during the reporting period has been conducted in conformance with category-specific monitoring and verification requirements in the Model Rule, as well as conformance with the procedures specified in the approved M&V plan for the qualified offset project. The Part 2 forms also provide the means for documenting project greenhouse gas emissions reductions or carbon sequestration achieved by the offset project during the reporting period, which are the basis for the award of CO_2 offset allowances. Each category-specific M&V Report contains detailed instructions for providing documentation required to demonstrate conformance with regulatory requirements and the approved M&V Plan, and quantification and documentation of project greenhouse gas emissions reductions or carbon sequestration.

III.7.3.1 Demonstration of Conformance with M&V Plan

Form 2.1 provides the means for the project sponsor to demonstrate project conformance with the monitoring and verification procedures required at Model Rule section XX-10.5 and specified in the approved M&V plan.

III.7.3.2 Determination of Emissions Reductions/Sequestration

The M&V Report must document actual emissions reductions or carbon sequestration achieved by the offset project during the reporting period. Each category-specific M&V Report includes detailed instructions for quantifying and documenting greenhouse gas emissions reductions or carbon sequestration.

III.7.3.3 Accredited Independent Verifier Review and Evaluation of M&V Report

After the project sponsor assembles the complete M&V Report and prior to submission to a state regulatory agency, the independent, state-accredited verifier must review and evaluate the report. Model Rule subsection XX-10.7(c)(5) specifies that a M&V Report must include a verification report and a certification statement signed by a state-accredited independent verifier, stating that the verifier has reviewed the entire application and evaluated the following:

- The adequacy and validity of information supplied by the project sponsor to determine emissions reductions or sequestration pursuant to the applicable requirements of Model Rule section XX-10.5;

- The adequacy and consistency of methods used to quantify, monitor, and verify reductions or sequestration pursuant to the applicable requirements of Model Rule section XX-10.5;

- The adequacy and validity of information supplied by the project sponsor to demonstrate that the offset project meets the applicable eligibility requirements of Model Rule section XX-10.5;

- Such other evaluations and verification reviews as required in writing by the regulatory agency;

Applicants should ensure that the verifier's report clearly addresses each of the required evaluations.

Independent Verifier Certification Statement and Report

Form 3.1 of the model M&V Report provides the means for a project sponsor to submit a verification report and certification statement from an accredited independent verifier in compliance with Model Rule requirements for the review and evaluation of the M&V Report by a verifier.

As part of Form 3.1, the verifier must sign the following certification statement:

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

(a) the adequacy and validity of information supplied by the project sponsor to determine emissions reductions or sequestration pursuant to the applicable requirements of Model Rule section XX-10.5.

(b) the adequacy and consistency of methods used to quantify, monitor, and verify reductions or sequestration pursuant to the applicable requirements of Model Rule section XX-10.5.

(c) the adequacy and validity of information supplied by the project sponsor to demonstrate that the offset project meets the applicable eligibility requirements of Model Rule section XX-10.5.

(d) such other evaluations and verification reviews as required in writing by the regulatory agency.

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

The independent verifier's report must be provided as an attachment to Form 3.1 and must document the following:

(1) The information provided by the project sponsor was valid and adequate to determine emissions reductions or sequestration.

(2) The methods used to quantify, monitor, and verify emissions reductions or sequestration are adequate and consistent.

(3) The information provided by the project sponsor was valid and adequate to demonstrate that the project meets the applicable eligibility requirements.

(4) The information provided by the project sponsor conforms to any state-specific requirement(s).

The M&V Report instructions specify that the verifier report must include the following contents, in the order listed below:

- Cover page with report title and date
- Table of contents
- List of acronyms and abbreviations
- Executive summary
- Description of objective of report
- Identification of the client, including name, address, and other contact information
- Identification of the offset project
- Description of evaluation criteria (applicable regulatory provisions and documentation requirements specified in M&V Report)
- Identification of individuals performing the verification work, including verification team leader and key personnel, and contact information for the team leader
- Description of the materials provided to the verifier by the project sponsor
- Description of the review and evaluation process, including any site visits and interviews
- Evaluation conclusions and findings, including level of assurance provided

III.8 Initiate State Regulatory Agency Review of M&V Report

To apply for the award of CO_2 offset allowances for a qualified offset project, the project sponsor must submit to the state regulatory agency a fully completed M&V Report, consisting of the coversheet and all required forms and related attachments. The M&V Report documents the CO_2-equivalent (CO_2e) emissions reductions or carbon sequestration achieved by the offset project during the reporting period. For all offset projects, with the exception of forest projects, the M&V Report must be submitted annually. For forest projects, an M&V Report must be

submitted not less than every five years. The M&V Report must be submitted within six months following the completion of the last calendar year for which allowances are sought.

Official state M&V Report forms and state-specific instructions for each eligible offset category are available through http://www.rggi.org/offsets/process/application_materials. Detailed submission instructions are included in each official application packet.

Regulatory agency review of M&V Reports occurs in two phases. First, the regulatory agency determines whether the M&V Report is complete. The completeness review involves checking that all required forms have been submitted and that all required documentation that must accompany the forms has been provided in the form prescribed in the M&V Report instructions. The Model Rule does not establish a deadline to determine completeness following receipt of the M&V Report. This review process may entail requests from the regulatory agency for additional information. In no event does a completeness determination by the regulatory agency prevent the agency from requesting additional information from the project sponsor if required to evaluate the M&V Report of the offset project.

Within 45 days of issuing a completeness determination,[18] the regulatory agency will issue a determination whether or not to approve the M&V Report. Approval of the M&V Report does not abrogate any applicable federal, state, and/or local requirements (e.g., permits, permit modifications) for commencing or conducting the offset project. As with the completeness review, an agency may issue requests for additional information; such requests must occur within the allowed 45 days.[19] For M&V Reports not approved, the regulatory agency should inform the project sponsor, preferably in writing, of the Report's deficiencies. Correction of such deficiencies may require that the corrected M&V Report be reviewed by an independent, accredited verifier before resubmission to the state regulatory agency.

III.9 Award and Recordation of CO_2 Offset Allowances Following the Approval of M&V Report

The regulatory agency will approve or deny a submitted complete M&V Report. Following the approval of an M&V Report, the regulatory agency will award one CO_2 offset allowance for each short ton of demonstrated reduction in CO_2 or CO_2-equivalent emissions or sequestration of CO_2 documented in the M&V Report. After CO_2 offset allowances are awarded, the regulatory agency will transfer and record the CO_2 offset allowances in the project sponsor's general account in the RGGI-COATS tracking system.

[18] Because timeframes for state regulatory agency review may differ by state, project sponsors should consult applicable state regulations.

[19] Because timeframes for state regulatory agency review may differ by state, project sponsors should consult applicable state regulations.

IV. Category-Specific Offset Project Explanation or Clarification

This chapter presents explanation or clarification that applies to specific types of offset projects. The material is organized as follows:

The following offset project explanation or clarification does not modify state regulations, forms, or instructions. Requirements for offset projects in RGGI participating states are specified in state CO_2 Budget Trading Program regulations. These regulations are based on a RGGI Model Rule (see http://www.rggi.org/model_rule_key_documents_link). For simplicity, the explanation or clarification provided in this chapter refers to specific RGGI Model Rule provisions and requirements, and instructions in model applications. The reader should note that this is done for informational purposes only and that state regulations are controlling.

IV.1 Explanation or Clarification for Landfill Gas Offset Projects

Landfill gas offset projects capture and destroy methane from landfills, preventing the emission of methane to the atmosphere. Landfill gas offset projects may include flaring projects, electricity generation projects, and direct-use projects.

This section discusses certain parts of the model Landfill Methane Capture and Destruction Consistency Application instructions that may require explanation or clarification. For each topic area, an excerpt from the application instructions is provided, which is then followed by explanation or clarification. This section is organized in order of the sections of the Consistency Application instructions.

Consistency Application Form 1.2 – General Information (project commencement date)

Among the information to be provided in Form 1.2 is the project commencement date.

Definitions at Model Rule section XX-10.2 for “offset project” (Model Rule subsection XX-10.2(z)) and “project commencement” (Model Rule subsection XX-10.2(ad)) include the following text, denoted below in italics:

Offset project. An offset project includes all equipment, materials, items, or actions directly related to the reduction of CO_2-equivalent emissions or the sequestration of carbon specified in a consistency application submitted pursuant to Model Rule section XX-10.4. Equipment, materials, items, or actions unrelated to an offset project reduction of CO_2-equivalent emissions or the sequestration of carbon, but occurring at a location where an offset project occurs, shall not be considered part of an offset project, unless specified at Model Rule section XX-10.5.

Project commencement. For an offset project involving physical construction, other work at an offset project site, or installation of equipment or materials, the date of the beginning of such

activity. For an offset project that involves the implementation of a management activity or protocol, the date on which such activity is first implemented or such protocol first utilized.
Explanation:

Landfill gas projects that capture and destroy methane may involve the use or expansion of an existing landfill gas collection system and/or the expansion or replacement of existing methane destruction equipment (e.g., flare or electric generation unit(s)).

For an offset project to be eligible for the award of CO_2 offset allowances, a Consistency Application must be submitted within six months of project commencement.

According to the Model Rule definition of "project commencement" (Model Rule subsection XX-10.2 (ad)), for an offset project involving physical construction, other work at an offset project site, or installation of equipment or materials (such as a landfill gas offset project), offset project commencement is the date of the beginning of such activity. Such equipment or materials are considered part of an offset project if the equipment or materials are related to the reduction of CO_2-equivalent emissions specified in the submitted Consistency Application (see Model Rule subsection XX-10.2(z)).

For a landfill gas offset project, physical construction includes the installation of equipment that is used for collection of landfill gas at one or more landfill cells and is used in a flare, electricity generation, or direct-use landfill gas system. For example, landfill gas collection system equipment could include vertical or horizontal wells, pipes, blowers, headers, condensate knockout drums, and flares.

If a prospective offset project includes the expansion or replacement of a pre-existing landfill gas collection and/or destruction system, the project would not be eligible if the pre-existing equipment was installed more than six months prior to the submission of the Consistency Application, provided the pre-existing system is related to the reduction of CO_2-equivalent emissions specified in the submitted Consistency Application. This is because the pre-existing equipment is considered part of the offset project, in accordance with the definition of offset project at Model Rule subsection XX-10.2(z), which states that an offset project consists of "*all equipment, materials, items, or actions directly related to the reduction of CO_2 equivalent emissions or the sequestration of carbon specified in a consistency application*…" In addition to expansion of pre-existing equipment, this also applies to pre-existing equipment that is replaced as part of the offset project, because any equipment not considered part of an offset project is limited to "e*quipment, materials, items, or actions unrelated to an offset project reduction of CO_2-equivalent emissions or the sequestration of carbon, but occurring at a location where an offset project occurs…"* In this instance, even if the offset project replaces pre-existing landfill gas equipment or control devices, such as a flare, such pre-existing equipment is directly related to the collection and destruction of landfill gas for which the prospective project seeks qualification for the award of CO_2 offset allowances in the Consistency Application. As a result, the project itself is already pre-existing and has commenced; the new equipment represents modification to a pre-existing project. If the pre-existing equipment was installed more than six months prior to the submission of a Consistency Application, the project is not eligible to qualify for the award of CO_2 offset allowances.

However, if a landfill has a pre-existing landfill gas collection and control system for a specific landfill cell, this does not preclude from eligibility a prospective landfill gas offset project that installs new equipment in another landfill cell. In this instance, the new equipment is isolated from the pre-existing equipment, and the pre-existing equipment is not directly related to the

reduction of CO_2-equivalent emissions specified in the offset project Consistency Application. In this instance, the pre-existing equipment is not considered part of the offset project.

Consistency Application Form 2.2 – Demonstration of Eligibility

To determine the eligibility of a particular landfill gas offset project, documentation is required substantiating that the landfill is not subject to federal New Source Performance Standards (NSPS) for municipal solid waste landfills at 40 CFR 60, Subpart Cc and Subpart WWW.

Instructions for Form 2.2 include the following text, denoted below in italics:

Attach documentation, with state and federal identification numbers, as applicable, that indicates that the landfill from which the offset project will draw landfill gas is not subject to federal New Source Performance Standards (NSPS) for municipal solid waste landfills, 40 CFR Part 60, Subpart Cc and Subpart WWW. The documentation must include the initial design capacity report submitted to the U.S. EPA pursuant to 40 CFR 60, Subpart WWW 60.752(a) or 40 CFR 60, Subpart Cc 60.33c(d), and in accordance with 40 CFR 60, Subpart WWW 60.757(a)(2).

Note that for purposes of eligibility under [State Regulations; Model Rule XX-10.5(a)(1)], a MSW landfill is considered to be subject to NSPS at 40 CFR 60, Subparts Cc and WWW if the landfill is subject to the federal emissions requirements at 40 CFR 60, Subpart Cc 60.33c(e) or Subpart WWW 60.752(b).

Explanation:

Federal regulations at 40 CFR 60, Subparts Cc and WWW apply to municipal solid waste (MSW) landfills and specify requirements for controlling landfill emissions of non-methane organic compounds (NMOCs). The federal regulations are known as New Source Performance Standards (NSPS) and Emission Guidelines (EG), at 40 CFR 60, Subparts Cc and WWW, respectively. The NSPS regulations apply to landfills that were constructed or modified after May 1991, and the EG regulations apply to landfills that were constructed or modified before May 1991, but accepted waste after November 8, 1987. These regulations are specified at 40 CFR 60, Subpart Cc ("Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills" promulgated on March 12, 1996, and amended on June 16, 1998) and Subpart WWW ("Standards of Performance for Municipal Solid Waste Landfills" promulgated on March 12, 1996, and amended on June 16, 1998).

The federal regulations state that MSW landfills with a design capacity less than 2.5 million megagrams or 2.5 million cubic meters of municipal solid waste must submit an initial design capacity report to the U.S. Environmental Protection Agency (U.S. EPA). MSW landfills that meet or exceed the design capacity threshold of at least 2.5 million megagrams and 2.5 million cubic meters of municipal solid waste are subject to NSPS or EG emissions requirements. (Such MSW landfills are also subject to permitting requirements at 40 CFR 70 and 40 CFR 71.) These emissions requirements dictate that the landfill NMOC emissions rate must be calculated annually using the procedures specified at Subparts Cc and WWW. If an NMOC annual report indicates that the landfill has an NMOC emissions rate above 50 megagrams per year, the landfill must install a landfill gas collection and control system within 30 months of the NMOC annual report.

As applied to the eligibility requirements for landfill gas offset projects at Model Rule subsection XX-10.5(a)1, MSW landfills are considered to be subject to NSPS at 40 CFR 60, Subparts Cc and WWW if the landfill is subject to the emissions requirements at Subpart Cc 60.33c(e) or Subpart WWW 60.752(b). "Subject to" as used in the Model Rule is distinct from applicability under 40 CFR 60, Subparts Cc and WWW, as the federal regulations apply to all MSW landfills (applicability for a landfill under either Subpart Cc or WWW is based on the date of landfill construction or modification).[20] Therefore, "subject to" as used in the Model Rule addresses the subset of landfills to which Subparts Cc and WWW apply and that are also subject to emissions requirements. Use of the term "applicability" under the federal regulations to mean "subject to" as used in the Model Rule would preclude all MSW landfill gas offset projects from eligibility for the award of CO_2 offset allowances, which is not the intended result.

The federal regulations at 40 CFR 60 are applied to a landfill as a whole, rather than individual landfill cells, because the boundaries of a particular landfill are defined as inclusive of adjacent landfill cells. As a result, the design capacity report and NMOC thresholds are applicable to the entire MSW landfill, as defined in 40 CFR Part 60. Consequently, the initial design capacity report and other required documentation refers to the total landfill design capacity.

According to 40 CFR Part 60, Subparts Cc and WWW, the definitions of key terms for landfills include:

"*Municipal solid waste landfill* or *MSW landfill* means an entire disposal facility in a contiguous geographical space where household waste is placed in or on land. An MSW landfill may also receive other types of RCRA Subtitle D wastes such as commercial solid waste, nonhazardous sludge, conditionally exempt small quantity generator waste, and industrial solid waste. Portions of an MSW landfill may be separated by access roads. An MSW landfill may be publicly or privately owned. An MSW landfill may be a new MSW landfill, an existing MSW landfill, or a lateral expansion."[21] (Defined in both 40 CFR 60.31c and 60.751)

"Lateral expansion means a horizontal expansion of the waste boundaries of an existing MSW landfill. A lateral expansion is not a modification unless it results in an increase in the design capacity of the landfill." (Defined only in 40 CFR 60.751)

"Modification means an increase in the permitted volume design capacity of the landfill by either horizontal or vertical expansion based on its permitted design capacity as of May 30, 1991. Modification does not occur until the owner or operator commences construction on the horizontal or vertical expansion." (Defined only in 40 CFR 60.751)

IV.2 Explanation or Clarification for Sulfur Hexafluoride (SF_6) Offset Projects

SF_6 offset projects reduce SF_6 emissions from electricity transmission and distribution equipment through leak reduction, capture and storage, recycling, and destruction.

This section discusses certain parts of the model Reduction in Emissions of SF_6 Consistency Application instructions that may require further explanation or clarification. For each topic area, an excerpt from the application instructions is provided, which is then followed by explanation or

[20] See 40 CFR 60, Subpart Cc 60.32c(a) and 40 CFR 60, Subpart WWW 60.750(a).

[21] The EPA NSPS and EG regulations at 40 CFR 60, Subparts Cc and WWW are applicable only to MSW landfills.

clarification. This section is organized in order of the sections of the Consistency Application instructions.

Consistency Application Form 2.2 – Demonstration of Eligibility (determining SF_6 nameplate capacity when calculating entity-wide SF_6 emissions rate)

When documenting that an electricity transmission and/or distribution entity SF_6 offset project is eligible for the award of CO_2 offset allowances, the project sponsor must calculate the baseline entity-wide SF_6 emissions rate and compare it to the applicable emissions rate performance standard for the entity's region, as designated at Model Rule subsection XX-10.5(b)(1)(ii), Table 1. Calculating the entity-wide SF_6 emissions rate involves dividing the total amount of SF_6 emitted by the entity during the baseline year with the total SF_6 nameplate capacity of SF_6-containing equipment of the entity for that year. Explanation is provided below to clarify the appropriate procedures for calculating entity-wide SF_6 nameplate capacity.

Instructions for Form 2.2 section 1 include the following text, denoted below in italics:

Calculate and enter the baseline year SF_6 emissions rate for the transmission and/or distribution entity where indicated on the form. Based on [Model Rule subsection XX-10.5(b), Table 1], enter the applicable emissions rate performance standard that applies to the entity where indicated on the form.

To demonstrate that the offset project has an SF_6 entity-wide emissions rate for the baseline year that is less than the applicable emissions rate performance standard, calculate the emission rate using the following formula:

SF_6 Emissions Rate (%) = [(Total SF_6 Emissions for Baseline Year)/ (Total SF_6 Nameplate Capacity at End of Baseline Year)] x 100

The entity-wide emissions used to calculate the entity-wide emissions rate entered in Form 2.2 must be that provided in Form 2.3 to document baseline year SF_6 emissions for the transmission and/or distribution entity. Total SF_6 nameplate capacity at the end of the baseline year must be that provided in the Entity-wide SF_6 Inventory Tracking System as an attachment to Form 2.3.

Explanation:

Model Rule subsection XX-10.5(b)(1)(ii) defines entity-wide SF_6 nameplate capacity as the SF_6 contained in "*all SF_6-containing equipment owned and/or operated by the entity, at full and proper SF_6 charge of the equipment rather than the actual charge of the equipment (which may reflect leakage)*." In some cases, such as with newer equipment, it may be appropriate to determine the SF_6 nameplate capacity of the equipment by using the equipment specifications supplied by the equipment manufacturer. These specifications usually can be located on a plaque affixed to the equipment. Where manufacturer specifications are not available or the equipment has been altered after it was manufactured, the nameplate capacity can be estimated by removing all of the SF_6 contained in the equipment when it is fully charged and weighing the amount of gas that is recovered.

Consistency Application Form 2.2 – Demonstration of Eligibility (definition of an urban area)

If the baseline entity-wide SF_6 emissions rate is greater than the transmission and/or distribution entity's applicable SF_6 emissions rate performance standard for the region where the entity is located, as designated at Model Rule subsection XX-10.5(b)(1)(ii), Table 1, the entity may still be eligible for an SF_6 offset project, provided the project is being implemented at an entity serving a predominantly urban service territory and the entity meets two of the four additional Model Rule criteria (see Model Rule subsection XX-10.5(b)(1)(iii)) listed in Form 2.2 of the Consistency Application.

Explanation is provided below clarifying the definition of urban area for use in documenting if a transmission and/or distribution entity serves a predominantly urban service territory.

Instructions for Form 2.2, section A include the following text, denoted below in italics:

An urban area consists of an urbanized area (UA) or an urban cluster (UC). An urbanized area consists of core census block groups or blocks that have a population density of at least 1,000 people per square mile. An urban cluster consists of surrounding census blocks that have an overall density of at least 500 people per square mile.

Explanation:

The definition of urban area used in the Consistency Application was adapted from the U.S. Census Bureau definition of an urbanized area, which follows below in italics:

For Census 2000, the Census Bureau classifies as "urban" all territory, population, and housing units located within an urbanized area (UA) or an urban cluster (UC). It delineates UA and UC boundaries to encompass densely settled territory, which consists of:

- *core census block groups or blocks that have a population density of at least 1,000 people per square mile and*
- *surrounding census blocks that have an overall density of at least 500 people per square mile*

In addition, under certain conditions, less densely settled territory may be part of each UA or UC.

The Census Bureau's classification of "rural" consists of all territory, population, and housing units located outside of UAs and UCs. The rural component contains both place and nonplace territory. Geographic entities, such as census tracts, counties, metropolitan areas, and the territory outside metropolitan areas, often are "split" between urban and rural territory, and the population and housing units they contain often are partly classified as urban and partly classified as rural.

Additional information is available at http://www.census.gov/geo/www/ua/ua_2k.html.

Consistency Application Form 2.2 – Demonstration of Eligibility (older than national average age of equipment)

If the baseline entity-wide SF_6 emissions rate for an electricity transmission and/or distribution entity is greater than the SF_6 emissions rate performance standard for the region where the transmission and/or distribution entity is located, as designated at Model Rule subsection XX-10.5(b)(1)(ii), Table 1, an SF_6 offset project may still be eligible for the award of CO_2 offset allowances if the project is being implemented at an entity serving a predominantly urban service territory and the entity meets two of the four additional criteria (see Model Rule subsection XX-10.5(b)(1)(iii)) listed in Form 2.2 of the Consistency Application. One of the additional criteria is that "the entity is comprised of older than average installed transmission and distribution equipment in relation to the national average age of equipment."

Explanation is provided below clarifying the basis for the estimate of national average age of equipment provided in the Consistency Application for use in documenting if the entity meets the "older than average installed transmission and distribution equipment" criterion.

Instructions for Form 2.2, section B include the following text, denoted below in italics:

> b. *Age of Equipment: Provide documentation that the entity is comprised of transmission and distribution equipment that is older than the national average age of equipment. Identify the year of purchase or year of installation of each piece of installed transmission and distribution equipment that has an SF_6 nameplate capacity. Divide the SF_6 nameplate capacity of the equipment that is older than the national average age of transmission and distribution equipment (30 years)[22] by the total SF_6 nameplate capacity used to calculate the baseline entity-wide emissions rate. If the result is greater than 75% of the total SF_6 nameplate capacity, no further documentation is required.*
>
> > *If the result is 75% or less of the total SF_6 nameplate capacity, provide additional narrative and documentation to demonstrate that the entity is comprised of older than average installed transmission and distribution equipment in relation to the national average age of equipment.*

Explanation:

The national average age of installed transmission and distribution equipment is approximately 30 years, based on an assessment made by a U.S. Department of Energy (U.S. DOE)-funded study that revealed that 75 percent of transmission lines are 25 years old or older; 75 percent of power transformers are 25 years or older; and 60 percent of circuit breakers are 30 years or older.[23] The 30-year average for transmission and distribution equipment serves as the best proxy available as a reasonable average age for SF_6-containing equipment. While there are utilities replacing older SF_6-containing breakers with newer SF_6-containing breakers, as well as

[22] *The [Regulatory Agency] generally considers the national average age of equipment to be 30 years, and this figure should be used by project sponsors for this calculation. If the project sponsor believes that 30 years does not accurately reflect the national average, the project sponsor should provide additional narrative justifying the use of a different number for the national average.*

[23] Global Environmental Fund and the Center for Smart Energy, *The Emerging Smart Grid: Investment and Entrepreneurial Potential in the Electric Power Grid of the Future*, October 2005. Available at: http://www.smartgridnews.com/artman/uploads/1/sgnr_2007_0801.pdf.

some utilities that are replacing oil breakers with SF_6 breakers, equipment containing SF_6 had entered the U.S. grid as far back as the 1960's when the first generation of SF_6 equipment—dual pressure (SF_6-containing) breakers—was introduced. Technology improvements in the 1970's also introduced SF_6 puffer breakers.[24]

Consistency Application Form 2.2 – Demonstration of Eligibility (inherently leak-prone equipment)

If the baseline entity-wide SF_6 emissions rate for an electricity transmission and/or distribution entity is greater than the SF_6 emissions rate performance standard for the region where the transmission and/or distribution entity is located, as designated at Model Rule subsection XX-10.5(b)(1)(ii), Table 1, an SF_6 offset project may still be eligible for the award of CO_2 offset allowances if the project is being implemented at an entity serving a predominantly urban service territory and the entity meets two of the four additional criteria (see Model Rule subsection XX-10.5(b)(1)(iii)) listed in Form 2.2 of the Consistency Application. One of the additional criteria is that the "required purpose or design for a substantial portion of the entity's transmission or distribution equipment results in inherently leak-prone equipment."

Explanation is provided below to assist in documenting whether the entity meets the "inherently leak-prone equipment" criterion.

Instructions for Form 2.2, section E include the following text, denoted below in italics:

e. *Inherently Leak-Prone Equipment: Provide documentation that required equipment purpose or design for a substantial portion of entity equipment results in inherently leak-prone equipment. Identify the manufacturer, model, and SF_6 nameplate capacity of each piece of equipment that has a required purpose or design that result in it being inherently leak-prone.*

   Inherently leak prone equipment is generally considered to be SF_6-containing operating equipment with an average annual SF_6 leak rate of 10% or higher since its installation. If actual equipment leak data are unavailable, estimate the average annual leak rates for individual pieces of equipment based on the number of service calls required since the equipment's installation and the amount of SF_6 leakage that typically triggers a service call (e.g. 10% loss of nameplate capacity). For example, a piece of equipment in service for three years that has required six service calls since its installation meets the definition of inherently leak-prone since its implied average annual leak rate of 20% (two service calls per year and assumed 10% loss of nameplate capacity per service call) is greater than the average annual leak rate of 10%.

   Total the SF_6 nameplate capacity of the inherently leak-prone equipment. Divide that total by the total SF_6 nameplate capacity used to calculate the baseline entity-wide emissions rate. If the result is greater than 33% of the nameplate capacity of SF_6-containing operating equipment, no further documentation is required.

   If the result is 33% or less of the total SF_6 nameplate capacity, provide additional narrative and documentation to demonstrate that required equipment purpose or

[24] Rittenhouse, T., *HV Breaker Maintenance – What Should Utilities be Doing?* T&D Guardian Volume II – Issue 2, June 2005. Available at: http://na.ptd.siemens.com/newsletters/services/06_2005/hv_breaker_maintenance.html.

design for a substantial portion of entity transmission and distribution equipment results in inherently leak-prone equipment.

Explanation:

For the purposes of defining "inherently leak prone", a 10-percent average annual SF_6 leak rate threshold was chosen based on current equipment "top up" practices that utilize pre-defined density or pressure alarm trigger levels. The triggering of an alarm is technically the result of a reduction in the gas density or pressure of SF_6-containing equipment. This reduction is associated with a loss of SF_6 gas. Thesen (2004) uses the Ideal Gas law to evaluate the relationship between SF_6 gas density reduction and SF_6 capacity losses.[25] A positive correlation was noted with a drop in 10 percent gas density equating to a 10 percent decrease in SF_6 mass relative to the original charge of the equipment. This observation was also noted in Blackman et al. (2006), which reviewed "top-up" practices for over 2,300 circuit breakers manufactured between 1998 and 2002.[26] Generally, alarm trigger levels will vary by utility depending on their maintenance policy. While it is also recognized that alarms, depending on the type of meter in use, may sometimes trigger for non-gas loss related reasons (e.g., alarm may be triggered by inaccurate temperature readings obtained through surface mounted sensors), it is used in the Consistency Application as the basis for defining inherently leak prone equipment, since service calls and associated SF_6 "top ups" following alarms are closely monitored and recorded. As the application instructions explain, if actual equipment leak data are unavailable, average annual leak rates for individual pieces of equipment can be estimated using: (i) the number of service calls required since the equipment's installation; and (ii) the amount of SF_6 that is typically "topped up" during each service call. Both the frequency of service calls as well as quantity of SF_6 added per service call must be taken into consideration in determining whether SF_6 insulated equipment is inherently leak prone. When an alarm is triggered, maintenance crews are typically dispatched to the equipment to "top-up" SF_6 losses. These events typically are recorded, which will provide the information necessary (i.e., measurements of the total SF_6 gas used to top up the equipment) to estimate losses.

The following hypothetical scenarios demonstrate why it is important to consider both the frequency of service calls since installation and the quantity of SF_6 gas used to fill the equipment at each event:

- The 10 percent minimum leak rate threshold would *not* be met if a piece of equipment that has been in service for 20 years has only been topped up with SF_6 two times since its installation, with each service call-related "top up" resulting in the addition of 10 percent of SF_6 capacity. In such a case, the average annual leak rate would be one percent (i.e., two maintenance events equating to 20 percent cumulative loss of SF_6 nameplate capacity divided by 20 years).

[25] S. Thesen, *PG&E and the New Breaker SF_6 Leak Study*. EPA Conference on SF_6 and the Environment: Emission Reduction Strategies, Scottsdale, Arizona, December 2004. Available at: http://epa.gov/electricpower-sf6/documents/conf04_thesen_paper.pdf.

[26] Blackman, J., M. Averyt, and Z. Taylor, *SF_6 Leak Rates from High Voltage Circuit Breakers – U.S. EPA Investigates Potential Greenhouse Gas Emissions Source*, Proceedings of the 2006 IEEE Power Engineering Society General Meeting, Montreal, Quebec, Canada, June 2006. Available at: http://www.epa.gov/electricpower-sf6/resources/index.html#four.

- The 10 percent minimum leak rate threshold would be met for a piece of equipment in service for two years that has been topped up with SF_6 four times since its installation. Each service call is assumed to reflect a reduction in gas density equivalent to a five percent loss of SF_6 capacity. The average annual leak rate would be 10 percent (i.e., four maintenance events equating to 20 percent cumulative loss of SF_6 nameplate capacity divided by two years).

It should also be noted that although older equipment is more prone to leak SF_6, particularly equipment using dual pressure technology, newer equipment, which is built to low leakage limits of 0.5 percent per year (based on the International Electrotechnical Commission Standard 62271-1, 2004), may also be leak prone if it meets the criterion of having an average annual SF_6 leak rate of 10 percent or greater following its installation.

Consistency Application Form 2.4 – Monitoring and Verification Plan (general procedures for maintenance of the cylinder-specific log)

As part of the Monitoring and Verification Plan, the project sponsor must provide an "inventory tracking system procedures and training" document, including—among other things—a master sheet identifying all SF_6-containing cylinders used by the transmission and/or distribution entity with unique cylinder identifiers and a standardized cylinder log form where the weight of each cylinder is entered before and after it is used.

Explanation is provided below to assist in providing proper information in the cylinder master sheet and cylinder log form.

Instructions for Form 2.4, section 2 include the following text, denoted below in italics:

Procedures for the maintenance of cylinder-specific logs, including maintenance of a master sheet identifying all cylinders using unique identifiers, and a standardized cylinder log form that includes (A) Location and specific identifying information of the equipment being filled with the SF_6 gas from the cylinder; (B) Location and specific identifying information of the equipment from which SF_6 is being recovered and placed into the cylinder for transfer, reuse, recycling, reclamation, or destruction purposes; and (C) Weight of the cylinder before and after: (1) the cylinder is connected to and disconnected from an automated gas top-off and filling system; or (2) any activity where gas is manually added to or removed from a cylinder…

Explanation:

The cylinder-specific log must indicate the location and specific identifying information of the equipment being filled with SF_6, or from which SF_6 is reclaimed, and the weight of the cylinder before and after this activity. Model Rule subsection XX-10.5(b)(5)(i) specifies that cylinder logs must be retained with the cylinder and returned with the cylinder to the centralized storage facility when the activity is complete or the cylinder is empty. If temperature and pressure readings are used to derive interim weight measurements, the cylinder-specific log also should indicate the method used to determine the cylinder weight.

The cylinder-specific log may be in the form of a physical log attached to the cylinder or an electronic database system that utilizes a scanable bar-code tag attached to the cylinder. In either case, a log must be created and retained (virtually, in the case of an electronic system) with each cylinder that is used to fill equipment or reclaim SF_6 from equipment. A scanable bar-code approach should allow for an electronic version of the log to be accessible to field

personnel handling the cylinders for data entry and data review at all times, either through a bar-code scanner, lap-top, or a combination of both. Care should be taken in using a bar-code approach to ensure that the bar-codes are protected from exposure to the elements, which could impair their function.

Consistency Application Form 2.4 – Monitoring and Verification Plan (frequency of recording cylinder weights in cylinder log)

As part of the Monitoring and Verification Plan, the project sponsor must provide documentation of an "inventory tracking system procedures and training" document that includes—among other things—a standardized cylinder log form where the weights of SF_6-containing cylinders must be entered before and after they are used.

Explanation is provided below to clarify specific activities that constitute "use" of SF_6-containing cylinders.

Instructions for Form 2.4, section 2 include the following text, denoted below in italics:

Procedures for the maintenance of cylinder-specific logs, including maintenance of a master sheet identifying all cylinders using unique identifiers, and a standardized cylinder log form that includes…(C) Weight of the cylinder before and after: (1) the cylinder is connected to and disconnected from an automated gas top-off and filling system; or (2) any activity where gas is manually added to or removed from a cylinder.

Explanation:

SF_6-containing cylinders that typically are stored at a centralized storage facility and are used temporarily in a different location for SF_6 filling or reclamation activities (e.g., kept on site at the point of use, such as a substation) may be weighed before leaving the centralized location and after returning to the centralized location for purposes of recording the weight of the cylinder before and after the activities. In this scenario, "use" of the cylinder is considered filling and/or reclamation of SF_6 for multiple pieces of equipment at a single site (e.g., a substation where the cylinder remains until it is returned to the centralized storage facility). However, the beginning-of-year and end-of-year SF_6 inventory, as calculated using the mass-balance formula, must include the beginning-of-year and end-of-year weight of all SF_6-containing cylinders and other equipment (e.g., gas carts) used by the transmission and/or distribution entity, regardless of whether the cylinders have been returned to the centralized storage facility.

As stated in the application instructions, when the cylinder is connected to an automated gas filling device (e.g., manifold) at a point of use (e.g., substation), the cylinder needs to be weighed only before and after it is connected to the automated filling equipment. However, the beginning-of-year and end-of-year SF_6 inventory, as calculated using the mass-balance formula must include the beginning-of-year and end-of-year weight of all cylinders and other containers (e.g., gas carts) used by the transmission and/or distribution entity, including cylinders that are connected to automated filling equipment.

Consistency Application Form 2.4 – Monitoring and Verification Plan (appropriate methods for recording cylinder weights before and after use)

As part of the Monitoring and Verification Plan, the project sponsor must provide documentation of an "inventory tracking system procedures and training" document that includes—among other

things—a standardized cylinder log form where the weights of cylinders must be entered before and after they are used.
Explanation is provided below to clarify acceptable methods for measuring cylinder weights to be recorded in the cylinder log.

Instructions for Form 2.4, section 2 include the following text, denoted below in italics:

Note that estimating the weight of a cylinder using temperature and pressure to estimate SF_6 disbursed from or added to a cylinder is permitted for interim measurements of cylinder weight throughout the year. However, estimating cylinder weight using temperature and pressure is not allowed for determining beginning-of-year and end-of-year cylinder weight. Physical weighing of cylinders using a certified scale is the only acceptable method for calculating cylinder weights that will be used to determine inputs to the mass-balance formula.

Explanation:

Model Rule subsection XX-10.5(b)(5)(i) requires that the weight of each SF_6-containing cylinder be measured before and after the cylinder is used to fill equipment or reclaim SF_6 from equipment and that the weight of the cylinder after each activity must be documented in a cylinder log retained with the cylinder. Fulfilling this requirement may involve measuring a single cylinder numerous times throughout the year. It is acceptable to use temperature and pressure-based calculations to estimate the weight of a cylinder for purposes of entering interim weights in the cylinder log, as long as the interim measurements estimated by this method are not used to determine the beginning-of-year weight and end-of-year weight of a cylinder for use in the annual SF_6 entity-wide inventory. It is not acceptable to use temperature and pressure-based estimates for calculating the beginning-of-year or end-of-year SF_6 inventories.

SF_6 liquefied gas has a unique pressure-volume-temperature relationship. Pressure readings will not consistently provide precise measurements of the weight of SF_6 in a cylinder, given that the SF_6 in the cylinder or container may be in both a gaseous and liquefied state at the same time. During extraction, for example, the liquefied SF_6 within the cylinder expands, turning into a gas. The gaseous SF_6 is extracted. This process cools the cylinder very quickly. The cooling effect can cause the bottom half of the outside of the cylinder to freeze (from the condensation and freezing of ambient moisture) causing the liquid SF_6 remaining in the cylinder to remain as liquid because it is cooled to the point where it can no longer vaporize, regardless of changes in pressure. The decrease in cylinder temperature is the result of a rapid pressure drop from the extraction of gas from the cylinder. In this case, a zero PSIG pressure reading of the cylinder in this state could be misinterpreted as an empty cylinder despite there being liquid SF_6 remaining as the “heel” in the cylinder.

Because the beginning-of-year and end-of-year entity-wide SF_6 inventories are calculated by summing the weights of all SF_6-containing cylinders and other containers as recorded in cylinder logs, the first and last weight recorded in each cylinder log for a given year must be measured using a certified scale. If temperature and pressure-based calculations are used to estimate interim weights of cylinders or containers before and after each SF_6 filling or reclamation activity occurring throughout the year, the method of weight measurement should be described in the cylinder log. When the beginning-of-year and end-of-year entity-wide SF_6 inventories are totaled, any cylinder with the last measurement shown as being weighed using the pressure and temperature-based calculation must be re-weighed using a certified scale and the cylinder weight re-recorded in the cylinder log.

IV.3 Explanation or Clarification for Avoided Conversion, Improved Forest Management and Reforestation Offset Projects

Forest projects increase removals of CO_2 from the atmosphere, or reduce or prevent emissions of CO_2 to the atmosphere, through increasing and/or conserving forest carbon stocks. This section discusses the calculation tools and guidance documents that are available to assist project sponsors and verifiers with the development, verification, and ongoing monitoring of forest offset projects. The calculation tools and guidance clarify requirements to project sponsors, improve verification efficiency, and reduce the time needed in project oversight by participating states. Guidance documents that accompany each of the calculation tools provide an introduction to the tool and step-by-step instructions in its use. These calculation tools and guidance documents are available online (see www.rggi.org) and include:

Supplemental Quantification Guidance (Consistency Application Form 2.3 – Baseline Modeling and Form 2.4 – Monitoring and Verification Plan)

The guidance provides best management practices for project sponsors and independent verifiers in developing project estimates and baselines. Adherence to the guidance in this document will help to ensure sound inventory practices (including inventory update processes), standardize data conversions, understand risks associated with the use of regression estimators for tree heights, and model project baselines. Furthermore, adherence to the practices outlined in this document will do much to prepare projects for verification.

A Streamlined Approach to the Component Ratio Method (Monitoring and Verification Report Form 2.2 – Determination of Reporting Period Sequestration)

The Component Ratio Method (CRM) is a means to calculate biomass in various portions of the tree, including below ground, stump, bark, branches, and top, from biomass calculated in the bole of the tree using biomass equations provided by RGGI. The calculations can be complex and produce biomass estimates for portions of the tree that are not reported independently. For example, the U.S. Forest Projects Offset Protocol is only concerned with the biomass component of the bole for wood products calculations, and the rest of the tree for deriving estimates of standing live and dead trees. Since the sums of the streamlined and default CRM calculations are equal, the simplified methodology allows project sponsors to avoid unnecessary calculations and use only portions of the CRM that are pertinent to the protocol.

Annual Monitoring Calculation Worksheets (Monitoring and Verification Report Form 2.2 – Determination of Reporting Period Sequestration)

The Annual Monitoring Calculation Worksheet is a tool that standardizes and simplifies the compilation of project data and provides greater assurance that the reported summary data are calculated without error. Separate worksheets are available for each of the U.S. forest project types.

Harvested Wood Products Worksheet (Monitoring and Verification Report Form 2.2 – Determination of Reporting Period Sequestration)

The reporting of harvested wood products, both in the baseline and in the project activity, is very complex. It involves many steps, including deriving estimates of the metric tons of CO_2e in logs delivered to the mill, the portion of the logs that are output as wood products, and the long term persistence of CO_2e in the generated wood products, both in and out of landfills. The worksheet

is designed to ensure that project sponsors completely address the protocol requirements and perform their calculations with the appropriate values.

Sequential Sampling Worksheets (Monitoring and Verification Report Form 3.1 – Independent Verifier Certification Statement and Report)

Sequential sampling is a required method for independent verifiers to accomplish the task of ensuring that the project sponsor's field measurements are within specified tolerances. The sequential sampling worksheets are tools designed to facilitate the verification of project data. Independent verifiers enter the project sponsor's data into the worksheets and compare them to their own measurements. The worksheets advise the verifier when sufficient oversight of field measurements has been achieved.

IV.4 Explanation or Clarification for Afforestation Offset Projects (CT and NY only)

Afforestation offset projects sequester carbon through the conversion of land from a non-forested to a forested condition.

This section discusses certain parts of the model Afforestation Consistency Application instructions that may require explanation or clarification. For each topic area, an excerpt from the application instructions is provided, which is then followed by explanation or clarification. This section is organized in order of the sections of the Consistency Application instructions.

Consistency Application Forms 2.3 and 2.4 and M&V Report Form 2.1 – Defining Sub-populations and Number of Sampling Plots

Forms 2.3 and 2.4 of the Consistency Application and Form 2.1 of the M&V Report require information about designation of sub-populations within the offset project boundary and designation of sampling plots.

Form 2.3 in the Consistency Application (Sequestration Baseline) requires:

- a map showing baseline sub-populations
- number, sizes, and locations of baseline sampling plots

Form 2.4 in the Consistency Application (Monitoring and Verification Plan) requires:

- a map showing reporting period sub-populations
- number, sizes, and locations of reporting period sampling plots

Form 2.1 in the M&V Report (Demonstration of Conformance with M&V Plan) requires:

- a map showing reporting period anticipate sub-populations
- number, sizes, and locations of reporting period sampling plots

Explanation is provided below to clarify appropriate procedures for defining sub-populations and the number of sampling plots.

Instructions for Consistency Application Form 2.3, sections B.4 and B.5, include the following text, denoted below in italics:

Designation of Baseline Sub-populations. Attach a map to scale showing how the area within the offset project boundary was divided into baseline sub-populations that form relatively homogenous units. The map or an accompanying attachment must include a description of how vegetation and tree species – both currently on the property and those to be planted for the offset project – and site factors (e.g., soil type, elevation, slope, age class) were considered in designating sub-populations.

Baseline Sampling Plots. Attach a description of the methodology used for determining the numbers, sizes, and locations of sampling plots for each sub-population. The description must include photos and locations of sampling plots with distinct identifiers to provide for verification of the baseline by an independent verifier or the [Regulatory Agency].

The attached description must demonstrate that the minimum number of sampling plots for each sub-population was determined consistent with the following equation:

$$n = [(s \times 1.960)/(mean \times re)]^2$$

where:

- n = *required number of sampling plots for each sub-population*
- s = *standard deviation of mean carbon content for the sampling plots*
- $mean$ = *mean reported carbon content for the sampling plots*
- re = *0.08, which is the level of sampling error to assure a total maximum error of 10% for the 95% confidence interval, assuming total error due to measurement error of 0.02*

The description must state how the value of "s" in the equation above was estimated when calculating the minimum number of sampling plots for the baseline in the absence of a known value for the standard deviation. Estimation of "s" can be based on pilot studies on the project property or experience on similar non-forested properties.

The description must state how the value of "mean" was estimated when calculating the minimum number of sampling plots for the baseline in the absence of a known value for the mean. Estimation of "mean" can be based on pilot studies on the project property or experience on similar non-forested properties.

The description must demonstrate that the process for determining the minimum number of sampling plots was repeated for each sub-population.

Note that the number, size, and locations of sampling plots used in the baseline need not be the same as those used during subsequent reporting periods for calculating carbon sequestration due to the offset project.

Instructions for Consistency Application Form 2.4, sections 1 and 2, include the following text, denoted below in italics:

The M&V Plan must include the following:

1. Designation of Sub-Populations. Attach a map to scale showing how the area within the offset project boundary will be divided into reporting period sub-populations that form relatively homogenous units. The map or an accompanying attachment must include a description of how vegetation and tree species – both currently on the property and those planted for the offset project – and site factors (e.g., soil type, elevation, slope, age class) will be considered in designating reporting period sub-populations that form relatively homogenous units.

Note that the number, size, and locations of sub-populations used for calculating sequestration due to the offset project need not be the same as those used in determining the sequestration baseline.

2. Sampling Plots. Attach a description of the methodology for determining the number, sizes, and locations of sampling plots to be used for calculating project sequestration for each sub-population. The methodology must include provisions for taking photos and documenting locations of sampling plots with distinct identifiers to provide for verification of monitoring reports by an independent verifier or the [Regulatory Agency].

The attached description must demonstrate that the minimum number of sampling plots for each sub-population will be determined consistent with the following equation:

$$n = [(s \times 1.960)/(mean \times re)]^2$$

where:

n	=	*required number of sampling plots for each sub-population*
s	=	*standard deviation of mean carbon content for the sampling plots*
mean	=	*mean carbon content for the sampling plots*
re	=	*0.08, which is the level of sampling error to assure a total maximum error of 10% for the 95% confidence interval, assuming total error due to measurement error of 0.02*

The description must state how the value of "s" in the equation above will be estimated when calculating the minimum number of sampling plots to be used for project monitoring in the absence of a known value for the standard deviation. Estimation of "s" can be based on pilot studies on the project property, applicable baseline results, or experience on similar properties.

The description must state how the value of "mean" will be estimated when calculating the minimum number of sampling plots to be used for project monitoring in the absence of a known value for the mean. Estimation of "mean" can be based on pilot studies on the project property, applicable baseline results, or experience on similar properties.

The description must demonstrate that the process for determining the minimum number of sampling plots will be repeated for each sub-population.

Instructions for M&V Report Form 2.1, sections 1 and 2, include the following text, denoted below in italics:

The M&V Report must include the following:

1. Identification of Sub-populations. Attach a map to scale identifying how the area within the project boundary is divided into sub-populations for determining project carbon sequestration.

2. Identification of Sampling Plots. Attach a list of the number, sizes, and locations of all sampling plots used for calculating carbon sequestration during the reporting period for each sub-population. Include recent photos of sampling plots and distinct sampling plot identifiers to provide for verification of reported sequestered carbon by an independent verifier or the [Regulatory Agency].

Explanation:

Designation of Sub-populations. Stratification, which is the division of the project area into relatively homogeneous sub-populations, enhances the ability of projects to meet the quantification precision requirements in Model Rule subsection XX-10.5(c)(3)(vii) and decreases sampling costs.

Typically, a project area might be divided into between one and six different sub-populations. The number of sub-populations required for a project to meet quantification precision requirements involves expert judgment. Note that the number, size, and locations of sub-populations used in the baseline need not be the same as those used during subsequent reporting periods for calculating carbon sequestration due to the offset project.

The size and spatial distribution of the land area – one large contiguous block of land or many small parcels – should not influence the designation of sub-populations.

Useful tools for defining baseline and reporting period sub-populations include ground-truthed maps from satellite imagery, aerial photographs, and maps of vegetation, soils, or topography.

Sampling Plots. Project sponsors should consider using more than the minimum number of sampling plots required to meet quantification precision requirements. An excess of plots should be considered to ensure that quantification precision requirements are met in the event of occurrences such as plots that can not be re-found after initial installation and unexpected increases in variability due, for example, to damage from catastrophic winds or floods. For further details, see Sections 3.2.3, 3.2.4, and 3.3 in U.S. Department of Energy, *Technical Guidelines Voluntary Reporting of Greenhouse Gases (1605(b)) Program*; Chapter 1, Emissions Inventories; Part 1 Appendix: Forestry; Section 3: Measurement Protocols for Forest Carbon Sequestration[27].

Note that the number, size, and locations of sampling plots used in the baseline need not be the same as those used during subsequent reporting periods for calculating carbon sequestration due to the offset project.

Consistency Application Form 2.3 and M&V Report Form 2.2 – Achieving Quantification Precision Requirements

[27] See Pearson, Brown, & Bindsey, *Measurement Guidelines for the Sequestration of Forest* Carbon (2007), available as a U.S. Department of Agriculture, Forest Service General Technical Report (NRS-18) http://www.nrs.fs.fed.us/pubs/3292.

Form 2.3 of the Consistency Application (Sequestration Baseline) and Form 2.2 of the M&V Report (Determination of Reporting Period Sequestration) require a demonstration of quantified accuracy. Model Rule subsection XX-10.5(c)(5)(b) requires that reported carbon pool measurements be within 10 percent of the true value at a 95 percent confidence interval.

Explanation is provided below addressing calculation of quantified accuracy.

Instructions for Consistency Application Form 2.3, section B.10 and M&V Report Form 2.2, section B.7 include the following text, denoted below in italics:

The spreadsheet must document that the quantified accuracy was calculated as follows:

a. *Percentage uncertainty in the baseline and reporting period combined carbon stocks in each carbon pool in short tons of CO_2-equivalent was calculated as follows:*

$$U = \sqrt{\left(\sum_{i=1}^{n} U_{sp,i}^{\ 2} \right)}$$

where:

U *Total percentage uncertainty in the combined carbon pools below:*

U_{latb} *Percentage uncertainty (expressed as a percentage of the mean at the 95% confidence interval) for carbon stock in live above-ground tree biomass*

U_{lbtb} *Percentage uncertainty (expressed as a percentage of the mean at the 95% confidence interval) for carbon stock in live below-ground tree biomass*

U_{s} *Percentage uncertainty (expressed as a percentage of the mean at the 95% confidence interval) for soil carbon stock*

U_{lantb} *(Optional) Percentage uncertainty (expressed as a percentage of the mean at the 95% confidence interval) for carbon stock in live above-ground non-tree biomass*

U_{doff} *(Optional) Percentage uncertainty (expressed as a percentage of the mean at the 95% confidence interval) for carbon stock in dead organic matter, forest floor*

U_{docwd} *(Mandatory/optional, as applicable pursuant to Model Rule XX-10.5(c)(3)(i)(d)) Percentage uncertainty (expressed as a percentage of the mean at the 95% confidence interval) for carbon stock in dead organic matter, coarse woody debris*

$U_{sp,\ i}$ *Percentage uncertainty (expressed as a percentage of the mean at the 95% confidence interval) for carbon stock in all carbon pools in sub-population i*

i *1, 2, 3, …n sub-populations*

b. Uncertainty in the carbon stock in each carbon pool was summed across sub-populations as follows:

$$U_j = \sqrt{\left(\sum_{j=1}^{n} U_{j,i}{}^2\right)}$$

where:

U_j *Percentage uncertainty (expressed as a percentage of the mean at the 95% confidence interval) for carbon stock in carbon pool j*

$U_{j,i}$ *Percentage uncertainty (expressed as a percentage of the mean at the 95% confidence interval) for carbon stock in carbon pool j in sub-population i*

j *1, 2, 3….m carbon pools (the carbon pools are: "latb" – live above-ground tree biomass; "lbtb" – live below-ground tree biomass; "s" – soil carbon; "lantb" – live above-ground non-tree biomass; "doff" – dead organic matter, forest floor; "docwd" – dead organic matter, coarse woody debris)*

i *1, 2, 3 …n sub-populations*

Explanation:

The quantification precision requirement of 10 percent of the mean at the 95 percent confidence interval is a higher standard than required by voluntary offset programs, such as the California Climate Action Reserve, especially given that the variable "soil carbon stock" is always mandatory under the Model Rule. However, this precision level can be met across all the measured carbon pools using the uncertainty quantification method, so that a relative lack of precision in one carbon pool, such as soil carbon or dead wood, can be countered by a higher level of precision in another carbon pool or pools, such as live above-ground tree biomass.

Stratification, which is the division of the project area into relatively homogeneous sub-populations, enhances the ability of a project to meet the quantification precision requirement and decreases sampling costs. Offset project sponsors have flexibility to determine sub-population strata, enabling a minimization of variation within strata and maximization of variation between strata. Potential stratification drivers could be baseline land use, planted species, planned management, elevation, aspect (i.e., compass direction a slope faces, which can impact growth rates), soil, and frequency of inundation. Offset project sponsors are also free to determine the allocation of sampling plots between strata so that higher precision may be targeted in easily accessed or easily measured strata to allow for lower precision in other strata, thus lowering sampling costs.

The baseline land cover for afforestation projects is, by definition, non-forested. Thus, rather than property dominated by trees, sporadic trees in non-forested lands are paired with non-tree vegetation, soil carbon, dead wood, and litter. Once the project starts, the baseline ceases to exist and so cannot be monitored through time. Therefore, a one-time measurement of baseline carbon stocks is used against an ongoing monitoring of project carbon sequestration. Both the

form of the baseline carbon stocks and the sources of variability in carbon stocks will differ greatly from the form and variability of carbon stocks during subsequent reporting periods, leading to a different stratification and a different number of sampling plots necessary to achieve the required quantification precision. The consequence is an entirely separate monitoring scheme for the baseline and project scenarios.

IV.5 Explanation or Clarification for Building Sector Energy-Efficiency Offset Projects

This section discusses certain parts of the model building sector energy-efficiency offset project Consistency Application instructions that may require explanation or clarification. For each topic area, an excerpt from the application instructions is provided, which is then followed by explanation or clarification. This section is organized in the order of the sections of the Consistency Application instructions.

Consistency Application Forms 2.1-2.4 – General Documentation Issues

This section provides general explanation for completion of Consistency Application Forms 2.1-2.4.

- Form 2.1 – Project Description
  This form requests general information related to project locations and management, as well as specific information related to the end-use energy conservation measures being implemented.

- Form 2.2 – Demonstration of Eligibility
  This form requests documentation of offset project eligibility. The information provided to document project eligibility covers the building(s) where energy conservation measures will be implemented, as well as technical information about the equipment and workmanship involved in implementing the energy conservation measures.

- Form 2.3 – Emissions Baseline
  This form requests documentation of the emissions baseline by each eligible fuel type. The form also provides a checklist of additional documentation that must be submitted in support of the baseline reported.

- Form 2.4 – Monitoring and Verification Plan
  This form requests provision of the Monitoring and Verification Plan and provides a checklist of components that must be included in the Monitoring and Verification Plan related to methodology and documentation for analyzing performance of energy conservation measures.

Explanation is provided below addressing general documentation issues.

Explanation:

The following general explanation applies to Forms 2.1 through 2.4 in the Consistency Application:

- Eligible building energy-efficiency offset projects reduce CO_2 emissions by reducing onsite combustion of natural gas, oil, or propane for end use in an existing or new commercial or residential building by improving the energy efficiency of fuel usage and/or the energy efficient delivery of energy services. Under this offset category, a building is defined in accordance with ASHRAE 90.1-2004 as "a structure wholly or partially enclosed within exterior walls, or within exterior and party walls, and a roof, affording shelter to persons, animals, or property".

- District heating systems and combined heat and power (CHP) systems are eligible ECMs even if they are located outside the building enclosure, provided they are serving non-electric building energy end uses. The Model Rule does not specify that an offset project must be located at a building, only that the offset project "reduce CO_2 emissions by reducing on-site combustion of natural gas, oil, or propane for end-use in an existing or new commercial or residential building by improving the energy efficiency of fuel usage and/or the energy-efficient delivery of energy services…" (see Model Rule subsection XX-10.5(d)).

- Requirements vary for commercial and residential building projects. However, projects for both building types may be combined in one application.

- A "design intent statement" is a narrative documenting the way the project sponsor intends to satisfy a particular regulatory requirement or documentation requirement in the Consistency Application. Where such statements are required, the Consistency Application instructions specify items that must be included.

- Documentation submission requirements and timelines differ for completed projects and projects in progress. The project sponsor must submit interim documentation for certain items in a Consistency Application for projects in progress and is required to provide final documentation upon project completion as part of the first M&V Report submittal. Documentation instructions are provided in each section of the Consistency Application instructions. Certain final documentation must be provided in the first M&V Report submitted for a project.

- All quantities submitted as part of documentation should include corresponding units.

- All third-party documentation (e.g. studies, manufacturer's specifications, manuals) submitted as part of documentation should include full citations.

Consistency Application Form 2.1 – Project Description (building location and specifications)

Form 2.1 requests general information related to project locations and management, as well as specific information related to the end-use energy conservation measures being implemented.

Explanation is provided below addressing appropriate procedures for providing building location(s) and specifications as part of the project description information.

Instructions for Form 2.1, section 2 includes the following text, denoted below in italics:

2. Building Location(s) and Specifications. Enter the following information in the Project Summary Table in Form 2.1:

- *Unique ID number (e.g., 1,2,3) for each building included in the offset project*
- *Address of each building*
- *Type of each building (existing building, whole-building retrofit, or new construction)*
- *Use of each building (commercial or residential)*
- *Square footage of each building*
- *Total number of buildings included in the offset project*
- *Total square footage for all buildings included in the offset project*

An example of the Project Summary Table is provided below.

[Sample] Project Summary Table

Building ID	Building Address/Location	Building Type	Building Use	Building Sq Ft
		☐ *Existing* ☐ *Whole-building retrofit* ☐ *New*	☐ *Residential* ☐ *Commercial*	
		☐ *Existing* ☐ *Whole-building retrofit* ☐ *New*	☐ *Residential* ☐ *Commercial*	
		☐ *Existing* ☐ *Whole-building retrofit* ☐ *New*	☐ *Residential* ☐ *Commercial*	
Total # of Buildings: _____		**Total Sq Ft: _____**		

***NOTE:** Multifamily residential projects more than three stories above grade should be classified as "commercial," in accordance with ASHRAE Standard 90.1-2004.*

Explanation:

The unique "Building ID" is to be self-assigned by the applicant.

Some energy conservation measures (ECMs) will impact multiple buildings simultaneously. For example, when a district heating system serves a number of buildings on a campus, implementing an ECM for the district heating system impacts multiple buildings. In such an instance, each of the buildings to be served by the ECM must be listed with a separate building ID.

Consistency Application Form 2.1 – Project Description (equipment and materials specifications)

Form 2.1 requests general information related to project locations and management, as well as specific information related to the end-use energy conservation measures (ECMs) being implemented. This includes documentation that the ECMs are eligible.

Explanation is provided below addressing ECM eligibility. Several examples of eligible and ineligible ECMs are provided for each measure category listed in the Model Rule subsections XX-10.5(d)(1)(i)(a)-(g), as well as specific clarification of some of the more complex measure categories.
Instructions for Form 2.1, section 5 include the following text, denoted below in italics:

5. Equipment and Material Specifications. Include the following information:

a. Identify the category of each applicable ECM, using the corresponding identification letter from the Categories of Eligible Energy Conservation Measures key in the Table (include only eligible ECMs).

b. Assign each ECM a unique ID number (e.g., 1,2,3).

c. Describe the specific measure taken or to be taken, including the manufacturer, model, capacity, and energy efficiency or energy performance of both original and new equipment or materials.

d. Specify the building ID numbers, consistent with those specified in the Project Summary Table in Form 2.1, for all buildings affected by the ECM.

e. For each ECM, enter the quantity of equipment or material installed and the unit of measure for the equipment or material installed (e.g., for a furnace, one unit or one piece of equipment; for ceiling insulation upgrades, ceiling square footage; etc.).

f. Specify the type(s) of fuel impacted using the letter codes provided in the Types of Fuel key in the table. Include both pre-installation and post-installation fuel type(s), even if there will be no fuel change.

Explanation:

The following table provides examples of eligible and ineligible projects for each ECM category.

Energy Conservation Measure (ECM) Category	***Examples of Eligible ECMs***	***Examples of Ineligible ECMs***
(a) improvements in the energy efficiency of combustion equipment that provides space heating and hot water, including a reduction in fossil fuel consumption through the use of solar and geothermal energy	• Replacement of gas fired hot water heater, furnace, or boiler with more efficient unit • Solar preheating of air or hot water • Geothermal preheating of air or hot water • The space and/or water heating component of a CHP system	• Using solar panels to generate electricity • Replacement of electric water heaters with more efficient electric water heaters • Electricity generation component of a CHP system

Energy Conservation Measure (ECM) Category	*Examples of Eligible ECMs*	*Examples of Ineligible ECMs*
(b) improvements in the efficiency of heating distribution systems, including proper sizing and commissioning of heating systems	• Heat exchangers to recapture energy from conditioned air • Choosing smaller units when replacing combustion equipment (right-sizing) • Commissioning (unless mandated by reference standards) • Recommissioning • Duct improvements (such as increasing insulation or decreasing leakage) • Installing ceiling fans (or other destratification technique) (only the impact on non-electric energy use is eligible) • Variable speed drives (only the impact on non-electric energy use is eligible, e.g., when used with gas-driven chillers)	• Any efficiency upgrades when the baseline heating system is electric
(c) installation or improvement of energy management systems (EMS)	• Installation or reconfiguration of EMS that impact fossil fuels (electricity impacts not eligible and must be factored out)	• EMS that affect only electricity use
(d) improvement in the efficiency of hot water distribution systems and reduction in demand for hot water	• Low-flow shower heads • Highly efficient laundry equipment and dishwashers • Pipe insulation • Control systems • Core layout plumbing design • Demand pumping or manifold distribution • Drain water heat recovery systems	• Dual-flush toilets or other cold-water measures • Any efficiency upgrades when the base water heating system is electric
(e) measures that improve the thermal performance of the building envelope and/or reduce building envelope air leakage	• Infiltration reduction • More efficient windows (i.e., low-e film and U-factor improvements) that reduce non-electric building heating or cooling load • Insulation, external sheathing, or pre-fabricated wall technologies that reduce non-electric building heating or cooling load	• Any of these efficiency measures when the baseline heating or cooling system is electric

Energy Conservation Measure (ECM) Category	*Examples of Eligible ECMs*	*Examples of Ineligible ECMs*
(f) measures that improve the passive solar performance of buildings and utilization of active heating systems using renewable energy	• Active solar heating using air or liquid transfer and storage systems • Strategic building design • Thermal storage systems • Vegetation on the roof to reduce non-electric building heating or cooling loads	• Natural ventilation affecting only cooling electricity use • Any of these efficiency measures when the baseline heating or cooling system is electric
(g) fuel switching to a less carbon-intensive fuel for use in combustion systems, including the use of liquid or gaseous eligible biomass, provided that conversions to electricity are not eligible	• Replacing a fuel-oil boiler with a natural gas boiler • Utilizing landfill gas or other biogas to power a boiler • Burning eligible agricultural wastes to power a boiler • Burning eligible liquid biofuels (e.g., biodiesel) to power a boiler	• Replace a fuel-oil boiler with an electric boiler • Burn old-growth timber to power a boiler • Generation of electricity through a solar photovoltaic system or wind power system

Additional clarification is provided below for certain categories of ECMs and certain ECM applications:

- Reduction in non-electric fuel consumption by utilizing useful thermal energy from combined heat and power (CHP) systems is eligible under ECM Category (a). All fuel consumption by the CHP system must be monitored and accounted for, and apportioned appropriately between electricity generation and thermal end-uses (i.e. space and/or water heating). Additional explanation is provided below under "Consistency Application Form 2.4 – Monitoring and Verification Plan (reporting period energy use – allocation by end use for CHP systems)".

- ECM category (b) applies to space heating distribution systems. These include both air- and water-based systems. ECM Category (d) applies to service hot water distribution systems. In cases where space heating and service water heating systems are combined, the project sponsor should indicate both ECM category (b) and (d).

- Fuel switching is included as an eligible ECM Category (category g) provided that the conversion of the facility equipment is not to electricity. ECM category (g), "fuel switching to a less carbon-intensive fuel for use in combustion systems, including the use of liquid or gaseous eligible biomass, provided that conversions to electricity are not eligible" falls under the Model Rule definition of an ECM[28] as "physical changes to facility equipment" and "revisions to operating and maintenance procedures". Fuel

[28] Model Rule subsection XX-10.2(o) defines an "Energy Conservation Measure (ECM)" or "Energy Efficiency Measure (EEM)" as: "A set of activities designed to increase the energy efficiency of a building or improve the management of energy demand. An ECM/EEM may involve one or more of the following: physical changes to facility equipment, modifications to a building, revisions to operating and maintenance procedures, software changes, or new means of training or managing users of the building or operations and maintenance staff."

switching may involve the replacement or modification of combustion equipment (e.g., the replacement of an oil-fired boiler with a natural gas-fired boiler) and may also involve firing of an alternate fuel without replacement or modification to combustion equipment, or only minor modifications to combustion equipment. This latter scenario involves "revisions to operating and maintenance procedures". ECMs under the fuel switching category are subject to all applicable ECM regulatory and application documentation requirements, including eligibility, documentation, codes, and standards, including:

- Demonstration of eligibility of the ECMs (Consistency Application, Section "Demonstration of Eligibility", Subsection 1 and 2);
- Demonstration of eligibility of the fuel types affected (Consistency Application, Section "Demonstration of Eligibility", Subsection 1 and 2);
- Demonstration of adherence to installation best practices (Consistency Application, Section "Demonstration of Eligibility", Subsection 3);
- Documentation that whole-building energy performance complies with referenced standards (applicable to whole-building retrofits and new buildings) (Consistency Application, Section "Demonstration of Eligibility", Subsection 4);
- Documentation that the market penetration rate for each ECM is less than five (5) percent (Consistency Application, Section "Demonstration of Eligibility", Subsection 7).

Consistency Application Form 2.1 – Project Description (documentation of equipment and materials specifications)

Form 2.1 requests general information related to project locations and management, as well as specific information related to the end-use energy conservation measures being performed, including documentation of the technical specifications of existing and new equipment, components, or materials.

Explanation is provided below addressing documentation of the equipment and materials used to implement the energy conservation measure.

Instructions for Form 2.1, section 6 include the following text, denoted below in italics:

6. *Documentation of Equipment and Materials Specifications. Provide the following documentation of equipment and materials identified in the Equipment and Material Specifications Table:*

a. *For equipment, building components, and building materials installed or to be installed* as part of the offset project*, copies of relevant sections of the manufacturer specifications for equipment, building components, and building materials installed or to be installed that verify all information provided in the Equipment and Materials Specifications Table. Include ENERGY STAR specifications if applicable. For building envelope components and materials, also provide documentation of R-value or U-value.*

b. *For original equipment, building components, and building materials being replaced, photos of* original *equipment and building components/materials, equipment nameplates, energy performance or ENERGY STAR labels (as applicable, showing manufacturer, model number, and energy efficiency or energy performance), and locations of installations. For building envelope components and materials, provide documentation of R-value or U-value (if available) and photos showing wall condition and wall layers.*

If equipment or building component/building material documentation is not available (e.g., due to missing labels or manuals, or discontinued equipment), provide documentation of average or generic specifications for equipment or components/materials of equivalent age and features. Documentation may include, for example, market studies from the time period of original installation or state building codes for the time period of original installation.

Note: The Equipment and Materials Specification Table and accompanying documentation will be used by the [Regulatory Agency] to establish ECM eligibility pursuant to [State Regulations; Model Rule Section XX-10.5]. If the offset project described in the Consistency Application is in progress, documentation of actual post-installation equipment and materials specifications will be required as part of the first annual Monitoring and Verification Report submitted for the project to confirm as-installed ECM eligibility.

Explanation:

Form 2.1, section 6.b of the Consistency Application, requires photos as part of the documentation. Photos help verify existing conditions, such as equipment location and envelope components, that may otherwise be difficult to document. Digital photos submitted electronically may be used to meet this requirement.

Consistency Application Form 2.2 – Demonstration of Eligibility (building codes or other regulatory requirements)

Form 2.2 requires documentation of eligibility for the building, the energy conservation measures (ECMs) implemented as part of the offset project, as well as details about when and how the ECMs were or will be implemented. Required documentation includes assurance that the energy conservation measures were not required by building codes or other local regulations.

Explanation is provided below addressing the relationship between building codes and other regulations and the energy conservation measures to be implemented.

The introduction for the instructions for Form 2.2 includes the following text, denoted below in italics:

Note: Equipment, materials, or actions required under state building codes or required pursuant to any local, state, or federal law, regulation, or administrative or judicial order are not eligible for the award of CO_2 offset allowances. This includes instances where initiation of the offset project itself triggers certain requirements pursuant to state building codes or other legal requirements.

Explanation:

The intent of the above application instruction language is to make clear to offset project sponsors that CO_2 emissions reductions that occur in building retrofit offset projects as a result

of mandated building codes and equipment standards are not eligible for the award of CO_2 offset allowances (see Model Rule subsection XX-10.5(d)(3)(ii)). Building retrofit projects are typically required to comply with building codes and equipment standards that are in effect at the time that the project is submitted for permits. Therefore, building retrofit projects are likely to reduce CO_2 emissions simply because of mandated compliance with code requirements. As a result, CO_2 emissions reductions due to compliance with building codes and equipment standards are not eligible for the award of CO_2 offset allowances. Only CO_2 emissions reductions that are achieved through implementation of eligible ECMs and that occur as a result of exceeding minimum energy performance mandated through building codes and equipment standards are eligible for the award of CO_2 offset allowances.

In practice, this means that the CO_2 emissions baseline for a building energy efficiency offset project must assume installation of equipment and/or materials that meet minimum energy performance or other requirements mandated under applicable building codes and equipment standards. For example, if an existing furnace with an efficiency of 65 AFUE is replaced with a furnace that meets current minimum federal standards of 78 AFUE, the CO_2 emissions reduced as a result of this improvement are not eligible for the award of CO_2 offset allowances. If, instead, a 96 AFUE furnace is installed to replace the 65 AFUE furnace, only the CO_2 emissions reduced as a result of the improvement from 78 AFUE to 96 AFUE are eligible for the award of CO_2 offset allowances, provided the ECM meets other eligibility requirements. The emissions baseline for the project must assume installation of the 78 AFUE furnace, not the 65 AFUE furnace in place prior to implementation of the offset project.

Additional information about this topic is included within the Consistency Application instructions under Form 2.3, section 4.a.

Consistency Application Form 2.2 – Demonstration of Eligibility (documentation of ECM installation)

Form 2.2 requires documentation of eligibility for the building(s) and the energy conservation measures (ECMs) implemented as part of the offset project, as well as details about when and how the ECMs were or will be implemented. This includes invoices or completed work orders as supporting documentation.

An explanation clarifying that the costs of ECM implementation are not required to be disclosed is provided below.

Instructions for Form 2.2, section 1.a of the Consistency Application includes the following text, denoted below in italics:
Documentation of project eligibility must include the following information:

1. Documentation of ECM Installation. For all ECMs included in the offset project, attach the following documentation of ECM installation, as applicable:

a. For all categories of ECMs, provide invoices or completed work orders for completed offset projects *that show purchases of materials, equipment, and design and installation services that detail the date of installation, what was installed, and what services were provided.*

Explanation:

Form 2.2, Section 1.a of the Consistency Application requires invoices or completed work orders that show significant project detail. However, pricing information is not required and may be omitted or obscured.

Consistency Application Form 2.3 – Emissions Baseline (baseline emissions)

Form 2.3 requests documentation of the emissions baseline by each eligible fuel type. Specific supporting documentation is required, including documentation of emissions factors used in baseline calculations.

Explanation is provided below addressing which emissions factors to use for biomass and blended biomass fuels when performing baseline calculations.

Instructions for Form 2.3, section 6 of the Consistency Application include the following text, denoted below in italics:

6. *Baseline Emissions. Provide a spreadsheet documenting the calculation of baseline emissions derived from baseline energy use and associated fuel-specific emissions and oxidation factors. Use the following formula to calculate total (summed over all combustion fuel types) baseline emissions in lbs of CO_2 (calculate each combustion fuel's emissions contribution separately):*

$$Emissions\ (lbs.CO_2) = \sum_{i=1}^{n} (BEU_i \times EF_i \times OF_i)$$

where:

BEU_i = *Annual baseline energy usage for fuel type i (MMBtu) calculated in Step 2*

EF_i = *Emissions factor (lbs. CO_2/MMBtu) for fuel type i as shown below in Table 4*

OF_i = *Oxidation factor for fuel type i as shown below in Table 4*

Table 4
Emissions and Oxidation Factors

Fuel	***Emissions Factor (lbs. CO_2/MMBtu)***	***Oxidation Factor***
Natural Gas	*116.98*	*0.995*
Propane	*139.04*	*0.995*

Table 4 (continued)
Emissions and Oxidation Factors

Distillate Fuel Oil	*161.27*	*0.99*
Kerosene	*159.41*	*0.99*

Explanation:

Table 4 provides emissions factors and oxidation factors for eligible fuel types. Eligible biomass is not included within this table because it is considered carbon neutral. An emissions factor of zero lbs CO_2/MMBtu should be used when calculating emissions of eligible biomass. For projects involving fuel switching to a blended fuel (e.g., B10), a weighted average emissions factor should be applied.

Consistency Application Form 2.4 – Monitoring and Verification Plan (reporting period energy use – allocation by end use for CHP and district heating systems)

Form 2.4 requires information about how monitoring and verification of emissions reductions will be performed, including how energy use during the reporting period will be monitored and reported. Documentation of planned energy monitoring and reporting procedures must be provided in the Monitoring and Verification Plan attached to Form 2.4.
The calculation of reporting period energy use as it applies to combined heat and power (CHP) systems is explained below.

Instructions for Form 2.4, section 3 of the Consistency Application include the following text, denoted below in italics:

3. Isolation of Energy Use. Provide documentation of the procedures to be used for isolation of energy use during the reporting period for each end-use or building system to be targeted by eligible ECMs as part of the offset project. Such isolation must ensure that each eligible ECM will be isolated from all other eligible and non-eligible ECMs, as well as from overall building energy usage. There are two options for isolation of energy use for end-uses or building systems to be targeted by eligible ECMs:

- *Direct metering of end-use or building system affected by eligible ECMs (note that if the only change to the building as part of the energy efficiency project will involve eligible ECMs included in the offset project, metering whole-building energy use is sufficient under this approach)*

- *Use of energy simulation modeling to apportion building energy use to each end-use or building system affected by eligible ECMs*

For both of these options, ECMs must be isolated from whole-building or whole-system energy use and also adjusted for areas where multiple ECMs interact with one another (required to avoid double-counting of ECM energy use) or where one ECM utilizes more than one eligible fuel type. Provide a narrative identifying the procedures to be used during the reporting period to isolate energy use in conformance with the following guidelines and/or standards applicable to the building types included in the offset project:

- *Commercial Buildings:*
  - *ASHRAE Guideline 14-2002*
  - *ASHRAE 90.1-2004, Section 11 and Appendix G*

- *Residential Buildings:*
  - *RESNET National Home Energy Rating Technical Guidelines, 2006*

If energy simulation modeling is to be used to isolate energy use, provide the following documentation:

- *Building simulation software input file, output file, and assumptions, on CD-ROM*
- *Copy of software manufacturer literature showing the modeling program name and version number*
- *Document demonstrating that software is BESTEST or RESNET certified, as*

applicable

Instructions for Form 2.4, section 5 of the Consistency Application include the following text, denoted below in italics:

5. Procedures to Determine Reduction in Energy Use by Fuel Type. Provide a spreadsheet that specifies the building-specific data sources, methods, and calculations to be used for each building included in the offset project to determine reporting period energy savings by fuel type during the reporting period relative to baseline energy usage. Energy use for all end-uses and building systems included in the energy usage baseline must be addressed during the reporting period.

Explanation:

Form 2.4 requires that project sponsors document how energy use during the reporting period will be isolated for each end-use or building system to be targeted by eligible ECMs as part of the offset project. Such isolation must ensure that each eligible ECM will be isolated from all other eligible and non-eligible ECMs, as well as from overall building energy usage.

A CHP system includes both eligible and non-eligible ECMs. The useful thermal energy provided by a CHP system is an eligible ECM, as it provides thermal energy that is used to reduce non-electric building energy loads (e.g., space heating or non-electric space cooling) that were served through on-site fossil fuel combustion in the project baseline. The CHP system is replacing or modifying a previous combustion system that served these non-electric building loads. The CHP system is serving these eligible building end uses while consuming less fossil fuel to meet these end uses than the baseline combustion system. The electrical energy provided by a CHP system is a non-eligible ECM, as it does not reduce on-site fuel combustion for non-electric building loads relative to the project baseline.

Reporting period energy use for only the eligible ECM portion of a CHP system must be determined in order to calculate energy usage reductions relative to baseline energy use. This requires total energy used by a CHP system to be tracked and allocated between electricity and thermal end-uses. This allocation is required because only the useful thermal energy provided by the CHP system targets an end use that can generate CO_2 emissions reductions that are eligible for the award of CO_2 offset allowances. While total fuel consumption for the CHP system is to be tracked for the purpose of demonstration of appropriate allocation, only the portion of fuel use allocated to thermal energy end-uses is included in reporting period energy use for the purpose of determining project energy usage reduction during the reporting period relative to baseline energy use.

There are a variety of methods available for allocating CHP fuel consumption among electricity and thermal end uses. The recommended method is consistent with the “Efficiency Method” as set forth in the GHG Protocol guidance for CHP plants[29], and further elaborated by the California Air Resources Board (ARB).[30] The efficiency method is recommended because it allocates

[29] "Allocation of GHG Emissions from a Combined Heat and Power (CHP) Plant: Guide to calculation worksheets," *The Greenhouse Gas Protocol Initiative*. WRI/WBCSD GHG Protocol Initiative, September 2006. Accessed March 17, 2010. <http://www.ghgprotocol.org/downloads/calcs/CHP_guidance_v1.0.pdf >.

[30] "Instructional Guidance for Mandatory GHG Emissions Reporting: chapter 9: cogeneration facilities (Guidance for Regulation Section 95112)," *Mandatory Greenhouse Gas Emissions Reporting*. California

GHG emissions according to the amount of fuel energy used to produce each final energy stream. This is consistent with RGGI's aim to quantify and reduce emissions from the combustion of on-site fossil fuels. It also is consistent with the overall RGGI Building Sector offset approach to calculate fuel emissions based on efficiency of equipment and fossil fuel consumption in the building. Other methods do not address on-site fuel consumption in an equally direct manner. For instance, the two other methods outlined in the GHG protocol guidance document allocate emissions based on the energy content in each CHP output stream (Energy Content method), or based on the useful energy -- the ability of heat to perform work -- represented by electric power and heat (Work Potential method) respectively. Neither of these methods adequately addresses the aim of RGGI to quantify GHG emissions from on-site combustion of fossil fuels.

The efficiency allocation method outlined below applies to "topping cycle" CHP systems, which is the most likely CHP configuration for building applications.

The efficiency allocation method has three steps:

1. Determine the energy flows of the CHP system expressed in MMBtus, including output flows of useful thermal energy and electric energy;
2. Determine the efficiencies of electricity and thermal energy production; and
3. Determine the fraction of fuel consumption allocated to thermal energy production and allocate total fuel consumption to thermal energy and electric energy.

The formulas used in this method are presented below:

1. **Determine the energy flows.** Determine total fuel input (F_T) in MMTBUs (using higher heating value of fuel). Include any supplemental fuel used in the duct burner of a heat recovery steam generator (HRSG). Determine output flows of useful thermal energy (H) measured in MMBTUs. Convert units of electric energy for power generated from units of MWh to MMBTU (P_{MMBTU}):

$$P_{MMBTU} = 3.413 \times P_{MWh}$$

2. **Determine the efficiencies of electricity and thermal energy production.** Calculate the facility-specific electricity generation efficiency value (e_P) in percent**:**

$$e_P = (P_{MMBTU} / F_T) \times 100$$

Determine the facility-specific useful thermal production efficiency value (e_H) in percent by using the HRSG or boiler manufacturer's equipment rating.

3. **Determine fuel allocation.** Calculate fuel allocated to useful thermal energy production (F_H) as follows:

$$F_H = (H/e_H)/(H/e_H + P_{MMBTU}/e_P) \times F_T$$

Calculate fuel allocated to electric energy production (F_P) as follows:

Air Resources Board, December 2008. Accessed March 17, 2010. <http://www.arb.ca.gov/cc/reporting/ghg-rep/ghg-rep-guid/09_Cogen.pdf>.

$$F_P = F_T - F_H$$

The example below applies the allocation method to a hypothetical CHP system. This example uses the same assumptions as the example provided in California ARB's "Instructional Guide for Operators" of cogeneration plants (cited above).

The CHP system has the following characteristics:

- Topping cycle plant with no supplemental fuel firing (e.g., duct burners)
- Annual fuel input = 1,000,000 MMBtu = F_T
- Annual power output = 144,390 MWh = P_{MWh}
- Annual thermal output = 340,680 MMBtu = H
- HRSG manufacturer's equipment efficiency rating = 85%

1. **Determine the energy flows.** Determine total fuel input (F_T) in MMTBUs (using higher heating value of fuel). Include any supplemental fuel used in the duct burner of a heat recovery steam generator (HRSG). Determine output flows of useful thermal energy (H) measured in MMBTUs. Convert units of electric energy for power generated from units of MWh to MMBtu (P_{MMBTU}):

   P_{MMBTU} = 3.413 x P_{MWh}
   = 3.413 x 144,390
   = 492,800 MMBtu

2. **Determine the efficiencies of thermal energy and electricity production.** Calculate the facility-specific electricity generation efficiency value (e_P) in percent**:**

   e_P = (P_{MMBTU} / F_T) x 100
   = (492,800 / 1,000,000) x 100
   = 49%

   Determine the facility-specific thermal efficiency value (e_H) in percent by using the HRSG or boiler manufacturer's equipment rating (E_H = 85% in this example).

3. **Determine fuel allocation.** Calculate fuel allocated to thermal energy production (F_H) as follows:

   F_H = (H/e_H)/(H/e_H +P_{MMBTU}/e_P) x F_T
   = (340,680/0.85)/(340,680/0.85 + 492,800/0.49) x 1,000,000
   = 284,960 MMBtu

   Calculate fuel allocated to electric energy production (F_P) as follows:

   F_P = F_T - F_H
   = 1,000,000 - 284,960
   = 715,040 MMBtu

Energy use by district heating systems should be modeled in accordance with ASHRAE 90.1-2004 rules.[31] ASHRAE treats district heating systems as a "fossil fuel" system type, and district cooling systems as water-based systems. Figure 11.3.2 in the ASHRAE Standard shows the mapping for HVAC system types for the energy cost budget method. Note #2 under Figure 11.3.2 of ASHRAE 90.1-2004 states the following for treatment of the district heating system when modeling a proposed building under the Energy Cost Budget Method (or performance method): "Systems utilizing district heating (steam or hot water) shall be treated as if the heating system type were "Fossil Fuel." Note #1 under the same figure addresses the proposed cooling system thus: "Systems utilizing district cooling shall be treated as if the condenser water type were "water." The table then proceeds to indicate the System that shall be used for the budget and proposed building under this scenario.

District heating systems and CHP systems may be installed in existing buildings or as new construction projects and may involve on-site or off-site systems. Explanation for modeling these various scenarios in accordance with the ASHRAE 90.1-2004 Energy Cost Budget Method is outlined below:

- Baseline Building: *For existing building projects*, for the thermal end use(s) being served by the proposed district heating system or the CHP system, the baseline thermal system energy use shall be the existing fossil fuel energy use measured on-site attributable to the thermal end uses. *For new construction projects*, in the case of both district heating and CHP systems, the baseline building energy use shall be modeled in accordance with ASHRAE 90.1-2004 rules for district heating systems in Section 11.3.2. Note #2 under Figure 11.3.2 of ASHRAE 90.1-2004 provides the following guidance to model the baseline for a proposed district heating system under the Energy Cost Budget Method (or performance method): "Systems utilizing district heating (steam or hot water) shall be treated as if the heating system type were Fossil Fuel." Figure 11.3.2 in the ASHRAE Standard shows the mapping for the fossil fuel HVAC system types among others. Depending on whether the condenser cooling source is Water/Ground or Air/None, the table proceeds to indicate the System that shall be used for the baseline building for various building sectors.

- Proposed Building: For on-site district heating systems and CHP systems, the proposed building energy use should be as measured on-site. For off-site district CHP plant systems, the proposed building shall be measured as if utilizing a "virtual" CHP system within the building with the same performance/efficiency characteristics as the off-site district plant (following the LEED-NC CHP Calculation Methodology with regard to "virtual" CHP systems).[32]

- Allocation of Energy Use from District Heating Systems and CHP Systems Serving Multiple Buildings or End-Users: All district heating systems serve multiple buildings; and some CHP systems provide a portion of energy generated to other buildings, an external customer, or to the electricity grid. In all these cases, energy must be allocated among the buildings or end-users.

  In the case of a district heating system, the input fuel and energy output is allocated

[31] Pertinent language related to district heating systems in ASHRAE 90.1-2004 is unchanged in the newer ASHRAE 90.1-2007.

[32] This approach is based on the approach used by USGBC LEED-NC CHP Calculation Methodology for LEED-NC v2.2 EA Credit 1 published in November 2005.

between the proposed building and other end-users in proportion to the end-use energy delivered to each.

In the case of a CHP system serving multiple buildings, total CHP system energy input is first allocated between electricity and useful thermal end uses. This allocation should be determined as described previously in this section. Next, the CHP system energy input and energy output is allocated between the proposed building and other end-users in proportion to the end-use energy delivered to each end user and the energy input allocated to the respective end-use (electricity or thermal energy). Only the portion of CHP system fuel input allocated to the proposed building's eligible thermal end-uses is used to determine reporting period energy use for an offset project.

IV.6 Explanation or Clarification for Agricultural Manure Management Offset Projects

Agriculture manure management offset projects avoid methane emissions from uncontrolled anaerobic digestion of manure and organic food waste through the collection and destruction of methane from manure and organic food waste decomposition in an anaerobic digester. The collected methane is utilized in either electricity generation or as fuel.

This section discusses certain parts of the model Agricultural Manure Management Consistency Application instructions that may require explanation or clarification. For each topic area, an excerpt from the application instructions is provided, which is then followed by explanation or clarification. This section is organized in order of the sections of the Consistency Application instructions.

Consistency Application Form 2.2 – Demonstration of Eligibility (demonstration of uncontrolled anaerobic storage)

To determine eligibility of an agriculture manure management offset project for the award of CO_2 offset allowances, documentation is required substantiating that the collected methane from the manure and organic food waste originated from an uncontrolled anaerobic storage system.

The following explanation provides additional clarification for documenting that manure and organic food waste influent would have been stored through uncontrolled anaerobic storage in the absence of the offset project.
Instructions for Form 2.2, section 1 include the following text, denoted below in italics:

1. *<u>Demonstration of Uncontrolled Anaerobic Storage</u>. Document for each facility that will provide influent to the anaerobic digester that the manure and/or organic food waste that is input into the anaerobic digester would have been stored through uncontrolled anaerobic storage in the absence of the offset project:*

    a. *For a facility providing manure, provide the following:*

        - *A diagrammatic representation (system schematic) of the previous waste management system at the project site prior to offset project implementation.*

        - *Documentation that the manure was stored for at least 30 days and that the storage tank was not stirred for at least 30 days, using the following equation and historic data:*

Storage time, days = Volume of the storage tank (gallons or cubic feet) / Average daily volume of manure input (gallons or cubic feet)

- *Documentation showing that the previous manure storage facility contained manure that had moisture content of at least 75%.*

b. *For a facility providing organic food waste, provide the following:*

- *A diagrammatic representation (system schematic) of the previous waste management system at the project site prior to offset project implementation.*

- *Documentation that the food waste was stored for at least 30 days and that the storage tank was not stirred for at least 30 days, using the following equation and historic data:*

Storage time, days = Volume of the storage tank (gallons or cubic feet) / Average daily volume of food waste (gallons or cubic feet)

- *Documentation showing that the previous food waste storage facility contained food waste that had moisture content of at least 75%.*

Explanation:

The requirement for documentation of a minimum of 30-days storage of manure or organic food waste in the baseline scenario is based on the minimum time period necessary to allow for anaerobic conditions. These conditions are necessary for the development of methanogenic bacteria that produce methane.[33]

The moisture content of manure or organic food waste impacts the extent of anaerobic conditions at the storage facility. Consequently, as part of demonstrating anaerobic conditions in manure or organic food waste storage in the baseline scenario, the moisture content of the anaerobic digester influent should be at least 75 percent. The 75 percent moisture content criterion is based on typical design criteria for digesters for creating anaerobic conditions. In general, digesters can either be designed to operate with a high solids concentration, with a total suspended solids (TSS) concentration of approximately 20 percent (moisture content 80 percent), or a low solids concentration of approximately 15 percent (moisture content 85 percent). Commercial digester companies that handle food wastes recommend that the solids contents of their digesters be no more than 25 percent to 30 percent (moisture content no less than 70 percent to 75 percent).[34]

[33] EPA 2008, "Anaerobic Digestion of Food Waste," Environmental Protection Agency Region 9; EPA-R9-WST-06-004, page 43. Available at http://www.epa.gov/region09/waste/organics/ad/EBMUDFinalReport.pdf

[34] Waste & Resources Action Program (WRAP) 2007, "Dealing with food waste in the UK," prepared for WRAP by Dr. Dominic Hogg, et al, Eunomia Research and Consulting, Ltd, Bristol, UK, March 2007.