



Rulebook

Phases I and II

December 2011

www.theice.com/ccx

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¹ On August 21, 2009, CCX redrafted both Chapter 8 (Commercial Forestry) and Chapter 9 (Offsets) of the CCX Rulebook into a more user-friendly format. The changes are outlined in detail in CCX Advisory 2009-08. This document includes Chapters 8 and 9 of the CCX rulebook as they existed within the rulebook prior to August 21, 2009 and, as an appendix, the applicable documents following August 21, 2009 including: Offsets Program Manual, Verification Guidance Document and Forestry Carbon Sequestration protocol. Other offsets protocols published on August 21, 2009 are unchanged and are available at the website of the CCX Offsets Registry Program (www.theice.com/ccx).

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Chapter 1 Chicago Climate Exchange Objectives, Definitions

1.0 Introduction (2006)

Chicago Climate Exchange (“CCX”) is a self-regulatory exchange that administers a voluntary Greenhouse Gas emission reduction and trading program for North America and other countries and regions as approved by CCX.

As determined by the Board of Directors, CCX may administer trading in other environmental markets.

1.1 Goals of Chicago Climate Exchange (2006)

The goals of the Exchange are to:

- (a) demonstrate unambiguously that a cross-section of North American private and other countries and regions as approved by CCX and public sector entities can reach agreement on a voluntary commitment to reduce Greenhouse Gas emissions and implement a market-based emission reduction program;
- (b) establish proof of concept by demonstrating the viability of a multi-sector and multi-national Greenhouse Gas emissions cap-and-trade program supplemented by Project-based emission offsets;
- (c) establish a mechanism for achieving price discovery as well as developing and disseminating market information;
- (d) allow flexibility in the methods, location and timing of emission reductions so that Greenhouse Gas emissions can be reduced cost-effectively;
- (e) facilitate trading with low transaction costs;
- (f) build market institutions and infrastructure and develop human capital in Greenhouse Gas emissions trading;
- (g) encourage improved emissions management;
- (h) harmonize and integrate with other international or sovereign trading regimes; and,
- (i) develop a market architecture that rewards innovative technology and management and encourages sustainable farming and forestry practices.

1.2 Regulatory Status (2006)

CCX is an Exempt Commercial Market as defined in Section 2(h)(3) of the Commodity Exchange Act and in Part 36.3 of the regulations of the Commodity Futures Trading Commission (CFTC). The Exchange is not registered with, or recognized, designated, licensed or approved by the CFTC. The circumstances set forth in this paragraph are subject to change.

An independent entity will at all times provide regulatory oversight of CCX. At the outset, the Exchange has contracted with the Financial Services Regulatory Authority (FINRA) to provide these regulatory services. FINRA will conduct verification of CCX Member emission baselines, periodic emission reports and annual True-up and will review Offset Project verification reports submitted to be prepared by CCX approved verification firms. The independent regulator will also undertake market surveillance of trading activity on the CCX Trading Platform.

Each CCX Member, Associate Member, Participant Member or Exchange Participant must be an Eligible Commercial Entity or an Eligible Commercial Participant as defined in the Commodity Exchange Act in order to be eligible for CCX Trading Platform access.

1.3 Definitions

“Activity”. See Emitting Activity.

“Aggregator” is a Participant Member that serves as an administrative representative, on behalf of Project Owners, of multiple CCX-qualifying Exchange Offset Projects. (2006)

“Applicable Law” refers to any statute, law, regulation, rule or ordinance of any federal, state or local governmental entity applicable to such party.

Associate Members” are entities or other parties recognized by the Exchange that have negligible or no direct emissions and make a commitment to quantify and offset their indirect emissions.

“Auction” is a periodic sale of CCX Exchange Allowances or Exchange Offsets, conducted by CCX, for the purposes of assisting price discovery and facilitating trading.

“Authorized Trader” is either an employee or a contracted agent of a CCX Registry Account Holder that is authorized to receive access privileges to the CCX Trading Platform and CCX Registry as determined by the relevant Registry Account Holder.

“Banking” is the retention of a Carbon Financial Instrument in a CCX Registry Account for use or sale in a later year.

“Baseline Adjustment” is a modification to a Member’s Emission Baseline to reflect acquisition or disposition of facilities that are Emission Sources and were operated during the Baseline Period or otherwise have an Emission Baseline as defined by CCX.

“Baseline Electricity Purchases.” See Electricity Purchase Baseline.

“Bilateral Trades” are privately negotiated Transactions that occur off the CCX Trading Platform that are settled bilaterally by the parties to the Transaction. (2009)

“Block Trade” is a privately negotiated transaction between two parties, which is posted to the CCX Trading Platform and is cleared by the Exchange. Block Trades must be for a minimum quantity and must be reported to the Exchange within a specified amount of time. (2009)

“Carbon Dioxide Equivalent” is a unit of measure used to convert emissions of non-CO₂ Greenhouse Gases (methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride) to a numeraire. (2006)

“Carbon Financial Instrument” (also referenced herein as “Carbon Financial Instrument” and “CFI”) is a CCX Exchange Allowance (“XA”), Exchange Offset (“XO”), or Exchange Early Action Credit (“XE”) which represents one-hundred metric tons of carbon dioxide and that is issued by CCX to the Registry accounts of CCX Members and are surrendered to the Exchange by Members to annually achieve compliance with the CCX Emission Reduction schedule.

“Carbon Sequestration” is the removal of carbon dioxide from the atmosphere and retention in a terrestrial system (e.g. forests and soils) or in a geologic formation.

“Carbon-stable Accounting Approach” is a forest carbon accounting procedure that allows a CCX Member with commercial forests in the United States (and other locations as may be approved by the Executive Committee) to quantify and report changes in Carbon Stocks associated with individual CCX-registered Exchange Forestry Offset projects on the condition that there is no net decrease in overall Carbon Stocks in the Member’s commercial forest inventory.

“Carbon Stock” is a quantity of carbon stored in soils or biomass, expressed in metric tons carbon dioxide equivalent.

“Carbon Storage” is the retention of carbon in biomass, in soils, or in geologic formations.

“Cash Transaction” is a privately negotiated transaction between parties.

“CCX Clearing Mechanism” is the CCX mechanism for settling and assuring payment for transactions executed on the CCX Trading Platform, including Block Trades. (2009)

“CCX Forest Carbon Baseline” (also referenced herein as “Forest Carbon Baseline”) is the quantity of Carbon Stocks in the CCX-included carbon pools (expressed in metric tons carbon dioxide (CO₂) equivalent) in place on lands included in a CCX-registered Project at the time of the Project’s inception. (2006)

“CCX Market Period” is the time period during which CCX Registry Account Holders commit to the terms of this *Rulebook*, as amended from time to time. (2006)

“CCX Products” are trading instruments that CCX may offer from time to time.

“CCX Registry” (also referenced herein as “Registry”) is an electronic database that will serve as the official holder of record and transfer mechanism for Exchange Allowances (XAs), Exchange Offsets (XOs) and Exchange Early Action Credits (XEs) owned by CCX Registry Account Holders.

“CCX Registry Account” is a data file in the CCX Registry that provides a record of all holdings and Transfers of CCX Carbon Financial Instruments for each CCX Registry Account Holder.

“CCX Registry Account Holder” (also referenced herein as “Registry Account Holder”) is a CCX Member, Associate Member, Participant Member or Exchange Participant.

“CCX Registry Retirement Account” (also referenced herein as “Registry Retirement Account”) is an account for holding all CFIs that have been retired for compliance or other purposes. CFIs in this account cannot be sold or transferred. (2006)

“CCX Standing Committee” (also referenced herein as “Committees”) is a Committee composed of CCX Members, Associate Members and Participant Members that provide oversight of particular CCX functions. (2006)

“CCX Trading Platform” is an electronic, internet-accessible system for posting and accepting bids to buy and offers to sell CCX Carbon Financial Instruments. (2006)

“Clean Development Mechanism” is one of the flexibility mechanisms established in Article 12 of the Kyoto Protocol to the United Nations Framework Convention on Climate Change to enable Greenhouse Gas emission mitigation Projects in developing countries to generate tradable emission offsets that may be used by industrialized countries as one means of meeting Greenhouse Gas emission reduction commitments.

“Compliance” is the status of being in conformance with the provisions established in this *Rulebook*. The term “in compliance” is also used to describe the status of a CCX Member or Associate Member that has surrendered Carbon Financial Instruments to CCX in an amount equal to its annual emissions.

“Compliance Year” is any calendar year during the Phase I and Phase II Programs.

“Conservation Tillage” includes practices defined in the Natural Resources Conservation Service National Handbook of Conservation Practices. These practices are:

- (1) No-till/Strip-till - Managing the amount, orientation, and distribution of crop and other plant residue on the surface year-round while growing crops in narrow slots or tilled or residue-free strips in soil previously untilled by full width inversion implements;

- (2) Ridge-till - Managing the amount, orientation, and distribution of crop and other plant residue on the soil surface year-round while growing crops on preformed ridges alternated with furrows protected by crop residue.

“Continuous Emission Monitor (CEM)” is equipment required by section 412 of the Clean Air Act Amendments of 1990, that is used to sample, analyze, measure, and provide on a continuous basis, a quantification of emissions of carbon dioxide and other emissions (CAAA 1990, sec. 402 (7).)

“Direct Emissions” are Greenhouse Gas emissions released on-site as a result of fuel combustion (e.g. use of fossil fuels in heating and cooling, production of electricity, vehicles), processing activities (e.g. production of adipic acid or cement) or fugitive emissions (e.g. gases leaked from joints or seals in electricity transmission equipment or gas pipelines) from facilities owned by a CCX Member. (2006)

Direct Emission Baseline” (also referenced herein as “Baseline Emissions” and “Emission Baseline”) is defined as the annual average of its Included Emissions during the calendar years 1998, 1999, 2000 and 2001 for the Phase I Program and possibly the Phase II Program or the calendar year 2000 for the Phase II Program, if elected. (2006)

“Economic Growth Provision (EGP)” is a provision that limits the maximum increase in emissions above a Member’s Emission Baseline that will be recognized in determining the annual True-up for each CCX Member. This Provision also applies to changes in Carbon Stocks on lands of CCX Members that are forest product companies. (2006)

“Electricity Purchase Baseline” is a Member’s Included Electricity Purchases baseline expressed in megawatt-hours (MWh). (2006)

“Electricity Purchase Reduction Schedule” is, for each CCX Member that elects the Electricity Purchase Opt-In Program, the annual reduction percentage below its Baseline Electricity Purchases.

“Elemental Rate” is the intensity, measured in pounds per acre, of a particular constituent element in a chemical applied as a fertilizer or herbicide. (2006)

“Eligibility Criteria” are the standards applied in defining CCX Offset Projects.

“Eligible Commercial Entity” is an entity or person that meets the conditions established in paragraph 1(a)(11) of the U.S. Commodity Exchange Act. (2006)

“Eligible Projects” are Offset Projects that conform to CCX rules and thus can be registered with CCX, allowing the Project Owner to receive Exchange Offsets.

“Emergency” means any occurrence or circumstance which, in the opinion of the Board of Directors of the Exchange, President, or any individual(s) designated by the President and approved by the Board, requires immediate action and threatens or may threaten such matters as

the fair and orderly trading in, or the liquidation of or delivery pursuant to, any agreements, contracts or transactions on the Exchange, including any manipulative or attempted manipulative activity; any actual, attempted, or threatened corner, squeeze, congestion, or undue concentration of positions; any circumstances which may materially affect the performance of agreements, contracts or transactions traded on the Exchange, including failure of the payment system or the bankruptcy, insolvency, or credit worthiness, of any participant; any action taken by any governmental body, or any other board of trade, market or facility which may have a direct impact on trading on the Exchange; and any other circumstance which may have a severe, adverse effect upon the functioning of the Exchange.

“Emission Baseline Period” is the time period covered by the calendar years 1998, 1999, 2000 and 2001 for the Phase I Program and possibly the Phase II Program or the calendar year 2000 for the Phase II Program, if elected.

“Emission Inventory” is the total quantity of a CCX Member’s owned Greenhouse Gas emissions that are included by the Member in its Emission Reports. (2006)

“Emission Report” is a report of Direct Emissions and Electricity Purchases that is submitted to CCX by CCX Members or a report of indirect emissions submitted by Associate Members and is signed by a corporate officer or a designated representative (as defined in the 1990 Clean Air Act, as amended). Unless provided otherwise, such Reports shall be transmitted to CCX, using methods prescribed by CCX. (2006)

“Emission Reduction Schedule” is the quantitative schedule of direct emission reductions that each CCX Member commits to undertake. (2006)

“Emission Source” is a facility, vehicle, or piece of equipment that is owned by a CCX Member and releases Greenhouse Gases. An Emission Source can be stationary, mobile, area or fugitive.

“Emitting Activity” is a specified category of actions involved in production, processing, transportation or service provision that causes the release of Greenhouse Gas emissions. An activity may be undertaken in multiple locations or by multiple facilities (e.g. operation of a fleet of heavy trucks or an oil pipeline). The total emissions from all pieces of equipment used to perform a functionally identical activity are used to determine that activity’s status as a Large or Small Emission Source.

“Equity Ownership Percentage” is, for a facility that has multiple owners, the proportion of the total equity that is owned by a CCX Member or Associate Member.

“Exchange” means the Chicago Climate Exchange and its divisions, but is exclusive of its subsidiaries or affiliates. (2006)

“Exchange Allowance (XA)” is a tradable Carbon Financial Instrument issued:

- (1) to each CCX Member in accordance with its Emission Baseline and Emission Reduction Schedules;
- (2) to a CCX Member that elects to include electricity purchases as a supplemental reduction objective if such Member reduces electricity purchases beyond the CCX Purchase Reduction Schedule; and,
- (3) to CCX Members in the commercial forestry sector that realize net increases in Carbon Stocks using the model-based accounting approach. (2006)

“Exchange-cleared Trade” is a Transaction entered on the CCX Trading Platform and settled via the CCX Clearing Mechanism.

“Exchange Early Action Credit” (“XE”) is a non-transferable, non-tradable Carbon Financial Instrument issued to certain Greenhouse Gas mitigation Projects undertaken from 1995 through 1998, on the basis of emission mitigation realized by the Project during the years 1995 through 2006.

“Exchange Emission Reduction” (“XER”) is a Carbon Financial Instrument issued on the basis of mitigation achieved by CCX-eligible Projects undertaken in Brazil that are not methane or forestry Projects (e.g. fuel switching and renewable energy Projects).

“Exchange Forestry Offset” (“XFO”) is an Exchange Offset issued to owners of Greenhouse Gas mitigation achieved by eligible forestry sequestration Projects.

Exchange Fluorocarbon Destruction Offsets (XFDO) is an Exchange Offset issued to owners of Greenhouse Gas emission reductions achieved by destruction of certain ozone depleting substances on or after January 1, 2007

“Exchange Methane Offset” (“XMO”) is an Exchange Offset issued to owners of Greenhouse Gas emission reductions achieved by certain landfill, agricultural methane and coal mine collection and combustion systems

“Exchange Offset” (“XOs”) is a tradable Carbon Financial Instrument generated by qualifying mitigation Projects and registered with CCX by CCX Members and CCX certain Participant Members. The categories of Exchange Offsets are: Exchange Forestry Offsets, Exchange Methane Offsets and Exchange Soil Offsets. (2006)

“Exchange Offsets for Electricity Produced from Renewable Energy Systems” (“XRE is an Exchange Offset issued to owners of Greenhouse Gas emission reductions achieved by qualifying renewable energy facilities.

Exchange Participants” are entities or natural persons that establish a CCX Registry Account for the purpose of acquiring and retiring Carbon Financial Instruments. (2009)

“Exchange Soil Offset” (“XSOs”) is an Exchange Offset issued to owners of Greenhouse Gas mitigation produced by eligible agricultural soil carbon sequestration activities in designated areas of the U.S.

“Exempt Commercial Market” has the meaning given in Section 2(h)(3) of the U.S. Commodity Exchange Act and in Part 36.3 of the regulations of the U.S. Commodity Futures Trading Commission (CFTC).

“Forest Carbon Reserve Pool” is a pool of Exchange Forestry Offsets equal to 20% of the offsets earned by CCX-eligible Forestry Projects that provides a self-insurance pool for Forestry Projects.

“Forest Carbon Sequestration” is the removal of carbon dioxide from the atmosphere and retention in a forest system.

“Greenhouse Gases” are gases that cause radiative forcing when present in the earth’s atmosphere. For CCX purposes, these gases are carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆).

“Included Emissions” are the Greenhouse Gas Emissions that are to be included in each CCX Member’s Emission Baseline and Periodic Emission Reports. Emissions of all Greenhouse Gases are converted to metric tons carbon dioxide equivalent using the one-hundred year Global Warming Potential values established by the Intergovernmental Panel on Climate Change.

“Included Electricity Purchases” are, for CCX Members that elect to include purchased electricity as a Supplemental Reduction Objective, the electricity purchased from other entities.

“Indirect Emissions” are the emissions associated with production of electricity or steam when such electricity or steam is purchased by a CCX Member from an external supplier. (2006)

“Intra-company Transfers” are transactions between CCX Registry Accounts that are owned and controlled by a single Registry Account Holder. (2006)

“Jointly Owned Facilities” is the co-ownership of an Emission Source by a CCX Member with one or more other entities that may or may not be a CCX Member. (2006)

“Large Electricity Purchase Activities” are, for CCX Members that elect to Opt-in electricity purchases and have entity-wide Owned Electricity Purchases of 300,000 megawatt-hours per year or more, the Member’s Owned Electricity Purchases associated with those facilities or activities that are estimated to be 5% or more of the Member’s total Owned Electricity Purchases. For CCX Members having entity-wide Owned Electricity Purchases of less than 300,000 megawatt-hours per year, Large Electricity Purchase Activities are the Owned Electricity Purchases associated with activities for which the Member’s Owned Electricity Purchases are 15,000 megawatt-hours per year or more.

“Large Emission Sources” are:

- (1) for CCX Members not primarily engaged in electricity production and have entity-wide Owned Direct Emissions of 200,000 tons CO₂ equivalent per year or more, those facilities and activities that release emissions owned by the Member that are estimated to be 5% or more of the Member’s total owned emissions;
- (2) for CCX Members having estimated entity-wide Owned Direct Emissions totaling less than 200,000 metric tons of CO₂ equivalent per year, Large Emission Sources are those facilities or activities that have Owned emissions of 10,000 metric tons of CO₂ equivalent per year or more; and,
- (3) for CCX Members primarily engaged in electricity production, Large Emission Sources are defined as electric power generation facilities having a rated capacity of 25 megawatts or larger.

“Leased Facilities” see “Owned Emissions”.

“Liquidity Provider” is an entity or person who trades on the Exchange for reasons other than compliance with the CCX Emission Reduction Schedule.

“Market Efficiency” is a characteristic of a market that is competitive and not subject to price congestion. (2006)

“Market Maker” is a person or entity that assumes obligations to post continuous bids and offers and to execute transactions in order to provide continuous market liquidity and orderliness. (2006)

“Market Close” is the time at which a trading session on the Trading Platform ends. (2006)

“Market Open” is the time at which a trading session on the Trading Platform begins. (2006)

“Market Period” can refer to the Phase I or Phase II Program periods.

“Market Surveillance Report” is a periodic report provided to CCX by the Provider of Regulatory Services designated by CCX.

“Maximum Recognized Emission Reduction” is a limitation on the reduction in CO₂ equivalent emissions that will be recognized in determining the quantity of surplus Exchange Allowances a CCX Member may sell or bank, as a result of the symmetric application of the Economic Growth Provision. (See also, “Super Reductions”) (2006)

“Maximum Recognized Increase in Carbon Stocks” is, for CCX Members that are forest product companies, an increase in Carbon Stocks that may be sold, banked or used for compliance. (2006)

“Maximum Recognized Reduction in Electricity Purchases” is a limitation on the reduction in Electricity Purchases (which can be realized either through reductions in overall Electricity

Purchases or through a substitution of electricity purchased from Renewable Electricity Production Systems for grid-purchased electricity) that will be recognized in determining the quantity of Exchange Allowances a CCX Member may be issued under the Electricity Purchase Opt-in Program. (See also, “Super Reductions”)

“**Member**” includes corporations, municipalities and other Entities that emit Greenhouse Gases from facilities located in countries and regions approved by CCX and commit to the CCX Emission Reduction Schedule for the Phase I and, or Phase II Programs. CCX Members are one of the five classes of CCX Registry Account Holders. (2009)

“**Metric Tons Carbon Dioxide Equivalent**” is the quantity of Greenhouse Gases, expressed in carbon dioxide equivalence, equal to 2,205 pounds. Metric tons of non-CO₂ greenhouse gases are converted using the IPCC 100 year global warming potential conversion factors.

“**Minor Ownership Emissions**” are:

- (1) for entities not primarily engaged in electric power production, emissions from any facility in which the CCX Member’s equity ownership share is less than 20% of the facility; and,
- (2) for entities primarily engaged in electric power production, the Owned Emissions from any facility in which the CCX Member’s Equity Ownership share is both less than 20% of the facility and represents less than 25 megawatts of generating capacity. (2006)

“**Mitigation Tonnage**” is a quantity of Greenhouse Gases, expressed in metric tons carbon dioxide equivalent, that is reduced, sequestered or avoided or otherwise offset through the purchase and surrender of Carbon Financial Instruments.

“**Mobile Source**” is a road, rail, airborne or waterborne vehicle that emits Greenhouse Gases.

“**Model-based Accounting Approach**” can be used by a Member from the commercial forestry sector to quantify changes in Carbon Stocks on its commercial forest land on the basis of projections made by growth and yield models, which estimate the volume by which the Above-Ground Biomass of different species of trees increases as the trees grow.

“**New Electric Power Generating Units**” are electricity generating units placed into commercial operation on or after January 1, 2002 by a CCX Member that is primarily engaged in electricity production.

“**Offset Project**” is a CCX-registered Project that is issued Exchange Offsets in reflection of the amount by which the Project reduces, sequesters or avoids Greenhouse Gas emissions.

“**Offset Provider**” may be a Project implementer or a CCX-registered Aggregator, that registers CCX-eligible Projects with the Exchange and can sell Exchange Offsets.

“Opt-in” is the election by a CCX Member to include in its Emission Baseline and Emission Inventory emissions from sources whose inclusion is not mandated as a condition of CCX membership. (2006)

“Owned and Operated Project” is a CCX-eligible Project that is operated by a CCX Member or Associate Member and for which Exchange Offsets and Exchange Early Action Credits may be issued.

“Owned Electricity Purchases” are electricity purchases associated with the activities undertaken by CCX Members or Associate Members, and are defined on the basis of the Member’s or Associate Member’s Equity Ownership Percentage of a Jointly Owned Facility that uses purchased electricity.

“Owned Emissions” are the direct Greenhouse Gas Emissions, expressed in metric tons carbon dioxide (CO₂) equivalent, associated with the activities undertaken at facilities the CCX Member owns, or where the CCX Member controls the activities that generates the Greenhouse Gas Emissions (e.g. Leased Facilities), and are defined on the basis of the Member’s Equity Ownership Percentage of a Jointly Owned facility that releases Greenhouse Gases. (2006)

“Ownership” is generally defined on the basis of the CCX Member’s Equity Ownership Percentage of facilities that release Direct Emissions or use purchased electricity. (2006)

“Participant Members” are Offset Providers, Offset Aggregators and Liquidity Providers that trade or transact on CCX but do not have an Emission Reduction Schedule.

“Phase I Program” (or Phase I) means the program for the calendar years 2003 through 2006. (Section 4.6) (2006)

“Phase II Program” (or Phase II) means the program for the calendar years 2007 through 2010. (Section 4.6) (2006)

“Pooled Projects” are the multiple Projects that are represented in CCX by a single Aggregator.

“Price Congestion” is a distortion in the price of Carbon Financial Instruments due to instability of or major imbalances in supply or demand.

“Program-wide Baseline Direct Emissions” are the sum of the Direct Emission Baselines of all CCX Members. (2006)

“Program-wide Direct Emissions” are the sum of the Direct Emissions of all CCX Members for a particular Compliance Year. (2006)

“Project” is a CCX-eligible action or facility that causes a reduction in Greenhouse Gas emissions or causes an increase in carbon storage in trees, forests or soils. A CCX-registered

Project can encompass multiple locations, facilities or land parcels, provided such multiple sites are subject to functionally similar Project activities.

“Project Category” is a grouping of functionally similar Projects. The following are examples of CCX Project categories: Methane Projects; Forestry Projects, Soil Carbon Projects.

“Project Owner” is the entity that is the legal owner of Offsets produced by a CCX-eligible registered Project. A Project Owner may represent one or more ultimate owners of Exchange Offsets produced by one or more Projects.

“Project Registration Filing” is the act of submitting to CCX all documentation required in order to register a Project with the Exchange.

“Project Report” is a report submitted to CCX (either directly or through an Aggregator) for the purpose of notifying CCX of the ongoing effectiveness of a CCX-registered Project. In some cases a Project Report must include an attestation by a CCX-approved Verifier as to the quantity of mitigation effectiveness and Exchange Offset issuance prepared in conformance with the rules provided herein, and with the verification protocols prescribed by the Exchange.

“Provider of Regulatory Services” is an entity designated by the Exchange to: audit Emission Baselines, annual True-up and Offset Project verifications; provide market oversight and compliance procedures; and utilize market surveillance technologies to monitor trading activity and prevent fraud and manipulation. (2006)

“Registered Offset Advisor” is an academic or non-governmental organization with accepted expertise to provide advice to CCX on the suitability and reputation of offset projects. (1/21/2004)

“Renewable Electricity Production System” is a CCX-specified electricity production system that uses renewable fuels or non-emitting methods to produce electricity.

“Renewable Fuels” are wood, wood wastes and wood-derived fuels; agricultural residues and grasses; landfill and agricultural methane; and ethanol (bioalcohol). Emissions from these fuels are excluded from CCX Emission Baselines and Periodic Emission Reports.

“Single Firm Sales Limit” is a limit on net sales of a single vintage of Exchange Allowances by any single CCX Registry Account Holder to other Exchange Members, Associate Members, Participant Members or Exchange Participants. (2006)

“Small Emission Source” is:

- (1) for CCX Members having entity-wide Owned Direct Emissions of 200,000 tons carbon dioxide (CO₂) equivalent per year or more, a facility or activity that releases emissions owned by the Member that are estimated to be less than 5% of the Member's total Owned Direct Emissions;

- (2) for CCX Members or Associate Members having estimated entity-wide Owned Direct Emissions totaling less than 200,000 metric tons of CO₂ equivalent per year, those facilities or activities that have Owned Emissions of less than 10,000 metric tons of CO₂ equivalent per year; and,
- (3) for CCX Members primarily engaged in electricity production, electric power generation facilities having a rated capacity of less than 25 megawatts.

“Soil Carbon Reserve Pool” is an entry in a CCX Registry Account into which each Exchange Soil Offset Project is required to place 20% of the Offsets it earns.

“Statement of Included Emissions and Baselines” is a CCX form listing the CCX Member’s Emission Sources (and, if applicable or elected, Emitting Activities) and electricity purchases (if Opted-in) that are to be included in CCX, as well as the Baselines associated with the Included Emissions and activities. (2006)

“Stationary Fossil Fuel Combustion” is fossil fuel combustion in a facility that is not mobile, often for the purpose of electricity or steam generation.

“Stationary Source” is a source of Greenhouse Gas emissions that is not mobile, such as electricity or steam generation facilities.

“Super Reductions” are Carbon Financial Instruments that represent emission reductions beyond the Maximum Recognized Emissions Reductions or increases in Carbon Stocks beyond the Maximum Recognized Increase in Carbon Stocks. (2006)

“Supplemental Reduction Objective” is the adoption of an emission reduction objective that involves: the Opt-in inclusion of Emission Sources or Activities (e.g. electricity purchases) beyond those required by CCX rules; and/or the adoption of a reduction target that goes beyond the CCX Emission Reduction Schedule.

“Surrender” the process by which CCX Members and Associate Members annually forfeit Carbon Financial Instruments to achieve True-up.

“Tillage” is one of various silvicultural activities that loosen the soil structure in a plantation with the aim of increasing rooting volume.

“Transaction” is a commercial agreement that provides for the transfer of Carbon Financial Instruments. The three categories of transactions that can be executed in CCX are:

- (1) CCX Exchange-cleared Trades;
- (2) Bilateral Trades; and,
- (3) Block Trades.

“Transfer” is the movement of a CCX Carbon Financial Instrument from one CCX Registry Account to another. Transfer implies the conveyance from transferor to transferee of full legal title to all Greenhouse Gas reduction and mitigation rights associated with transferred Carbon Financial Instruments.

“True-up” is the annual Surrender by each CCX Member of Carbon Financial Instruments in an amount equal to a CCX Member’s Owned Emissions during the Compliance Year or the annual Surrender of CFIs in an amount sufficient for a CCX Associate Member to fulfill its CCX commitments.

“United States” (“U.S.”) is the fifty states that comprise the United States of America as well as all U.S. territories (including Guam, Puerto Rico and the U.S. Virgin Islands).

“Verifier” is an entity that is approved by CCX to conduct verification of CCX Exchange Offset Projects. With the exception of certain small Projects, each Project Registration Filing and Periodic Project Report must be accompanied by a verification statement signed by a CCX-approved Verifier.

“Vintage” is the first Compliance Year for which a CCX Carbon Financial Instrument may be used in achieving Compliance with a CCX Member’s or Associate Member’s Emission Reduction Schedule or Electricity Purchase Reduction Schedule. (2006)

“WRI/WBCSD Protocols” are the Greenhouse Gas calculation tools contained in the *“Corporate GHG Accounting and Reporting: Corporate Inventory Module,”* found at the website www.ghgprotocol.org, which was developed by the World Resources Institute in conjunction with the World Business Council for Sustainable Development.

Chapter 2 Exchange Membership

2.0 Purpose

This Chapter:

- defines CCX membership categories: Members, Associate Members, Participant Members, Exchange Participants, and Registry Participants, all of which are CCX Registry Account Holders;
- establishes eligibility conditions and application procedures; and,
- describes membership privileges, duties and rules of conduct.

2.1 Exchange Membership

2.2 Classes of CCX Membership

The five classes of CCX Membership are Members, Associate Members, Participant Members Exchange Participants, and Registry Participants. Together these are referred to as CCX Registry Account Holders. Each of these classes is described below.

2.2.1 Members

Members are corporations, municipalities and other entities that emit Greenhouse Gases from their facilities. Members adopt Greenhouse Gas emission reduction commitments and satisfy those commitments by either reducing emissions from their facilities or offsetting emissions.

2.2.2 Associate Members

Associate Members are entities that indirectly emit Greenhouse Gases and commit to offset those emissions. The requirements and privileges of Associate Members are addressed in Chapter 11.

2.2.3 Participant Members

Participant Members include Offset Providers and Liquidity Providers. The requirements and privileges of Participant Members are addressed in Chapter 12.

2.2.3.1 Offset Providers/Aggregators

Offset Providers and Aggregators are entities such as Project Owners, Project implementers, registered Aggregators and entities selling Exchange Offsets produced by qualifying CCX-registered Offset Projects.

2.2.3.2 Liquidity Providers

Liquidity Providers are entities or individuals who trade on the Exchange for reasons other than compliance with the CCX Emission Reduction Schedule, such as Market Makers (see Rule 5.11) and proprietary trading groups.

2.2.4 Exchange Participants

Exchange Participants are entities or individuals that do not adopt Greenhouse Gas emission reduction commitments but do establish a CCX Registry Account for the purpose of acquiring and retiring Carbon Financial Instrument[®] contracts. The requirements and privileges of Exchange Participants are addressed in Chapter 12.

2.2.5 Registry Participant (2009)

Registry Participants are entities with direct emissions of Greenhouse Gases who do not take on the CCX Emission Reduction Schedule but commit to report such emissions to CCX for third party verification. Membership is renewed each year at the option of the Registry Participant.

2.2.6 Additional Membership Classes

Subject to the approval by the Board of Directors, the Executive Committee may create additional membership classes consistent with the goals and objectives of the Exchange.

2.3 Eligibility

Any individual or entity that satisfies the requirements provided in this Chapter 2 and is found to be suitable by the CCX Executive Committee to assume the obligations and privileges of CCX membership is eligible to become a Registry Account Holder. Entities that seek to be members must be duly organized, existing and in good standing under the laws of its jurisdiction of organization.

2.4 Registry Account Holder Applications

2.4.1 General Provisions

Each entity or person desiring to become a Registry Account Holder shall file with the Exchange an application for membership in the form prescribed by the Exchange (together with an initiation fee in such amount as specified by the Exchange), and such financial documents and other information as the Exchange may request. The applicant shall be required to provide additional information, if requested, to the Exchange or to the Provider of Regulatory Services designated by CCX, to assist the Exchange in the administration of applications.

The Exchange may deny membership and Registry Account Holder Status to an applicant for any reason including if an applicant:

- (i) has ever been denied registration in an exchange, or had a registration suspended, revoked, or conditioned by a governmental or regulatory authority;
- (ii) has ever been denied membership or clearing privileges by any commodity or securities exchange/clearing organization or has had any membership or clearing privileges suspended, revoked, or conditioned;
- (iii) has been convicted, pled guilty, entered a plea of “no contest,” or entered into a voluntary settlement as to any violation of any criminal or penal code; or,
- (iv) currently has any judgments, liens, attachments, or other encumbrances filed against it.

2.4.2 Maintenance of Eligibility

Each Registry Account Holder shall at all times meet the standards of eligibility set forth in Section 2.3, and shall immediately halt access to the trading platform if such eligibility conditions cease to exist.

Each Registry Account Holder shall immediately notify the Exchange in writing about any material change in any information contained in its Registry Account Holder application.

Each Registry Account Holder shall immediately notify the Exchange in writing upon becoming aware of any event that may impact its Registry Account Holder eligibility as stipulated in Section 2.3 or that could be used as causes for denial of membership.

The Exchange may determine not to permit a Registry Account Holder to continue as a Registry Account Holder if the Registry Account Holder:

- (i) fails to meet any of the standards of eligibility specified in Section 2.3;
- (ii) is subject to one of the causes for denial of membership or participation specified in Chapter 2.4.1;
- (iii) fails to meet any condition placed by the Exchange on such Registry Account Holder;
- (iv) violates any agreement with the Exchange; or becomes subject to a statutory disqualification under Applicable Law;
- (v) engages in conduct that does not further the goals of the Exchange; or,
- (vi) engages in conduct unbecoming of a Registry Account Holder.

2.5 [Reserved]

2.6 Privileges

2.6.1 Registry Accounts and CCX Trading Platform

Each Registry Account Holder will be provided access to their Registry Account for the purpose of viewing Registry balances, and may authorize any of its employees to have access to the same.

In order to have eligibility to access the CCX Trading Platform, a Registry Account Holder must qualify as an Eligible Commercial Entity as defined in Section 1a(11) of the Commodity Exchange Act or other entity permitted to trade on an Exempt Commercial Market as that term is defined in CFTC Regulation 36.3.

2.6.2 Voting

Voting on resolutions and actions placed before the membership by the Executive Committee shall be the privilege of CCX Members only. Each Member shall have an equal vote on resolutions and actions placed before the membership by the Executive Committee.

2.6.3 No Delegation

No Registry Account Holder shall delegate to any other person or entity the rights and privileges of membership without written permission of the CCX Executive Committee.

2.7 Duties and Obligations

2.7.1 General Provisions

Each Registry Account Holder shall abide by the provisions established in this *Rulebook*, as amended from time to time, and by all circulars, notices, directives or decisions adopted pursuant to or made in accordance with the Rules of the Exchange. Each Registry Account Holder shall keep and maintain a current copy of the Exchange *Rulebook* in a readily accessible place.

Any violation of the Rules of the Exchange by any employee or representative of a Registry Account Holder shall constitute a violation of the Rules by such Registry Account Holder.

2.7.2 Termination for Non-Conformance with Rules

Failure to conform to the Rules provided herein may result in termination of CCX membership and prohibition from all further participation in CCX without refund or reimbursement of any amounts paid for membership, dues, transaction fees or otherwise.

2.7.3 Fulfillment of Obligations

Each Registry Account Holder shall be fully responsible for the timely performance of all obligations stated in the membership application and related undertakings, the Rules of the Exchange, and any and all obligations associated with purchase and/or sale of Products via the CCX Trading Platform.

2.7.4 Maintenance of Records

Each Registry Account Holder shall maintain adequate records of orders entered, transactions effected and positions carried on the Exchange as the Exchange may prescribe. Such records shall at all times be open to inspection by the Exchange and by the Provider of Regulatory Services designated by CCX.

2.7.5 Addresses and Contact Information

Each Registry Account Holder shall file with the Exchange and keep current at all times:

- (1) the address where notices may be served;
- (2) if the Registry Account Holder is an individual, the individual's residential and business address and complete contact information; and,
- (3) if the Registry Account Holder is other than an individual, the name, address and complete contact information of the employee who is to be the primary liaison with the Exchange.

Registry Account Holders shall promptly inform the Exchange of any change in the designated contact person or employee, or any related contact information.

2.7.6 Provision of Information to the Exchange

Each Registry Account Holder shall make and file additional reports with the Exchange at such times and containing such information in such form as the Exchange may prescribe. Each Registry Account Holder shall, in a timely fashion, furnish such information as may from time to time be requested by any representatives of the Exchange or Provider of Regulatory Services designated by CCX, acting in the course of their duties.

2.7.7 Supervision of Employees and Representatives

Each Registry Account Holder shall diligently supervise all activities of its employees and representatives in all matters involving the Exchange to ensure compliance with the Rules and such directives of the Board of Directors or Executive Committee as may be given from time to

time. Without limiting the generality of the foregoing, each Registry Account Holder shall:

- (1) have at all times at least one senior officer who is responsible for supervision of all employees and representatives and shall promptly advise the Exchange of any change in the name, title, address, phone number, fax number or e-mail address of each such officer;
- (2) train its employees regarding the Rules and the proper use of the CCX Trading Platform and Registry; and,
- (3) furnish the Exchange on demand with a list of all Authorized Traders employed or otherwise authorized by such Registry Account Holder, giving the name, location and trader identification (as prescribed by the Exchange).

2.7.8 Non-U.S. Based Registry Account Holder Requirements

Each Registry Account Holder that does not maintain an office in the United States that is responsible for preparing and maintaining financial and other reports required to be filed with the Exchange shall:

- (1) prepare all required financial reports in English;
- (2) reimburse the Exchange for any expense incurred in connection with examinations of the Registry Account Holder;
- (3) ensure the availability of an individual who is knowledgeable in relevant technical and financial matters to assist representatives of the Exchange or the Provider of Regulatory Services designated by CCX, acting in the course of their duties; and,
- (4) identify an individual to receive service of process in the event the Commodity Futures Trading Commission or other government agency issues a subpoena.

2.8 Fees and Payments

The CCX Board of Directors shall have the sole power to set the dates and amounts of any fees, dues, charges and assessments to be levied on Registry Account Holders, which fees, dues, charges and assessments shall be paid to the Exchange when due, *provided* that the CCX Board of Directors may delegate such authority to an Exchange Committee or to one or more officers of the Exchange. Such fees, dues, charges and assessments shall include (but are not limited to):

- Initial Membership Fee
- Annual Dues
- Account Registration Fees
- Transaction Fees
- Offset Registration Fees
- Early Action Credit Registration Fees
- Intra- and Inter-company Transfer Fees

The CCX Board of Directors shall have the authority to waive any such fees, dues, charges and/or assessments or to offer discounts for any classification of Registry Account Holder and may modify the fee structure from time to time at its sole discretion, *provided* that the CCX Board of Directors may delegate such authority to an Exchange Committee or to one or more officers of the Exchange.

If a Registry Account Holder fails to pay any Exchange fees, dues, charges or assessments (or any installment thereof) within thirty days after such assessment, the Registry Account Holder may be suspended until such assessment, or installments thereof, is paid. If such payment obligation remains unsatisfied for six consecutive months after its due date, the Exchange may terminate, suspend or otherwise limit the privileges of such Registry Account Holder.

2.9 Prohibited Conduct

No Registry Account Holder shall:

- (1) disseminate any false, misleading or inaccurate information, including reports concerning any Carbon Financial Instrument[®] contracts or other Products traded on the Exchange, or market information or conditions that affect or tend to affect the price of any Product traded on the Exchange;
- (2) manipulate, or attempt to manipulate, the price of any Product traded on the Exchange;
- (3) furnish false or misleading information to, or fail to furnish information when requested by, the Board of Directors of the Exchange, any representatives of the Exchange or the Provider of Regulator Services designated by the Exchange;
- (4) violate or fail to conform to the Rules of the Exchange or any Applicable Laws;
- (5) enter any bids, offers or transactions into the Exchange Trading Platform when such Registry Account Holder knows or should have known that it is insolvent, within the meaning of any applicable bankruptcy or insolvency laws, federal or state, domestic or foreign, without the prior written approval of the Exchange;
- (6) violate, or fail to comply in a timely manner with, the terms of any agreement between the Registry Account Holder and the Exchange, or of any order or decision of the Exchange;
- (7) enter bids or offers into the CCX Trading Platform other than in good faith for the purpose of executing transactions, or make any bid or offer for the purpose of establishing a market price which does not reflect the true state of the market;
- (8) knowingly enter into a transaction on the Exchange that is a wash sale or a transaction entered into for the purpose of manipulating the market;
- (9) engage in conduct or practices inconsistent with just and equitable principles of trade, or conduct or practices detrimental to the best interests of the Exchange;
- (10) engage in conduct that does not further the goals of the Exchange;
- (11) disclose confidential information obtained in the course of participation on or proceedings of an Exchange committee, hearing or investigation; or,
- (12) engage in unlawful conduct or behave in a manner that is inconsistent with high standards of professional and personal decorum.

2.10 Violations of Exchange Rules

2.10.1 Procedures for Rule Violations

A Registry Account Holder or a person associated with a Registry Account Holder who is alleged to have violated or aided and abetted a violation of any Applicable Law, or any provision of the CCX Rules or any interpretation thereof, or any order, direction or resolution of the Board of Directors or Executive Committee concerning the conduct of business on the Exchange, shall be subject to the disciplinary jurisdiction of the Exchange under this Section 2.10.1, and after notice and opportunity for a hearing may be appropriately disciplined in accordance with Rules of the Exchange.

Instances of possible violations of CCX Rules shall be reported to the CCX Office of General Counsel (“OGC”). If the OGC determines that further consideration of the alleged violation is warranted, the OGC will initiate a due process investigation of the subject Registry Account Holder (“Respondent”) by the Provider of Regulatory Services designated by CCX, in coordination with the appropriate Exchange Committee(s). Upon completion of each investigation a recommendation shall be submitted to the Executive Committee.

The OGC shall be kept apprised of the status of any investigation and receive copies of all communications and any resulting report and recommendations. The OGC may intervene at any time in the interest of efficiency, and may close a matter if it reasonably believes that no violation exists, or with the consent of the Executive Committee may settle the matter by agreement with the subject Registry Account Holder(s). Disciplinary actions for violation of Exchange Rules may include, but are not limited to fines, reformation or invalidation of any transaction(s), loss or suspension of trading or other privileges of membership, and/or suspension or termination of CCX membership.

In the event of a due process investigation, to the extent legally permitted CCX shall notify the Respondent, when practicable, before any investigation is initiated. If prior notice is not practicable, the Respondent shall be notified at the earliest reasonable opportunity. The notification shall:

- (1) state the nature of the investigation;
- (2) briefly state the reasons for the investigation; and,
- (3) to the extent practicable, discuss the timeframe and/or next steps to be undertaken in the investigation.

In conducting investigations of possible Rule violations, the OGC, the Provider of Regulatory Services designated by the Exchange, or the appropriate Exchange Committee(s) may require the Registry Account Holders to provide relevant information and may conduct interviews, hearings or other actions as necessary to complete a fair and accurate investigation.

Upon completion of the investigation the Provider of Regulatory Services designated by the

Exchange shall prepare a report and recommendations which shall be forwarded, with any further recommendations of the Exchange Committee(s) involved in the investigation, to the Executive Committee. If the Executive Committee reasonably believes that a violation has been committed it shall act upon each investigation recommendation as follows:

- (1) The Respondent subject to investigation shall be given an opportunity for a hearing before the Executive Committee. The hearing shall be conducted in the following manner:
 - (a) The hearing shall be held promptly after reasonable notice to the Respondent. No member of the hearing body may serve on that body in a particular matter if that person or any person or firm with which that person is affiliated, has a financial, personal or other direct interest in the matter under consideration, excluding Registry Account Holders that may have an indirect interest solely by virtue of such status.
 - (b) Formal rules of evidence need not apply, but the hearing shall not be so informal as to be unfair; the Executive Committee may in its discretion impose reasonable procedural rules to facilitate orderly proceedings.
 - (c) The appropriate Exchange staff and the Provider of Regulator Services designated by the Exchange shall present the case on behalf of the Exchange on those matters that are the subject of the hearing.
 - (d) The Respondent shall be entitled to appear personally at the hearing and to be represented by counsel.
 - (e) The Respondent shall be entitled to cross-examine any person(s) appearing as witness(es).
- (2) Within five business days following the conclusion of the hearing, the Executive Committee shall render a written decision based upon the weight of the evidence contained in the record of the proceeding, and shall provide a copy to the Respondent at which time it shall become binding on the Respondent in all respects. The decision shall include:
 - (a) a brief summary of the evidence produced at the hearing;
 - (b) findings and conclusions;
 - (c) a description of the disciplinary or other action to be taken; and,
 - (d) the reasons for the disciplinary or other action.
- (3) The written decision of the Executive Committee shall be final and not subject to appeal. The Exchange may enforce its decision in any Court of competent jurisdiction in the same manner as an award in arbitration. Registry Account Holders failing or refusing to promptly comply with the written decision of the Executive Committee shall be subject to further fines, sanctions and/or suspensions of privileges or membership as the Executive Committee may determine in its reasonable discretion.

2.10.2 Violations of Exchange Rules Threatening Imminent Harm

The CCX Executive Committee or Board of Directors is authorized to take summary action (without affording prior opportunity for hearing) to suspend or terminate the membership of a Registry Account Holder to protect the best interests of the Exchange when it reasonably believes that a Rules violation of a Registry Account Holder (“Respondent”) presents an imminent risk of harm to the Exchange.

The following procedures shall apply to such actions:

- (1) The Respondent shall, when practicable, be notified in writing before the action is taken. If prior notice is not practicable, the Respondent shall be notified at the earliest possible opportunity. The notice shall:
 - (a) state the action taken or to be taken;
 - (b) briefly state the reasons for the action; and,
 - (c) state the effective time and date and the duration of the action.
- (2) The Respondent shall be given an opportunity for a subsequent hearing before the CCX Executive Committee. The hearing shall be conducted in accordance with the following requirements:
 - (a) The hearing shall be held promptly after reasonable notice to the Respondent. No member of the hearing body may serve on that body in a particular matter if that person or any person or firm with which that person is affiliated has a financial, personal or other direct interest in the matter under consideration, excluding Registry Account Holders that may have an indirect interest solely by virtue of such status.
 - (b) Formal rules of evidence need not apply, but the hearing shall not be so informal as to be unfair; the Executive Committee may in its discretion impose reasonable procedural rules to facilitate orderly proceedings.
 - (c) The appropriate Exchange staff and the Provider of Regulatory Services designated the Exchange shall present the case on behalf of the Exchange on those matters which are the subject of the hearing.
 - (d) The Respondent shall be entitled to appear personally at the hearing and to be represented by counsel.
 - (e) The Respondent shall be entitled to cross-examine any person(s) appearing as witness(es).
- (3) Within five business days following the conclusion of the hearing, the Executive Committee shall render a written decision based upon the weight of the evidence contained in the record of the proceeding, and shall provide a copy to the Respondent at which time it shall become binding on the Respondent in all respects. The decision shall include:

- (a) a description of the summary action taken;
 - (b) the reasons for the summary action;
 - (c) a brief summary of the evidence produced at the hearing;
 - (d) findings and conclusions;
 - (e) a determination that the summary action should be affirmed, modified, or reversed; and,
 - (f) a declaration of any action to be taken pursuant to the determination specified in (e) above (including such disciplinary actions as stated in Section 2.10.1 of these Rules), and the effective date and duration of such action.
- (4) The written decision of the Executive Committee shall be final and not subject to appeal. The Exchange may enforce its decision in any Court of competent jurisdiction in the same manner as an award in arbitration. Registry Account Holders failing or refusing to promptly comply with the written decision of the Executive Committee shall be subject to further fines, sanctions and/or suspensions of privileges or membership as the Executive Committee may determine in its reasonable discretion.

Where a Registry Account Holder fails or refuses to perform under the terms of a trade or to pay obligations arising out of such trades to another Registry Account Holder, on complaint of the other Registry Account Holder, the defaulting Registry Account Holder shall be suspended until the contract is performed or the debt satisfied.

If it appears that a Registry Account Holder is insolvent, cannot demonstrate its ability to achieve compliance, is in such financial condition that it cannot be permitted to continue in business with safety to its customers, its creditors, or the Exchange, the Executive Committee may impose any restriction upon the operations of the Registry Account Holder as deemed appropriate in the circumstances.

2.11 Termination of Membership

The membership of any Registry Account Holder may be terminated at any time if the Executive Committee or Board of Directors determines that such termination is in the best interests of the Exchange.

Registry Account Holder status obtained by fraudulent representations or concealment shall be subject to immediate termination by the Executive Committee.

A Registry Account Holder may be required to withdraw from the Exchange if the Executive Committee shall determine, after notice and an opportunity to be heard, that such Registry Account Holder no longer meets the eligibility standards as stipulated in Section 2.3 or that events have taken place that constitute causes for denial of membership as specified in Section

2.4.1.

Notwithstanding any termination of its membership, each Registry Account Holder shall remain subject to the jurisdiction of the Exchange after the effective date of such termination as if such individual or entity were still a Registry Account Holder with respect to any investigation or proceeding commenced by the Exchange against such individual or entity, or any claim in arbitration filed against such entity, provided that such investigation, proceeding or arbitration is commenced not more than six months after the effective date of such termination.

Each entity whose status as a Registry Account Holder has been terminated shall immediately notify the Exchange of any change in its address as most recently reported to the Exchange for a period of one year following the effective date of such termination.

No refund or reimbursement of membership or other fees, dues, charges or assessments shall be made by the Exchange in the event that: (i) the membership of a Registry Account Holder is suspended or terminated for violation of any Exchange Rule; (ii) the Executive Committee finds that a Registry Account Holder no longer meets the eligibility standards stated in Section 2.3; or (iii) events have taken place that constitute a grounds for denial of membership as stated in Section 2.41.

2.12 Notice to Others of Suspension, Termination or Reinstatement

Whenever a Registry Account Holder has been suspended, the Exchange shall immediately announce the suspension to the other Registry Account Holders. If such suspension is modified or rescinded after the hearing, the Exchange shall announce the revised action to the other Registry Account Holders.

When a Registry Account Holder that has had its membership terminated, suspended or otherwise limited applies for reinstatement, the Exchange shall make notice thereof available to all Registry Account Holders.

2.13 Application of Rules and Jurisdiction (2005)

By submitting its signed CCX membership application, paying membership fees, accessing, or entering any order into the CCX Trading Platform, or otherwise making use of the privileges of membership in the Exchange, each Registry Account Holder agrees and without any need for any further action, undertaking or agreement, as follows:

- (1) to be bound by and comply with the Rules of the Exchange and Applicable Law; and,
- (2) to become subject to the jurisdiction of the Exchange with respect to any and all matters arising from, related to, or in connection with, the status, actions or omissions of such Registry Account Holder.

2.14 Indemnification

Each Registry Account Holder agrees to indemnify and hold harmless the Exchange, its parent(s), affiliates and subsidiaries and their respective directors, officers, employees, agents and contractors (including any Provider of Regulatory Services) from any and all claims, losses, fines, penalties, liabilities and expenses (including attorneys fees and costs) arising from or related to its or its representative's alleged or established conduct or participation in the Exchange, including but not limited to (i) negligent acts and omissions, fraud or intentional misconduct, (ii) breach of any obligation to complete any order, transaction or contract, (iii) any breach of Exchange Rules or Applicable Law, and (iv) any proceeding brought against the Exchange alleging its failure to prevent, detect or require certain conduct of a Registry Account Holder.

2.15 Dispute Resolution

Any dispute or controversy arising under or in connection with this *Rulebook*, or any other dispute concerning the operation of the Exchange shall, at the Exchange's sole discretion, be settled exclusively by arbitration, conducted before a panel of three arbitrators, sitting in a location selected by mutual agreement within the City of Chicago, Illinois in accordance with the rules for commercial arbitration of the American Arbitration Association then in effect. A determination made by arbitration pursuant to this Section 2.15 shall be final and binding upon the parties. Notwithstanding the agreement to arbitrate such disputes and controversies, the Exchange shall be entitled to enforce, in any court of competent jurisdiction, any written decision of the Executive Committee pursuant to Sections 2.10.1 or 2.10.2, or any Registry Account Holder's compliance with any restrictive covenant or confidentiality provision applicable to, or contained in, this *Rulebook* or elsewhere to the fullest extent permitted by law by seeking any remedy available at law or in equity, including but not limited to a temporary restraining order, injunction, and specific performance, without having to arbitrate and without need to post a bond to do so.

2.16 Exchange Communications

The Exchange shall publish a notice with respect to each addition to, or modification of, the Rules of the Exchange, in a form and manner that is reasonably designed to enable each Registry Account Holder to become aware of and familiar with, and to implement any necessary preparatory measures to be taken by it with respect to, such addition or modification, prior to the effective date thereof; *provided* that any failure of the Exchange to so publish a notice shall not affect the effectiveness of the addition or modification in question. For purposes of publication, it shall be sufficient (without limiting the discretion of the Exchange as to any other reasonable means of communication) if a notice is sent to each Registry Account Holder by mail, recognized courier service, facsimile or electronic mail (including by means of a hyperlink included in an electronic mail message), to the address, facsimile number or electronic mail address (as applicable) provided by such Registry Account Holder in connection with its application for membership, as updated from time to time.

Chapter 3 Exchange Governance

3.0 Purpose

This chapter describes:

- the governance structure of the Exchange, including the Board of Directors, the Executive Committee and other Board Committees;
- the Exchange Committees, including Standing Committees and Ad Hoc Committees;
- Confidentiality obligations and other requirements of committee members and Exchange members; and
- Procedures in the event of conflicts of interest.

3.1 Name

The name of the Exchange shall be “Chicago Climate Exchange.” The Exchange may also be referred to by its trade name “CCX.”

3.2 Principal Place of Business

The Exchange shall have its principal place of business in Chicago, Illinois.

3.3 Effectiveness of Rules

These Rules became effective as of July 31, 2003, and have been periodically updated since that time. Unless otherwise specified by the Board of Directors, all new and amended Rules shall become effective on the date of publication.

3.4 Authorization

The Board of Directors and its Executive Committee and such other Board Committees as exist from time to time, the Standing Committees and such other Exchange Committees as may exist from time to time, and the Officers of the foregoing, shall be established, appointed or elected as described in this Chapter 3, and shall have the rights, duties and responsibilities set forth herein. Notwithstanding anything in these Rules, the Board of Directors shall have the power and authority to review, modify, suspend and/or overrule any action of any authorized person or committee, and also retains the power and authority to perform any action delegated by it to any person or committee.

3.5 Board of Directors

The Board of Directors shall have the power and authority to the full extent granted corporations by the laws of the State of Delaware and Applicable Law, subject only to the provisions of the Certificate of Incorporation and the Bylaws of Chicago Climate Exchange, Inc. Any determination made in good faith by the Board of Directors concerning its power and authority shall be conclusive. The enumeration of the powers of the Board of Directors herein shall not be construed to exclude or limit the powers conferred upon the Board of Directors by Chicago Climate Exchange, Inc. organizational documents or Applicable Law.

3.5.1 Board of Directors Responsibilities

The business and affairs of the Exchange shall be managed by or under the direction of the Board of Directors, consistent with the power and authority generally conferred by Applicable Law or otherwise provided herein or in its organizational documents.

The Board of Directors may delegate certain responsibilities and corresponding power and authority to the Executive Committee or such other Board Committees as it may designate, but shall retain the powers and authority to undertake any of the delegated responsibilities. Further, notwithstanding anything in these Rules to the contrary, the Board of Directors shall have the power and authority to call for review, and to affirm, modify, suspend or overrule, any and all decisions of the Executive Committee or other Board Committees, or any member or Officer thereof.

3.5.2 Board of Directors Membership

The Board of Directors shall initially be composed of 12 “Directors”, as follows:

- (a) The Chief Executive Officer (CEO);
- (b) The President;
- (c) Two Directors elected by holders of Series A Convertible Preferred Stock;
- (d) Three Directors elected by Members (with a reduction commitment); and,
- (e) Five Outside Directors who shall not otherwise be affiliated with or employed by the Exchange or employed by any shareholder.

The Chief Executive Officer shall serve as Chairman of the Board of Directors. Two of the Outside Directors selected by the Chairman shall serve as Vice-Chairmen of the Board of Directors.

Notwithstanding the foregoing, the number and qualification of Directors described in

this Section may be fixed or changed from time to time by action of the Board of Directors.

3.5.3 Board of Directors Tenure

One of the Directors elected by holders of Series A Convertible Preferred Stock shall hold office for an initial term of one year and one shall hold office for an initial term of two years, or until their death, resignation or removal, whichever occurs first, in a manner permitted by Applicable Law. The position of the Director that holds office for an initial term of one year will come up for election in 2004. The position of the Director that holds office for an initial term of two years shall come up for election in 2005. The newly elected Directors shall hold office for a term of three years, or until their death, resignation or removal, whichever occurs first, in a manner permitted by Applicable Law.

One of the Directors elected by Members shall hold office for an initial term of one year, one shall hold office for an initial term of two years and one shall hold office for an initial term of three years, or until their death, resignation or removal, whichever occurs first, in a manner permitted by Applicable Law. The position of the Director that holds office for an initial term of one year shall come up for election in 2004. The position of the Director that holds office for an initial term of two years shall come up for election in 2005. The position of the Director that holds office for an initial term of three years shall come up for election in 2006. The newly elected Directors shall hold office for a term of three years, or until their death, resignation or removal, whichever occurs first, in a manner permitted by Applicable Law.

Outside Directors shall be elected by the shareholders in a majority vote. Two of the Outside Directors shall hold office for an initial term of three years, two shall hold office for an initial term of four years and one shall hold office for an initial term of five years, or until their death, resignation or removal, whichever occurs first, in a manner permitted by Applicable Law. The positions of the two Outside Directors that hold office for an initial term of three years shall come up for election in 2006. The positions of the two Outside Directors that hold office for an initial term of four years shall come up for election in 2007. The position of the Outside Director that holds office for an initial term of five years shall come up for election in 2008. The newly elected Outside Directors shall hold office for a term of three years.

The term of all Directors shall commence on the date of the first meeting of the Board of Directors.

In the event that any Director other than an Outside Director ceases to be qualified as a Director by virtue of a change in professional affiliation, the Director shall cease to be a Director and his or her office shall become vacant.

3.5.4 Board of Directors Meetings

A regular meeting of the Board of Directors shall be held quarterly. The Board of Directors may provide, by resolution, the time and place for the holding of additional regular meetings without notice other than such resolution.

Special meetings of the Board of Directors may be called by the Chief Executive Officer or any four Directors. The Directors calling a special meeting of the Board of Directors shall fix the time and place at which such meeting shall be held, and such time and place shall be specified in the notice of such meeting.

3.5.5 Board of Directors Quorum and Attendance

At all meetings of the Board of Directors, a majority of the Directors currently in office shall constitute a quorum for the transaction of business. An act of the Board of Directors requires affirmative vote of a majority of Directors present at the meeting where a quorum is present. If a quorum is not present at any meeting of the Board of Directors, a majority of the Directors present at such meeting may adjourn it without notice other than announcement at such meeting, until a quorum is present.

Directors may attend meetings of the Board of Directors either in person or by electronic means, such as by telephone or video-conferencing. Any Director not physically present at a Board of Directors meeting but in continuous communication with such meeting shall be deemed to be present. Continuous communication shall exist when a Director not physically present is able to communicate with each other Director deemed present, and to participate in the proceedings of the meeting. Directors may not send a delegate to represent them at any meeting of the Board of Directors.

3.5.6 Board of Directors Meeting Procedures

Board of Directors meetings shall be conducted according to established business practices. A written record in the form of minutes shall be made of every meeting. In case of dispute, Robert's Rules of Order shall govern.

3.5.7 Vacancy, Resignation and Removal of Directors

A vacancy created because of the death, disability, resignation or removal of a Director shall be filled by the same method as used to appoint the Director who left the vacancy.¹

¹ A vacancy of an office of a Director elected by holders of Series A preferred stock shall be filled through a majority vote of such shareholders. A vacancy of an office of a Director elected by Exchange Members shall be filled through a majority vote of Exchange Members. A vacancy of an office of an Outside Director shall be filled through a vote of the

A Director appointed by holders of Series A preferred stock or elected by Members to fill such vacancy shall serve as a Director until the next annual election of Directors and until his or her successor is duly elected and qualified or until his or her death, resignation or removal, whichever occurs first, in a manner permitted by Applicable Law.

A Director may resign at any time by giving written notice to the Chief Executive Officer. A Director may be removed for cause by an act of the Board of Directors. For these purposes, “for cause” shall mean that the Director, in carrying out his or her duties, has been guilty of negligence or willful misconduct.

A Director appointed by holders of Series A preferred stock may be removed at any time by the holders of Series A preferred stock, effective immediately upon providing written notification to the remaining Directors. The termination of a person’s duties as an Officer of the Board of Directors also shall terminate automatically such person’s status as a Director.

3.5.8 Officers of the Exchange

The Chief Executive Officer (“CEO”) shall be selected by a majority vote of the Board of Directors. The CEO may appoint other “Officers” of the Exchange at his or her discretion. All Officers shall exercise such powers and perform such duties as may be determined from time to time by the CEO, Board of Directors or Executive Committee. Any two or more Officer positions may be held by the same person.

3.5.9 Board Committees

The Board Committees shall consist of the Executive Committee, the Nominating Committee, the Audit Committee, the Compensation Committee and such other Board Committees as the Board of Directors may establish from time to time. Board Committees shall have the power and authority to execute the responsibilities stated in these Rules and as expressly delegated by the Board of Directors. Directors may not send a delegate to represent them at any Board Committee meeting. The Board of Directors may remove any Board Committee member at any time.

Unless otherwise specified in the Rules or by the Board of Directors, the Nominating Committee, the Audit Committee, the Compensation Committee and such other Board Committees as the Board of Directors may establish from time to time, shall each be comprised of up to 3 Directors (but no less than 2 Directors) appointed by the Board of Directors, and shall adhere to the provisions for tenure, meetings, quorum, attendance and meeting procedures stated in Section 3.6 relative to the Executive Committee.

shareholders in a majority vote.

3.6 Executive Committee

The Executive Committee shall have such authority as provided in these Rules, as modified from time to time by the Board of Directors in accordance with these Rules.

3.6.1 Executive Committee Responsibilities

The Executive Committee is authorized and empowered to undertake the following responsibilities:

- (1) oversee the affairs of the Exchange as provided by these Rules;
- (2) hold such hearings regarding breach of the Rules and other matters, and determine and implement such corrective actions or sanctions as it deems necessary and appropriate in accordance with the Rules;
- (3) designate sub-committees of the Executive Committee and delegate such powers and authority to act as it deems appropriate from time to time;
- (4) receive and act upon recommendations from Standing Committees and Ad Hoc Committees;
- (5) address any unresolved issues emerging from Standing Committees and Ad Hoc Committees;
- (6) establish and/or amend rules governing membership of Standing Committees and Ad Hoc Committees and voting privileges therein for Members, Participant Members and Associate Members;
- (7) establish additional Standing Committees and Ad Hoc Committees as necessary; and
- (8) undertake such other matters as delegated by resolution of the Board of Directors.

3.6.2 Executive Committee Membership

The Executive Committee shall be comprised of at least 5 and not more than 7 Directors, with at least 2 being non-Member Directors, including:

- (a) the Chief Executive Officer;
- (b) the President;
- (c) one of the Vice-Chairmen of the Board of Directors selected by the Chairman of the Board of Directors; and,
- (d) a minimum of 2 Directors that are Members (with reduction commitments) of the Exchange; and
- (e) such other Directors, including necessary non-Member Directors, as the Board of Directors may select.

For the first one-year term of service the Executive Committee members that are representatives of Members shall be appointed by the Chairman of the Board of Directors and approved by the Board of Directors. For subsequent terms of service the Executive Committee members that are representatives of Members shall be elected by the Members in a majority vote at a meeting of the Members and shall be subject to approval by the Board of Directors.

3.6.3 Executive Committee Tenure

Executive Committee members shall serve one-year, renewable terms, or until their death, resignation or removal, whichever occurs first, in a manner permitted by Applicable Law.

3.6.4 Executive Committee Meetings, Quorum and Attendance

The Executive Committee shall meet monthly or as required. There shall be a quorum when a majority of Executive Committee members currently in office is in attendance. An act of the Executive Committee requires affirmative vote of a majority of Directors present at the meeting where a quorum is present.

Executive Committee members may attend either in person or by electronic means, such as telephone or video-conferencing. Any Executive Committee member not physically present at an Executive Committee meeting but in continuous communication with such meeting shall be deemed to be present. Continuous communication shall exist when an Executive Committee member not physically present is able to communicate with each other member deemed present, and to participate in the proceedings of the meeting. Members of the Executive Committee may not send a delegate to represent them at any meeting of the Executive Committee.

3.6.5 Executive Committee Meeting Procedures

Executive Committee meetings shall be conducted according to established business practices. A written record in the form of minutes shall be made of every meeting. In case of dispute, Robert's Rules of Order shall govern.

3.6.6 Vacancy, Resignation and Removal of Executive Committee Members

A vacancy on the Executive Board of Directors, other than that of an Exchange executive or a Vice Chairman, created because of the death, disability, resignation or removal of an Executive Committee member elected by Members shall be filled through a majority vote of Members. The Executive Committee member so appointed to fill such vacancy shall

serve until the next annual election of Executive Committee members and until his or her successor is duly elected and qualified, or until his or her death, resignation or removal, whichever occurs first.

An Executive Committee member may be removed at any time by the act of the Board of Directors.

3.7 Standing Committees and Ad Hoc Committees

The Standing Committees shall consist of the Environmental Compliance Committee, the Forestry Committee, the Offsets Committee, the Trading and Operations Committee, and such other Standing Committees as the Board of Directors may establish from time to time.

The Board of Directors or the Executive Committee may designate one or more Ad Hoc Committees from time to time in its discretion. The role of each Ad Hoc Committee shall be as defined at the time of creation by the Board of Directors or Executive Committee, as the case may be.

All Standing Committees and Ad Hoc Committees together may be referred to as “Exchange Committees”. Exchange Committees shall be comprised of representatives of Members, Associate Members and/or Participant Members. The Board of Directors or the Executive Committee may abolish any Standing Committee or Ad Hoc Committee.

3.7.1 Standing Committees Responsibilities

Each Standing Committee shall meet to consider matters for which it is responsible, and shall formulate such recommendations and conduct such business as stated in these Rules or as specified by the Board of Directors or Executive Committee. A Standing Committee may approve routine matters that are expressly within the scope of its power and authority. Non-routine matters and matters that are not expressly within the scope of its power and authority shall be considered by the responsible Standing Committee, and its recommendations shall be forwarded to the Executive Committee for approval. The responsibilities of each Standing Committee are presented below. Standing Committees may also provide input in connection with alleged violations of Exchange Rules and resolution of disputes involving members of the Exchange.

3.7.2 Environmental Compliance Committee

The Environmental Compliance Committee shall:

- (1) recommend rules for and oversee implementation of Emission Baselines,

- Emission Reduction Schedules and emissions monitoring and verification;
- (2) serve as a peer group to monitor compliance with such rules;
- (3) evaluate violations of such rules and recommend a course of action to the Executive Committee; and
- (4) perform such other tasks involving Emission Baselines and environmental compliance as may be appropriate from time to time.

The Environmental Compliance Committee may recommend changes in monitoring methods in consideration of, among other factors, the following:

- (1) determination that a new or modified method represents a significant improvement over existing best practices;
- (2) changes in data availability;
- (3) changes in the ability of Members and Associate Members to apply the prescribed methods; and,
- (4) the ability of the affected Members and Associate Members to completely implement the recommended changes.

3.7.3 Forestry Committee

The Forestry Committee shall:

- (1) develop and approve Forestry Project protocols used to evaluate proposed CCX registrations of Forestry Projects;
- (2) consider new types of Forestry Projects for registration with CCX;
- (3) provide guidance to CCX staff during the Forestry Project registration process;
- (4) review and evaluate proposed registrations of Forestry Projects, including those that do not fit established Forestry Project protocols, and approve Forestry Project registrations where appropriate;
- (5) develop and recommend standards for verification of registered Forestry Projects;
- (6) provide guidance to the Executive Committee in its consideration of matters involving Forestry Projects, including but not limited to, new and amended protocols, new and amended verification standards, and registration of Forestry Projects;
- (7) monitor the diversity of registered Forestry Project types and implement methods for maintaining diversity as necessary;
- (8) evaluate violations of Forestry Project Rules and provide guidance to the Executive Committee; and
- (9) perform such other tasks involving Forestry Projects as may be appropriate from time to time.

3.7.4 [Reserved]**3.7.5 Offsets Committee**

The Offset Committee shall:

- (1) develop and approve Offset Project protocols used to evaluate proposed CCX registrations of Offset Projects;
- (2) consider new types of Offset Projects for registration with CCX;
- (3) provide guidance to CCX staff during the Offset Project registration process;
- (4) review and evaluate proposed registrations of Offset Projects, including those that do not fit established Offset Project protocols, and approve Offset Project registrations where appropriate;
- (5) develop and recommend standards for verification of registered Offset Projects;
- (6) provide guidance to the Executive Committee in its consideration of matters involving Offset Projects, including but not limited to, new and amended protocols, new and amended verification standards, and registration of Offset Projects;
- (7) monitor the diversity of registered Offset Project types and implement methods for maintaining diversity as necessary;
- (8) evaluate violations of Offset Project Rules and provide guidance to the Executive Committee; and
- (9) perform such other tasks involving Offset Projects as may be appropriate from time to time.

3.7.6 Trading and Market Operations Committee

The Trading and Market Operations Committee shall:

- (1) monitor trading market operations and identify actions that may be needed to enhance market performance and liquidity and avoid price congestion; and
- (2) oversee the periodic expansion of the market with a view to assuring efficient market performance;
- (3) make recommendations to and consult with the Executive Committee in an effort to enhance trading market operations; and
- (4) perform such other tasks involving trading and market operations as may be appropriate from time to time.

3.7.7 Standing Committee and Ad Hoc Committee Membership

All Standing Committees and Ad Hoc Committees shall be comprised of individual representatives of Members, Associate Members and/or Participant Members. Individual representatives must be employed by or own a portion of the sponsoring member; consultants or independent contractors of Exchange members are not eligible to be committee members. Appointed representatives may not delegate committee participation to any other person. Committees shall be comprised of at least five (5) people and no more than eleven (11) people, the actual number which shall be determined from time to time on a committee-by-committee basis with consideration given to the availability of qualified candidates and the efficient conduct of committee business. All Members, Associate Members and Participant Members may nominate candidates to serve on a Standing Committee or Ad Hoc Committee. Candidates must possess a reasonable level of knowledge and experience in the subject matter of the committee for which they are being nominated. Nominations shall be evaluated by the Executive Committee, which shall appoint appropriate candidates and provide suitable written notice to candidates of the success of their nominations.

3.7.8 Standing Committee Tenure

Members of Standing Committees shall be appointed for staggered two-year terms. Initially, half of the candidates for committee positions (and the additional candidate, if there is an odd number of committee positions) shall be appointed for a two-year term and the balance of candidates appointed for a one-year term, which going forward will provide that approximately half of the positions on a Standing Committee will be up for reappointment each year. Committee members may serve multiple terms, depending on the needs of the Committee and the available population of able candidates. In determining whether to reappoint or replace Standing Committee members, the Executive Committee may consider the competing needs in staffing committees, of reappointing committee members to maintain knowledgeable and experienced people, and replacing members in order to spread the benefits and responsibilities of committee service and to gain fresh perspective. In the event that the Executive Committee does not formally reappoint or replace Standing Committee members in a given year, the committee members whose terms are expiring shall be deemed reappointed for an additional one-year term.

3.7.9 Standing Committee and Ad Hoc Committee Meetings

Standing Committees and Ad Hoc Committees shall meet as necessary. No written notice shall be required for any meeting of a Standing Committee or Ad Hoc Committee.

3.7.10 Standing Committee and Ad Hoc Committee Quorum and Attendance

At all meetings of Standing Committees and Ad Hoc Committees, a majority of the committee members shall constitute a quorum for the transaction of business. Decisions shall be taken by a majority of the committee members entitled to vote at any meeting at which a quorum is present. In order to be counted for purposes of a quorum or the transaction of business, committee members must be present in person or by electronic means.

Standing Committee members may attend either in person or by electronic means, such as telephone or video-conferencing. Any Standing Committee member not physically present at a meeting but in continuous communication with such meeting shall be deemed to be present. Continuous communication shall exist when a Standing Committee member not physically present is able to communicate with each other member deemed present, and to participate in the proceedings of the meeting. Standing Committee members may not send a delegate to represent them at any meeting.

3.7.11 Standing Committee and Ad Hoc Committee Meeting Procedures

Committee meetings shall be conducted according to established business practices. Standing Committees and Ad Hoc Committees may elect a Chairman and Vice Chairman by majority vote. A written record in the form of minutes shall be made of every meeting. In case of dispute, Robert's Rules of Order shall govern.

Each Exchange Committee (Standing Committees and Ad Hoc Committees) shall be served and aided by one or more Exchange staff liaison. Exchange Staff shall be responsible for (i) setting meeting dates and agendas, (ii) preparing certain written materials such as guidelines and protocols, (iii) taking meeting minutes, and (iv) coordinating presentations and other committee administration.

Representatives of members of the Exchange may attend as observers at meetings for the consideration of specified issues, only with the prior permission of the Committee Chairman and Exchange staff liaison. Committees may invite outside experts and advisors to consult on technical matters and assist in deliberations. Committee members shall conduct themselves in accordance with the confidentiality and conflict of interest Rules as stated in this Chapter 3.

3.7.12 Resignation and Removal of Committee Members

A vacancy created because of the death, disability, resignation or removal of a committee member shall be filled by the Executive Committee pursuant to a standard nomination process. Subject to his or her death, resignation or removal, a replacement committee member shall serve the balance of any term he or she has been appointed to fill, and then

be subject to reappointment or replacement by the Executive Committee as provided in Section 3.7.8 of these Rules.

A committee member may be removed for failure to regularly attend meetings or for any other reason (or no reason) at any time at the direction of the Executive Committee. In the event the Executive Committee elects to remove a committee member, the Exchange staff liaison responsible for the committee shall prepare (on behalf of the Executive Committee) and send written notice of removal to the committee member to be removed. Removal shall be effective upon transmission of such notice.

3.8 Regulation of the Exchange

CCX is an Exempt Commercial Market as defined in Section 2(h)(3) of the Commodity Exchange Act and in Part 36.3 of the regulations of the Commodity Futures Trading Commission (CFTC). The Exchange is not registered with, or recognized, designated, licensed or approved by the CFTC.

The Exchange shall designate an appropriate entity to provide regulatory services. The Provider of Regulatory Services designated by CCX shall:

- (1) perform verification of the Emission Baseline data and calculations of Members;
- (2) conduct market surveillance and provide Market Surveillance Reports; and,
- (3) perform verification of annual Emission Reports, supporting data and calculations submitted by Members and Associate Members; and,
- (4) review Offset Projects reports, supporting data and calculations regarding net changes in Carbon Stocks.

In case of irregularities or matters worthy of further investigation, the Provider of Regulatory Services designated by CCX shall make recommendations to the Compliance Director of the Exchange. The Compliance Director shall inform the relevant Exchange Committee of these concerns. The Provider of Regulatory Services designated by CCX shall then undertake further investigation and make recommendations for action to the Executive Committee. Each Registry Account Holder shall cooperate fully with the Provider of Regulatory Services designated by CCX and CCX committee investigations.

The Exchange may from time to time enter into such agreements with domestic or foreign self-regulatory organizations, associations, boards of trade and their respective regulators providing for the exchange of information and other forms of mutual assistance for financial surveillance, routine audits, market surveillance, investigations, enforcement and other regulatory purposes as the Exchange may consider necessary or appropriate or as required by the appropriate regulatory body. The Chief Executive Officer or the Executive Committee, or his, her or its delegate, is authorized to provide information to any such organization, association, board of trade or regulator that is a

party to an information sharing agreement with the Exchange, in accordance with the terms and subject to the conditions set forth in such agreement.

3.9 Indemnification (2010)

The Exchange shall, to the full extent to which it is empowered to do so by Applicable Law, indemnify any person who was or is a party or is threatened to be made a party to any threatened, pending or completed action, suit or proceeding, whether civil, criminal, administrative or investigative, by reason of the fact that such person is or was a Director or Officer of the Exchange, a member of an Exchange Committee, or is or was serving at the request of the Exchange as a Director or Officer of another corporation, partnership, joint venture, trust or other enterprise, against all expenses (including attorneys' fees), judgments, fines and amounts paid in settlement actually and reasonably incurred by such person in connection with such action, suit or proceeding and shall include the right to be paid by the Exchange the expenses incurred in defending any such proceedings in advance of its final disposition; *provided* that such indemnification will not apply to any such person if a court of competent jurisdiction has made a final determination that such claim resulted directly from the gross negligence, bad faith or willful misconduct of such person.

Persons who are not covered by the paragraph above and who are or were employees or agents of the Exchange, or are or were serving at the request of the Exchange as employees or agents of another corporation, partnership, joint venture, trust or other enterprise, may be indemnified to the extent authorized from time to time by the Board of Directors.

The indemnification provided or permitted by this provision shall not be deemed exclusive of any other rights to which those indemnified may be entitled by law or otherwise, and shall continue as to any person who has ceased to be a Director, Officer, employee or agent and shall inure to the benefit of the heirs, executors and administrators of such person.

3.10 Limits of Exchange Liability

Except as required in Applicable Law, and except in instances where there has been a finding of willful or wanton misconduct, gross negligence, bad faith or fraudulent or criminal acts, in which case the party found to have engaged in such misconduct cannot invoke the protection of this provision, neither the Exchange nor any of its Directors, Officers, employees, agents or consultants shall have or incur any liability whatsoever to Exchange members, any persons associated therewith, their customers or any third parties related thereto or their successors, assigns, or representatives, for any loss, damage, cost, claims or expense (including but not limited to indirect, incidental or consequential damages) that arise out of the use or enjoyment of the facilities or services afforded by

the Exchange, any interruption in or failure or unavailability of any such facilities or services, any action taken or omitted to be taken with respect to the business of the Exchange or any information or data provided or withheld by the Exchange. Such limitation of liability shall apply to all claims, whether in contract, tort, negligence, strict liability or otherwise.

The Exchange makes no warranty, express or implied, as to the results to be obtained by any person or entity from the use of any data or information transmitted or disseminated by or on behalf of the Exchange. The Exchange makes no express or implied warranties of merchantability or fitness for a particular purpose or use with respect to any data or information transmitted or disseminated by or on behalf of the Exchange.

Subject to the limitations set forth above, neither the Exchange nor any of its Directors, Officers, employees, agents or consultants shall have or incur any liability whatsoever to its Registry Account Holders, their customers or any third parties associated therewith, or their successors, assigns, or representatives, for any loss, damage, cost or expense (including but not limited to indirect, incidental or consequential damages) incurred by Registry Account Holders or customers as a result of any failure, malfunction, fault, delay, omission, inaccuracy, interruption or termination of service in connection with the furnishing, performance, operation, maintenance or use of or inability to use all or any part of any Exchange systems. Such limitation of liability shall apply regardless of the cause of such systems failure even if due to Exchange error, omission or negligence. Further, such limitation of liability shall apply to all claims, whether in contract, tort, negligence, strict liability or otherwise.

Additionally, the Exchange, its Directors, Officers, employees, agents or consultants shall have or incur absolutely no liability whatsoever for any errors or inaccuracies in information provided by any Exchange systems or for any losses resulting from unauthorized access or any other misuse of any Exchange systems by any person.

Membership or participation in the Exchange by a Member, Associate Member, Participating Member, Exchange Participant or customer shall be deemed acceptance by such party or parties of this Section 3.10.

3.11 Confidentiality

No member of the Board of Directors or any Board Committee or Exchange Committee shall use or disclose any material non-public information obtained in connection with such member's participation in the Board of Directors or any Board Committee or Exchange Committee, for any purpose other than the performance of his or her official duties as a member of the Board of Directors or any Board Committee or Exchange Committee.

No Member, Associate Member, Participating Member, Exchange Participant or

customer shall disclose any information regarding this *Rulebook* or disclose any portion of this *Rulebook*, all of which shall be treated as confidential information. This Section 3.11 is not intended and shall not be construed to replace, amend or modify any existing confidentiality agreement or non-disclosure agreement between any Member, Associate Member, Participating Member, Exchange Participant or customer and CCX.

No Officer, employee or agent of the Exchange shall participate in the trading of Products on the Exchange. Participation on an Exchange Committee shall not foreclose a Registry Account Holder from trading.

3.12 Conflicts of Interest

No member of the Board of Directors or any Board Committee or Exchange Committee shall participate in such body's deliberations and voting on any matter involving a person or entity that is identified by name as a subject of the matter ("named party in interest") where such member:

- (a) is the named party in interest;
- (b) has a family relationship with the named party in interest; a family relationship includes the member's spouse, former spouse, parent, stepparent, child, sibling, stepbrother, stepsister, grandparent, grandchild, uncle, aunt, nephew, niece or in-law;
- (c) is an employer, employee, or fellow employee of the named party in interest; or,
- (d) has a direct and substantial financial relationship with the named party in interest.

No member of the Board of Directors or any Board Committee or Exchange Committee shall participate in such body's deliberations and voting on any significant action if such member knowingly has a direct and substantial financial interest in the result of the vote. For purposes of this section, the term "significant action" means (i) any action or Rule change that addresses a specific Emergency (as defined in Section 3.13), or (ii) any action or change in Rules that is designed to respond to extraordinary market conditions or that otherwise is likely to have a substantial effect on prices.

Notwithstanding the foregoing, no member of the Board of Directors or any Board Committee or Exchange Committee shall be restricted from participating or voting on a matter concerning the Exchange solely because such member has a financial relationship with or ownership interest in the Exchange.

Each person who believes that he or she is subject to a conflict restriction of the types specified above shall disclose to the Chief Executive Officer, committee Chairman or Vice Chairman, or his or her designee, the relevant information in connection with (i) the relationship with a named party in interest, or (ii) those financial interests which could be

affected by the significant action.

The Chief Executive Officer, committee Chairman or Vice Chairman, or his or her designee shall determine whether recusal is required based on the information provided by the committee member. The Chief Executive Officer, committee Chairman or Vice Chairman, or his or her designee, using whatever information is available to him or her, may also unilaterally determine whether any member of the relevant deliberating body who does not choose to abstain from deliberations and voting is subject to a conflicts restriction under this Section. The Chief Executive Officer, committee Chairman or Vice Chairman, or his or her designee, shall disqualify from deliberations and voting any person that he or she determines is subject to a conflict under this Section 3.12.

Any member of the Board of Directors or any Board Committee or Exchange Committee who would otherwise be required to abstain from deliberations and voting pursuant to the provision established above may participate in deliberations, but not voting, if the deliberating body, after considering the factors specified below, determines that such participation would be consistent with the public interest; provided, however, that before reaching any such determination, the deliberating body shall fully consider the information about the subject member's relationship with a named party in interest or substantial financial interest in the significant action that is being contemplated. In making its determination, the deliberating body shall consider:

- (1) whether such member's participation in the deliberations is necessary to achieve a quorum; and,
- (2) whether such member has unique or special expertise, knowledge or experience in the matter being considered.

The minutes of any meeting to which the conflicts determination procedures set forth in this provision apply shall reflect the following information:

- (1) the names of all committee members of the relevant deliberating body who attended such meeting in person or who otherwise were present by electronic means;
- (2) the name of the conflicted or potentially conflicted committee member, the named party of interest or substantial financial interest which was the basis for conflict, a brief summary or other relevant facts, and the extent to which the conflicted committee member was in fact recused; and,
- (3) a brief summary of the information that was considered in evaluating the conflict or potential conflict.

No member of the Board of Directors or any Board Committee or Exchange Committee shall be disqualified from participating in the consideration of a particular matter or issue because of previous committee participation involving the same matter.

3.13 Emergency Powers of the Board of Directors

The Board of Directors, President, or any individual(s) designated by the President and approved by the Board of Directors may determine that an Emergency exists. Once determined, the Board, President, or such designee as the case may be, has broad discretion to address any emergency situation and may take action to promote the best interests of the exchange, including but not limited to, liquidation of positions held by a member, the suspension of trading privileges of a member, and the suspension of trading of the market or a temporary change in trading hours

An Emergency action shall expire once the Board of Directors, President, or any individual(s) designated by the President and approved by the Board determines to rescind the Emergency action in the same manner as for its adoption or if legal or regulatory authorities fail to authorize the extension of the Emergency action within thirty (30) days after its adoption for a period not to exceed sixty (60) additional days.

All Exchange transactions and contracts shall be subject to the exercise of these Emergency powers by the Board of Directors., the President, or such designees as the case may be.

The term “Emergency” shall include all Emergency circumstances listed in the definitions of Emergency provided in Chapter 1 as well as circumstances now or hereafter referenced in Applicable Laws and regulations thereunder, and all other circumstances in which in the reasonable view of the Board of Directors, the President, or any individual(s) designated by the President and approved by the Board presents an unacceptable level of risk of harm to the Exchange or to fair and orderly trading on the Exchange. All Exchange transactions and contracts shall be subject to the exercise of these Emergency powers by the Board of Directors, the President, or such designees as the case may be.

In the event the physical functions of the Exchange are, or are threatened to be, severely and adversely affected by a physical emergency such as but not limited to fire or other casualty, bomb threats, substantial inclement weather, power failures, transportation breakdowns, communications or automated system breakdowns, either the Chief Executive Officer, the President, or in their absence any Director or Officer of the Exchange, is authorized to take such action as he or she shall deem necessary or appropriate to deal with such Emergency, including but not limited to: suspending trading; temporarily extending, limiting or changing the hours of trading; and extending the last day of trading.

3.14 New and Amended Rules

The Executive Committee may recommend to the Board of Directors Rule changes and the adoption of new Rules. The Board of Directors shall have discretion to accept, reject or amend the Executive Committee’s recommendation, in its sole discretion. New or

amended Rules shall be promptly published to all members of the Exchange. New or amended Rules shall become effective upon publication unless a different effective date is included in the notice of Rule change.

Chapter 4 CCX Emission Reduction Program and Operations

4.0 Purpose

This chapter:

- provides definitions of Chicago Climate Exchange Carbon Financial Instruments (CFI);
- addresses the nature of trades;
- provides market rules and operational features; and,.

4.1 Not Used (2006)

4.2 Rule Interpretation and Modifications

Unless otherwise provided in this *Rulebook*, applicable CCX Committees shall be responsible for recommending to the Exchange interpretations and appropriate modifications of rules established in this Chapter. The CCX Environmental Compliance Committee is responsible for reviewing all proposed interpretations and modifications and shall have final decision-making authority regarding this Chapter.

4.3 CCX Carbon Financial Instruments, Vintages and Banking (2006)

The tradable CFIs employed in CCX are:

- (a) Exchange Allowances (XAs) issued to:
 - (1) Exchange Members in accordance with each Member's Emission Baseline and Emission Reduction Schedule;
 - (2) any CCX Member that elects to include electricity purchases as a supplemental reduction objective and such Member reduces electricity purchases beyond the CCX reduction schedule (as provided in the Electricity Purchase Opt-in Provision); and,
 - (3) CCX Members in the commercial forestry sector that realize net increases in CCX-recognized Carbon Stocks when such Members employ the Model-based Accounting Approach;
- (b) Exchange Offsets (XOs) generated by qualifying projects that are registered with CCX by Exchange Members and Exchange Participant Members; and,
- (c) Other instruments that may be established by the Board of Directors.

CCX Members who hold legal title to and originally financed or otherwise materially supported qualifying early action projects (as defined in Chapter 9 of this *Rulebook*) may use Exchange Early Action Credits (XEs) for Compliance (subject to provisions described in Section 4.11

below). XEs are CCX CFIs that are not transferable among Registry Account Holders, unless so authorized by CCX.

Super Reductions are CCX Exchange Allowances that represent annual emission reductions that are beyond the maximum annual emission reductions recognized by CCX (as provided in Section 4.8 below). Super Reductions may be sold to non-Members but are not usable for Compliance in CCX, unless so authorized by CCX.

The unit of emissions measurement, reporting, price quotation and trading in CCX shall be metric tons carbon dioxide (CO₂) equivalent. Each CCX CFI represents one hundred metric tons of carbon dioxide (CO₂) equivalent and will reside in the CCX Registry in a manner that designates the CFIs' annual Vintage. Each CFI type will be recognized as equivalent when surrendered for Compliance. CFIs may be used for Compliance in their designated Vintage year or banked for use in later years, subject to provisions in Section 4.11.5. CCX CFIs may not be used in Compliance in years that precede the Vintage of an Instrument.

4.4 Nature of Transfers in CCX (2006)

Under CCX rules, issuance of Exchange Allowances and Exchange Early Action Credits to CCX Members and issuance of Exchange Offsets to CCX Participant Members or Members, confers to the recipient legal ownership rights associated with Greenhouse Gas emission reductions and offset projects undertaken by CCX Members and Participant Members.

Every transfer of CFIs among Registry Account Holders is the conveyance from seller to buyer of full legal title to all legal rights associated with Greenhouse Gas reduction and mitigation rights represented by CCX CFIs transferred from transferor to transferee.

The terms and conditions that govern all transactions of CCX CFIs are addressed further in Section 5.5 of this *Rulebook*.

4.5 Not used (2006)

4.6 CCX Emission Baselines, Emission Reduction Schedule and Exchange Allowance Allocations (2007)

As detailed in Chapter 6 of this *Rulebook*, each CCX Member's Phase I Direct Emission Baseline is defined as the annual average of its Included Emissions during the calendar years 1998, 1999, 2000 and 2001. Each Member's Phase II Direct Emission Baseline may be defined in the same manner as the Phase I Direct Emission Baseline or may be defined by the calendar year 2000 emissions, at the election of a Member. If a Member is a Phase I participant, the election of its Phase II Direct Emission Baseline definition must be made by December 31, 2007. As provided below, each Member's Emission Baseline is adjusted to reflect acquisition or sales

of facilities that were operated during the Baseline period or otherwise has an applicable CCX Baseline. .

As applicable by a Member’s election, each CCX Member’s Phase I Baseline Electricity Purchases is defined as the annual average of included electricity purchases during the calendar years 1998, 1999, 2000 and 2001. Phase II Baseline Electricity Purchases will be defined in the same manner as the Phase II Direct Emission Baseline election made by a Member. (See Section 4.10)

Each CCX Member will be issued Exchange Allowances (XAs) for the applicable CCX Phase I and / or Phase II programs in an amount reflecting the CCX Emission Reduction Schedule for direct emissions. The CCX Exchange Allowance Issuance Schedules are listed in Table 4.1.

Table 4.1 Exchange Allowance Issuance Schedule (CCX Emission Reduction Schedule)

Year	Emissions Reduction Schedule	Exchange Allowance Issuance Schedule ¹
<u>PHASE I MEMBER</u>		
2003	1% of Member’s Baseline	99% of Member’s Baseline
2004	2% of Member’s Baseline	98% of Member’s Baseline
2005	3% of Member’s Baseline	97% of Member’s Baseline
2006	4% of Member’s Baseline	96% of Member’s Baseline
<u>PHASES I & II MEMBER</u>		
2007	4.25% of Member’s Baseline	95.75% of Member’s Baseline
2008	4.5% of Member’s Baseline	95.5% of Member’s Baseline
2009	5.0% of Member’s Baseline	95.0% of Member’s Baseline
2010	6.0% of Member’s Baseline	94.0% of Member’s Baseline
<u>PHASE II MEMBER²</u>		
2007	1.5% of Member’s Baseline	98.5% of Member’s Baseline
2008	3.0% of Member’s Baseline	97.0% of Member’s Baseline
2009	4.5% of Member’s Baseline	95.5% of Member’s Baseline
2010	6.0% of Member’s Baseline	94.0% of Member’s Baseline

¹ These quantities are not adjusted to reflect the quantity of Exchange Allowances that will be dedicated to the periodic CCX Auctions described in Section 4.12 below.

² This Emissions Reduction Schedule reflects a Member’s Phase II participation from the beginning of the Phase II program. Members joining the Phase II program prior to January 1, 2007 will have emissions reduction schedules that decline linearly such that all Phase II Members must achieve the 6% reduction in 2010.

4.7 True-up (2007)

Each CCX Member will undertake the emission monitoring and reporting procedures specified in Chapter 7 of this *Rulebook*. Subsequent to the end of each calendar year of the CCX Market Period, each CCX Member must True-up its emissions and CFI holdings in a manner prescribed by the Exchange. True-up is defined as the annual retirement by the Exchange of each CCX Member's Exchange Allowances, Exchange Offsets and Exchange Early Action Credits in an amount equal to that Member's owned CO₂ equivalent emissions during the Compliance Year.^{3,4} CCX will notify each Member of the total quantity of CFIs that must be surrendered for True-up, and each Member and Associate Member will then provide notice to the Exchange indicating which CFIs it chooses to Surrender. CFIs that are Surrendered are transferred to the Registry Account Holder's Registry Retirement Account.

Members that enroll in Phase I after the launch of the Exchange shall be required to achieve True-up for their Owned Emissions for all calendar years 2003 through 2006 and will be bound by the same terms and obligations as existing Registry Account Holders. Members that enroll in Phase II after January 1, 2007 shall be required to achieve True-up for their Owned Emissions for all calendar years 2007 through 2010 and will be bound by the same terms and obligations as existing Registry Account Holders.

4.8 Economic Growth Provision (EGP) (2007)

The maximum CO₂ equivalent emissions that will be recognized for the purpose of Phase I True-up by each CCX Member will be 102% of that Member's Emission Baseline level during each of the years 2003 and 2004, and 103% of its Baseline during each of the years 2005 and 2006. The maximum CO₂ equivalent emissions that will be recognized for the purpose of Phase II True-up by each CCX Member will be 103% of that Member's Emission Baseline level during each of the years 2007 through 2010.

The combination of the CCX Emission Reduction Schedule and the Economic Growth Provision provides that the maximum amount of net purchases of Exchange Allowances and/or Exchange Offsets (and, if applicable, usage of Exchange Early Action Credits) required for Compliance as reflected in Table 4.2

³ The quantity of CFIs to be retired upon true-up is also subject to: the Economic Growth Provision; constraints on the use of Exchange Offsets and Exchange Early Action Credits; and the exemption for certain specified new best-in-class facilities.

⁴ CCX Members not primarily engaged in electricity production who elect to include electricity purchases as a Supplemental Reduction Objective are required to surrender CFIs if the Member fails to achieve the Electricity Purchase Reduction Schedule. CCX commercial forestry companies must surrender CFIs equal to decreases in included Carbon Stocks when Carbon Stocks are included through use of the Model-based Accounting Approach (See Chapter 8).

Table 4.2 Maximum Level of Net Purchases Exchange Allowances / Exchange Offsets for True-up

Year	Economic Growth Provision Limits	Maximum Level of Net Purchases
<u>PHASE I MEMBER</u>		
2003	102% of Member's Baseline	3% of Member's Baseline
2004	102% of Member's Baseline	4% of Member's Baseline
2005	103% of Member's Baseline	6% of Member's Baseline
2006	103% of Member's Baseline	7% of Member's Baseline
<u>PHASES I & II MEMBER</u>		
2007	103% of Member's Baseline	7.25% of Member's Baseline
2008	103% of Member's Baseline	7.5% of Member's Baseline
2009	103% of Member's Baseline	8.0% of Member's Baseline
2010	103% of Member's Baseline	9.0% of Member's Baseline
<u>PHASE II MEMBER⁵</u>		
2007	103% of Member's Baseline	4.5% of Member's Baseline
2008	103% of Member's Baseline	6.0% of Member's Baseline
2009	103% of Member's Baseline	7.5% of Member's Baseline
2010	103% of Member's Baseline	9.0% of Member's Baseline

The Economic Growth Provision also applies separately to changes in biomass carbon stored on lands of CCX Members that are forest product companies that include forest Carbon Stocks by using the Model-based Accounting Approach.

As provided in Section 4.11 below, this Provision is applied symmetrically, and such application establishes for each Member a Maximum Recognized Emission Reduction (as defined in Section 4.11.2) below each Member's Annual Emission Reduction Target.

4.9 Treatment of Emissions from Specified New Best-in-Class Facilities

CCX will specify certain facilities that have emissions performance characteristics that are considered under CCX rules to be "best-in-class". As provided in Chapter 9, rules on Exchange

⁵ The emissions reduction schedule reflects a Member's Phase II participation from the beginning of the Phase II program. Members joining the Phase II program prior January 1, 2007 will have a different emissions reduction schedule and maximum level of net purchases determined by CCX. All Phase II Members will be subject to the 9% maximum level of net purchases in 2010.

Offsets may also be developed in order to allow issuance of Exchange Offsets to certain technologies that, when installed, have emissions performance characteristics that are considered superior

4.9.1 Exemption of Emissions from Certain Best-in-Class Buildings (2009)

Emissions and electricity usage in buildings for which construction or retrofit was initiated on or after January 1, 2002 and that demonstrate achievement of best-in-class energy efficiency ratings shall be exempt when quantifying compliance with annual CCX emission and electricity purchase reduction commitments.

For the purpose of demonstrating best-in-class status, the Member must achieve a score of 80 or better on the US EPA's Energy Star Target Finder tool. For the test, the Member must use energy data for the building for the most recent 12 month period with stable post construction occupancy and operation. Once a Member achieves a designation of 'best-in-class', the building may be exempt for the remainder of the CCX Program Phase. A Member shall reevaluate the building's eligibility under this provision when transitioning to a new CCX Program Phase based on the year prior to the start of a new CCX Program Phase. Members claiming this exemption must provide CCX with the all the relevant records and assumptions for the period in question for CCX's Provider of Regulatory Services independent verification. The required documentation may include: energy use records, inputs and assumptions to the Target Finder Tool and the printed results.

Where the Member operates a building or building type that is not adequately represented by the EPA Energy Star Target Finder tool, the Member may work with EPA to adjust the tool so that the best-in-class building test can be fairly applied.

4.9.2 Exemption of Emissions from Certain New Electric Power Generating Units (2006)

New Electric Power Generating Units, or Units, are defined as units placed into commercial operation on or after January 1, 2002. Each CCX Member that operates a new electric power generating unit is allowed to exempt annually a quantity of emissions up to 895,425 metric tons CO₂ equivalent, which is equivalent to the annual CO₂ emissions of a 500 megawatt capacity natural gas combined cycle electricity generating plant operated at 55% of capacity and having a heat rate of 7,000 btu/kWh. The exempt emissions are not allowed to be greater than the emissions from the New Electric Power Generating Unit. Emissions from New Electric Power Generating Units that are in excess of 895,425 metric tons CO₂ per year will be included in the CCX Member's Emission Inventory to the extent that such emissions are also in excess of the CO₂ emissions that would be produced by a gas combined cycle electric power generating unit that is representative of such units that are placed into service on or after January 1, 2002. (9/15/2003)

4.10 Electricity Purchase Opt-in Program (EPOP)

4.10.1 Operation (2007)

Each CCX Member not primarily engaged in the production of electricity may elect to include its purchased electricity as a Supplemental Reduction Objective, i.e. “Opt-in” purchased electricity. Chapters 6 and 7 of this *Rulebook* provide details on Included Electricity Purchases and monitoring and reporting protocols.

For each CCX Member that elects this Opt-in, the Electricity Purchase Reduction Schedule is identical to the CCX Emission Reduction Schedule. Each Member’s Phase I Baseline Electricity Purchases is defined as the annual average of its included electricity purchases during the calendar years 1998, 1999, 2000 and 2001, expressed in megawatt-hours (mwh). Phase II Baseline Electricity Purchases will be defined in the same manner as the Phase II Direct Emission Baseline election. (See Section 4.6)

4.10.1.2 Electricity Purchases Conversion Factors

Each CCX Member who elects the Opt-in will be issued Exchange Allowances annually when the Member’s annual actual electricity purchases are below the quantity associated with the applicable Electricity Purchase Reduction Schedule.

4.10.1.2.1 Phase I Electricity Purchases Conversion Factors

Members will be issued Exchange Allowances (XAs) at the rates listed in Table 4.3a (unless alternative, case-specific electricity purchase conversion factors are approved by the Environmental Compliance Committee) for each megawatt-hour by which actual electricity purchases are below the reduction schedule, subject to the limitations provide in Section 4.10.2. The vintage of such XAs shall correspond to the year in which the Member’s annual actual electricity purchases are below the quantity associated with the Electricity Purchase Reduction Schedule.

Table 4.3a Phase I Electricity Purchase Conversion Table

Location of Facilities Included in Electricity Purchase Opt-in Program	CO2 Metric Tons per mwh
U.S.	.61
Canada	.20
Mexico	.59

4.10.1.2.2 Phase II Electricity Conversion Factors (2007)

For Phase II, CCX Members in specified circumstances will be required to apply regional electricity purchase emission factors to determine the quantity of XAs to be issued or surrendered in the annual compliance process. Members for whom such specified circumstances are not applicable will continue to have their annual XA issuance (or surrender) quantities calculated using the national emission factors listed in Table 4.3a (unless alternative, case-specific electricity purchase conversion factors are approved by the Environmental Compliance Committee) for each megawatt-hour by which actual electricity purchases are below (or above) the reduction schedule, subject to the limitations provide in Section 4.10.2. The vintage of such XAs shall correspond to the year in which the Member’s annual actual electricity purchases are below the quantity associated with the Electricity Purchase Reduction Schedule.

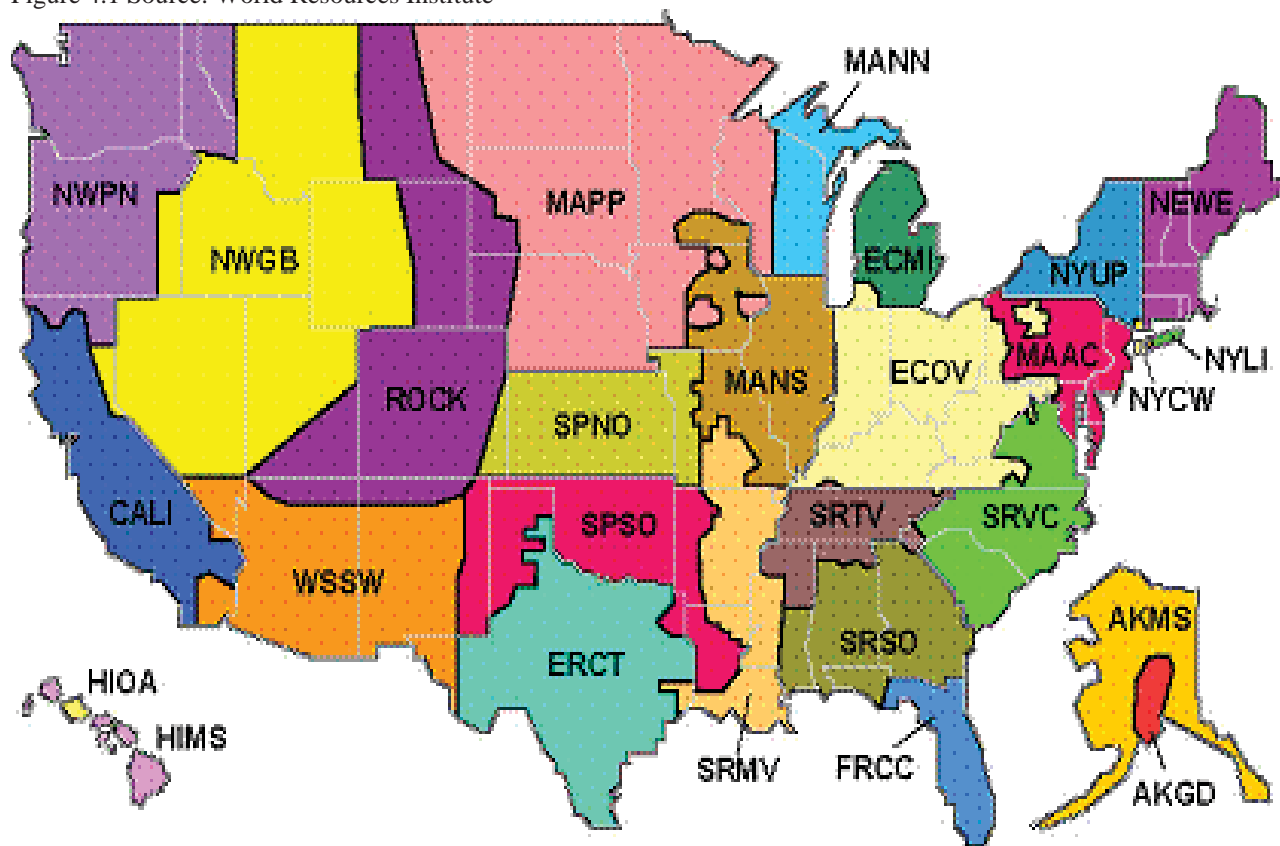
Applicable circumstances that will require CCX Members to have regional emission factors applied to their Electricity Opt-in Calculations are:

1. If a CCX Member that opts-in electricity purchases includes in its CCX commitment facilities located solely in one NERC region (see Table 4.3b and Figure 4.1 below), that Member will have its annual XA position for electricity purchases calculated through use of the NERC region emission factor applicable to the location of those facilities.
2. If a CCX Member undertakes contractual procurement of dedicated “clean” electric power, the net reduction in electricity-related emissions shall be calculated for such contracts using the emission factors of the NERC region in which such contractual purchases are made.

Table 4.3b Electricity Purchase Conversion Table by NERC Region: CCX CO₂ emission factors applied for Members who opt-in electricity purchases and employ regional factors

NERC Region	NERC sub-regions in the region	Regional electricity emission factor (metric tons CO ₂ /mwh)
ASCC	all Alaska	.49
ECAR	ECMI, ECOV	.82
ERCOT	ERCT	.64
FRCC	FRCC	.63
HICC	All Hawaii	.78
MAAC	MAAC	.50
MAIN	MANN, MANS	.68
MAPP	MAPP	.83
NPCC	NYLI, NYCW, NEWI, NYUP	.51
SERC	SRMV, SRSO, SRTV, SRVC	.62
SPP	SPNO, SPSO	.89
WECC	CALI, NWGB, NWPB, ROCK, WSSW	.51

Figure 4.1 Source: World Resources Institute



4.10.1.2.2.1 Facility Divestiture or Closure Resulting in Operations Within a Single NERC Region (2007)

When a facility is divested or closed that would result in a Member's remaining facilities to be located within a single NERC region, CCX will use the applicable national conversion factor in determining the XAs to be allocated for the year in which the divestiture or closure occurred. The following year, CCX will use the applicable NERC regional conversion factor.

4.10.1.2.2.2 Facility Acquisition Resulting in Operations in Multiple NERC Regions (2007)

When a facility is acquired that would result in a Member having operations in multiple NERC regions, CCX will use the applicable national conversion factor in determining the XAs to be allocated in the year of the facility acquisition.

4.10.1.2.2.3 Contract for "Clean" Power When Operating in a Single NERC Region (2007)

If a Member has contracted to procure "clean" power subsequent to the CCX Baseline period and the Member only operates in a single NERC region, CCX will apply the contracted "low-emitting" facility emission factor to the reported quantity of "clean" power contracted and will determine the net benefit (e.g. XA allocation) of switching to "clean" power by converting an

equivalent level of the annual electricity purchases objective into emissions using the regional emission factor and netting this result against the converted “clean” power. The applicable regional emission factor will be applied to the remaining electricity purchases (non-“clean”) and the remaining annual electricity purchases objective.

4.10.1.2.2.4 Contract for “Clean” Power When Operating in Multiple NERC Regions (2007)

If a Member has contracted for “clean” power and operates in multiple NERC regions, CCX will apply the “low-emitting” facility emission factor to the reported quantity of “clean” power contracted and will determine the net benefit (e.g. XA allocation) of switching to “clean” power by converting an equivalent level of the annual electricity purchases objective into emissions using the applicable regional emission factor and netting this result against the converted “clean” power. The applicable national conversion factor will be applied to the remaining electricity purchases (non-“clean”) and the remaining annual electricity purchases objective.

4.10.1.3 Electricity Purchase Opt-in True-Up (2007)

When a CCX Member elects to include its electricity purchases and its actual electricity purchases are above the quantity associated with the Electricity Purchase Reduction Schedule, the Member must, in the corresponding True-up period, Surrender Exchange Allowances, Exchange Offsets and/or Exchange Early Action Credits. In such cases the Member must Surrender CFIs at the applicable rates listed in Tables 4.3a and 4.3b (or, if applicable, approved alternative electricity conversion factors) per megawatt-hour by which actual electricity purchases are above the Electricity Purchases Reduction Schedule, subject to the limitations provided in Section 4.11. CCX will notify each Member of the total quantity of CFIs that must be retired for True-up, and each Member will then provide notice to the Exchange indicating which CFIs it chooses to Surrender.

Electricity produced using CCX specified Renewable Electricity Production Systems can be reported as zero emission electricity, provided the Member provides documentary evidence that the electricity is produced solely for the Member or is otherwise dedicated to the Member. Electricity produced by the following Renewable Electricity Production Systems shall qualify under this provision:

- solar;
- hydropower;
- wind; and,
- renewable fuels, which, for CCX purposes are:
 - wood, wood wastes and wood-derived fuels⁶;
 - agricultural residues and grasses;
 - landfill and agricultural methane⁷; and,
 - ethanol (bioalcohol) and biodiesel.

⁶ As provided in Section 6.7 of this *Rulebook*, CCX Members may elect to include N₂O and CH₄ emissions associated with fossil fuel and biomass combustion.

⁷ As provided in Section 9.7 of this *Rulebook*, the issuance of Exchange Offsets to CCX-qualifying methane collection and combustion systems will be based on the net greenhouse gas reduction benefits of such projects.

Documentary evidence that electricity is produced solely for the Member or is otherwise dedicated to the Member may consist of copies of power plant ownership documents, power purchase contracts, and, as specified by CCX, certain renewable energy certificates.

4.10.2 Application of the Economic Growth Provision to Electricity Purchases (2007)

If a CCX Member elects to include its electricity purchases, the maximum quantity of electricity purchases that will be recognized in determining Phase I True-up for each CCX Member will be 102% of that Member’s Electricity Purchase Baseline during each of the years 2003 and 2004, and 103% of that Member’s Electricity Purchase Baseline during each of the years 2005 and 2006. The maximum quantity of electricity purchases that will be recognized in determining Phase II True-up for each CCX Member will be 103% of that Member’s Electricity Purchase Baseline during each of the years 2007 through 2010.

The combination of the CCX Electricity Purchases Reduction Schedule and the Economic Growth Provision provides that the maximum amount of net purchases of Exchange Allowances and/or Exchange Offsets (and, if applicable, usage of Exchange Early Action Credits) required for Compliance as reflected in Table 4.4.

Table 4.4 Maximum Level of Net Purchases Exchange Allowances / Exchange Offsets for Electricity Purchases True-up

Year	Economic Growth Provision Limits	Maximum Level of Net Purchases for Electricity Purchases True-up
<u>PHASE I MEMBER</u>		
2003	102% of Member’s Baseline	3% of Member’s Baseline
2004	102% of Member’s Baseline	4% of Member’s Baseline
2005	103% of Member’s Baseline	6% of Member’s Baseline
2006	103% of Member’s Baseline	7% of Member’s Baseline
<u>PHASES I & II MEMBER</u>		
2007	103% of Member’s Baseline	7.25% of Member’s Baseline
2008	103% of Member’s Baseline	7.5% of Member’s Baseline
2009	103% of Member’s Baseline	8% of Member’s Baseline
2010	103% of Member’s Baseline	9% of Member’s Baseline
<u>PHASE II MEMBER⁸</u>		
2007	103% of Member’s Baseline	4.5% of Member’s Baseline
2008	103% of Member’s Baseline	6% of Member’s Baseline
2009	103% of Member’s Baseline	7.5% of Member’s Baseline
2010	103% of Member’s Baseline	9% of Member’s Baseline

⁸ The electricity purchase reduction schedule reflects a Member’s Phase II participation from the beginning of the Phase II program. Members joining the Phase II program prior January 1, 2007 will have a different electricity

4.11 Market Efficiency

4.11.1 Objectives

The purpose of CCX Market Efficiency rules are to facilitate the CCX Market and prevent market instability and Price Congestion. CCX will, on a regularly scheduled basis, issue Exchange notices to report to CCX Registry Account Holders the specific quantitative limitations, expressed in metric tons of CO₂, associated with the constraints listed below and will conduct ongoing monitoring of net sales positions for each CCX Member.

4.11.2 Maximum Recognized Emission Reductions, Electricity Purchase Reductions and Super Reductions (2008)

The Maximum Recognized Emission Reduction below each Member's Phase I and Phase II Emission Reduction Target will be limited to the levels reflected in Table 4.5.

Table 4.5 Maximum Recognized Emission Reduction Below Each Member's Emission Reduction Target

Year	Maximum Recognized Emission Reduction Below Targets
	<u>PHASE I MEMBER</u>
2003	3% of Member's Baseline
2004	4% of Member's Baseline
2005	6% of Member's Baseline
2006	7% of Member's Baseline
	<u>PHASE I & II MEMBER</u>
2007	7.25% of Member's Baseline
2008	7.5% of Member's Baseline
2009	8.0% of Member's Baseline
2010	9.0% of Member's Baseline
	<u>PHASE II MEMBER⁹</u>
2007	4.5% of Member's Baseline
2008	6.0% of Member's Baseline
2009	7.5% of Member's Baseline
2010	9.0% of Member's Baseline

purchase reduction schedule and maximum level of net purchases determined by CCX. All Phase II Members will be subject to the 9% maximum level of net purchases in 2010.

⁹ The Maximum Recognized Emission Reduction schedule reflects a Member's Phase II participation from the beginning of the Phase II program. Members joining the Phase II program prior January 1, 2007 will have a

For direct emission reductions, this provision shall apply to CCX Members that have a Direct Emission Baseline in excess of 500,000 metric tons carbon dioxide (CO₂) equivalent upon enrollment in the Exchange. For CCX Members with a Direct Emission Baseline of 500,000 metric tons CO₂ or less, the sales and banking of CFIs will be constrained only by the Single Firm Sales Limit during the Phase I Program. (2/16/2004)

The Maximum Recognized Reduction in Electricity Purchases is defined as the maximum CCX-recognized quantity by which the Member's actual electricity purchases are below its Electricity Purchase Reduction Target. Table 4.6 reflects the Phase I and Phase II Maximum Recognized Reductions in Electricity Purchases.

Table 4.6 Maximum Recognized Reduction in Electricity Purchases Below Each Member's Electricity Purchase Reduction Target

Year	Maximum Recognized Reduction in Electricity Purchases Below Target
	<u>PHASE I MEMBER</u>
2003	3% of Member's Baseline
2004	4% of Member's Baseline
2005	6% of Member's Baseline
2006	7% of Member's Baseline
	<u>PHASE I & II MEMBER</u>
2007	7.25% of Member's Baseline
2008	7.5% of Member's Baseline
2009	8.0% of Member's Baseline
2010	9.0% of Member's Baseline
	<u>PHASE II MEMBER¹⁰</u>
2007	4.5% of Member's Baseline
2008	6% of Member's Baseline
2009	7.5% of Member's Baseline
2010	9% of Member's Baseline

different Maximum Recognized Emission Reduction schedule determined by CCX. All Phase II Members will be subject to the 9% maximum reduction level in 2010.

¹⁰ The Maximum Recognized Electricity Purchases Reduction schedule reflects a Member's Phase II participation from the beginning of the Phase II program. Members joining the Phase II program prior January 1, 2007 will have a different Maximum Recognized Electricity Purchases Reduction schedule determined by CCX. All Phase II Members will be subject to the 9% maximum reduction level in 2010.

CFIs associated with reductions in excess of the lower boundaries described above are defined as Super Reductions. Super Reductions realized in the Phase I Program are marketable but are not usable for Compliance in CCX¹¹ in the Phase I Program. Super Reductions in the Phase II Program are marketable, but are not usable for compliance in the Phase II Program.

CCX shall maintain a record of each Member's actual emissions, and, as applicable, electricity purchases. Super Reductions shall be established in the Registry for a CCX Member only to the extent that the Member's excess emission or electricity purchase reductions are quantitatively larger than the amount by which the Member's emissions or (as applicable) electricity purchases in other years exceed the quantities associated with the application of the Economic Growth Provision to that Member. To the extent that a Member has emissions or electricity purchases above the Economic Growth Provision in any year and also has Super Reductions in the current year or from other years, CCX will reduce the Member's quantity of Super Reductions by the amount by which the emissions or electricity purchases are above the Economic Growth Provision.

For Phase I Members that participate in Phase II and had Super Reductions in the Phase I Program, CCX will release to a Member's Registry Holding Account twenty-five percent (25%) of total Super Reductions earned and unsold by the Member in the Phase I Program for each of the four Phase II years 2007 through 2010. The released Phase I Program Super Reductions will be used to meet Members' compliance requirements in the Phase II Program.

In order to maintain Phase I Super Reductions generated from opt-in election(s) in Phase I, a Member must maintain the opt-in election(s) in Phase II.

4.11.2.1 Super Reduction Transactions (2006)

Members are required to report any sales of Super Reductions made in a manner prescribed by the Exchange. At the time of the sale, the Member must inform any non-member that the Exchange will establish a Registry Account in the name of the non-member, if one does not exist, in order to hold the Super Reductions. The Member will be responsible for submission to the Exchange of all transaction fees and administrative costs associated with the sale of Super Reductions to a non-member. For the purposes of this Rule 4.11.2.1, the term "Member" applies to CCX Members, Associate Members, Participant Members and Exchange Participants.

A Member shall only market that amount of Super Reductions that are in excess of the cumulative total of the levels that previous years' Direct Emissions and Electricity Purchases were in excess of the Economic Growth Provisions and previous years' decreases in Carbon Stocks. (2006)

¹¹ Super Reductions associated with registered Exchange Offsets and increased Carbon Stocks in Commercial Forestry operations and are addressed in sections 4.11.6 and 8.14 respectively.

4.11.3 Phase I Single Firm Sales Limit (2006)

For the Phase I Program, net sales of Exchange Allowances by any single CCX Member to other CCX Members, Associate Members or Participant Members through the CCX market will be limited to 0.5% of the CCX Program-wide Direct Emissions Baseline, apportioned over 2003, 2004, 2005 and 2006 Vintage Exchange Allowances according to the schedule provided in Table 4.7.

Table 4.7 Phase I Single Firm Sales Limit

Exchange Allowance Vintage	Net Exchange Allowance sales limit: percent of Program-wide Baseline Direct Emissions that can be sold by a single Member
2003	0.05%
2004	0.10%
2005	0.15%
2006	<u>0.20%</u>
Total	0.50% of Program-wide Baseline Direct Emissions

Appendix 4.1 provides a hypothetical example that illustrates the Single Firm Sales Limit and demonstrates an increase in the limit as CCX Program-wide Baseline Direct Emissions increase due to entrance of new CCX Members.

Net allowed sales by a single firm will be escalated proportionately if Program-wide Emissions rise above Baseline levels. Should Program-wide Emissions rise above the CCX Program-wide Baseline Direct Emissions, the allowed sales by any single CCX Member to other CCX Members, Associate Members and Participant Members will be increased by the same percentage by which Program-wide Emissions rise above Program-wide Baseline Direct Emissions. Appendix 4.2 provides a hypothetical example of this escalation mechanism.

Net allowed sales by a single firm will not be reduced if the Phase I Program-wide Direct Emissions Baseline decreases. If the Phase I Program-wide Direct Emissions Baseline decreases and subsequently increases, the level of net allowed sales by a single firm may be escalated proportionately, but only when the Phase I Program-wide Direct Emissions Baseline rises above the level used to determine the current net allowed sales by a single firm. The net allowed sales by a single firm will be escalated proportionately based on the increase in the Phase I Program-wide Direct Emissions Baseline above the level used to determine the current net allowed sales by a single firm. Appendix 4.1 provides a hypothetical example of this escalation mechanism.
 (6/22/2005)

4.11.4 Phase II Sales Limits (2007)

For the Phase II Program, net sales of Exchange Allowances by any single CCX Member¹² to other CCX Members, Associate Members, Participant Members or Exchange Participants through the CCX market will be limited to a percentage of each Member’s Baseline as presented in Table 4.8. These limits are equal to the Maximum Recognized Emission Reductions described in Section 4.11.2.

Table 4.8 Phase II Sales Limits

Year	Phase I & II Member	Phase II Member ¹³
2007	7.25% of Member’s Baseline	4.5% of Member’s Baseline
2008	7.5% of Member’s Baseline	6.0% of Member’s Baseline
2009	8.0% of Member’s Baseline	7.5% of Member’s Baseline
2010	9.0% of Member’s Baseline	9.0% of Member’s Baseline

4.11.5 Limitation on Banking Exchange Allowances and 2003 Special Reserve (2007)

During 2003, each CCX Member is allowed to undertake a combination of net sales and Banking¹⁴ of Exchange Allowances that is, for each CCX Member, the lesser of the quantities established by:

- (1) surplus Exchange Allowances as defined by the Maximum Recognized Emission Reduction (as determined for each Member’s Direct Emissions Baseline and, separately, the Member’s Electricity Purchase Baseline, when applicable); and
- (2) the quantity of Exchange Allowances that can be sold as defined by the Single Firm Sales Limit.¹⁵

¹² During the Phase II Program, Members have a Direct Emissions Baseline of 500,000 mt CO₂, or less, are not subject to the limits listed in Table 4.8.

¹³ The Phase II Sales Limits for Phase II Members assume participation from the beginning of the Phase II program. Members joining the Phase II program prior to January 1, 2007 will have a different Phase II Sales Limits schedule determined by CCX. All Phase II Members will be subject to the 9% Sales Limit in 2010.

¹⁴ Retention of a CFI in a CCX Member’s Registry Account for use or sale in later years.

¹⁵ For some CCX Members the binding constraint under this provision will be the Single Firm Sales Limit. As a hypothetical example, if the CCX Program-wide Emission Baseline is 250,000,000 metric tons CO₂, then the Single Firm Sales Limit in 2003 (0.05% of the Program-wide Emission Baseline) is 125,000 metric ton CO₂. In 2003 the symmetric application of the Economic Growth Provision limits net sales by each CCX Member to 3% of its Baseline (which could be realized if its emission fell to 96% of Baseline, i.e. 3% below target). In this scenario the symmetric application of the Economic Growth Provision will represent a lesser quantity than the Single Firm Sales Limit for all CCX Members having Baseline emissions of less than 4,166,666 metric tons CO₂.

If, during 2003, the Single Firm Sales Limit is less than the quantity determined by the Maximum Recognized Emission Reduction (and, as applicable, the Maximum Recognized Reduction in Electricity Purchases), then the difference between those two quantities shall be placed in a Special Reserve for each respective CCX Member for possible future release.

For Phase I Members that participate in Phase II and had Super Reductions and, or CFIs placed into Special Reserves in the Phase I Program, CCX will release to a Member's Registry Holding Account twenty-five percent (25%) of total Super Reductions earned and unsold by the Member in the Phase I Program for each of the four Phase II years 2007 through 2010. The released Phase I Program Super Reductions and Special Reserves may be used to meet Members' compliance requirements in the Phase II Program.

During 2004, 2005 and 2006 of the Phase I Program each CCX Member is allowed to sell and/or bank the quantity of Exchange Allowances that is the lesser of the quantities determined by the Maximum Recognized Emission Reduction (and, as applicable, the Maximum Recognized Reduction in Electricity Purchases) and the Single Firm Sales Limit. During 2004, 2005 and 2006 each CCX Member may also bank the amount by which the quantity established by the Economic Growth Provision exceeds the quantity established by the Single Firm Sales Limit.

The level of net purchases of CFIs in any Vintage will be added to a CCX Member's Banking level for the applicable Vintage. (9/13/2005)

Appendix 4.3 provides a hypothetical example of the operation of this provision. The Appendix illustrates the Member-level application of the Maximum Recognized Emission Reduction as well as the generation of Super Reductions (i.e. the quantity of emission reductions that are in excess of the quantity recognized by CCX due to the Maximum Recognized Emission Reduction).

4.11.6 Use of Exchange Offsets and Exchange Early Action Credits (2007)

During 2003, program-wide use of Exchange Offsets for Compliance will be allowed in an amount equal to 0.5% of the total CCX Program-wide Baseline Direct Emissions. Exchange Early Action Credits may be used for Compliance starting in 2004. During years 2004, 2005 and 2006, program-wide use of Exchange Offsets plus Exchange Early Action Credits will be allowed in an amount no more than 4.5% of the total Program-wide Baseline Direct Emissions, apportioned over 2004-2006 according to the schedule provided in Table 4.9.

Table 4.9 Total Allowed Use for Compliance of Exchange Offsets (XOs) plus Exchange Early Action Credits (XEs)

Year	Total allowed use of Exchange Offsets plus Exchange Early Action Credits for Compliance (as a percent of Program-wide Baseline Direct Emissions)
	<u>Phase I</u>
2003	0.5% (XOs only)
2004	1.0%
2005	1.5%
2006	<u>2.0%</u>
	Phase I Total 5.0% of Program-wide Baseline Direct Emissions
	<u>Phase II</u>
2007	2.125%
2008	2.25%
2009	2.50%
2010	<u>3.00%</u>
	Phase II Total 9.875% of Program-wide Baseline Direct Emissions

If in any year the actual amount of Exchange Offsets plus Exchange Early Action Credits used for compliance is less than the allowed amounts specified in Table 4.9, then the difference between allowed usage and actual usage shall be carried forward to the subsequent year. Should actual usage again fall below the adjusted level of all usage, that differential shall be annually carried forward to the subsequent year.

The total program-wide quantity of Exchange Early Action Credits used for Compliance during 2004, 2005 and 2006 will not exceed 50% of the total quantity of Exchange Offsets plus Exchange Early Action Credits used for Compliance.

Total allowed use for Compliance of Exchange Offsets during 2003 and Exchange Offsets plus Exchange Early Action Credits during 2004, 2005 and 2006 will be escalated proportionately to reflect the extent to which CCX Program-wide Direct Emissions rise above Baseline levels.¹⁶

CCX will prescribe a *pro rata* method for apportioning the use of registered Exchange Offsets and Exchange Early Action Credits by individual CCX Members if the total quantity of these CFIs that Members wish to use for Compliance exceeds the quantities established by the market constraints described above.

¹⁶ While the associated quantities differ, the operation of this escalation mechanism is functionally identical to the escalation mechanism for the single-firm sales limit, which is illustrated in Appendix 4-2.

4.11.7 Phase I Program Exchange Offsets from Owned and Operated Facilities (2007)

For each CCX Member, total net sales to CCX Members, Associate Members and Participant Members plus use for Compliance of Exchange Offsets produced by facilities that it owns and/or operates (such as Exchange Landfill Offsets, Forestry Projects undertaken by CCX Members in the commercial forestry sector) will be allowed in an amount equal to no more than 0.5% of the total CCX Program-wide Baseline Direct Emissions, apportioned over 2003 through 2006 according to the schedule provided in Table 4.10.

Table 4.10 Total Net Sales and Use of Exchange Offsets from CCX Member Owned and Operated Facilities

Year	Total Net Sales plus use for Compliance of Exchange Offsets generated from a CCX Member's Owned and Operated facilities
2003	Phase I 0.05%
2004	0.10%
2005	0.15%
2006	0.20%
Total	0.50% of Program-wide Baseline Direct Emissions

Allowed sales plus use for Compliance by a single CCX Member under this provision will be escalated proportionately to reflect the extent to which Program-wide Direct Emissions exceed Program-wide Baseline Direct Emission levels.¹⁷

Exchange Offsets from Owned and Operated Facilities generated by CCX Members during CCX Phase I in amounts exceeding the annual Phase I sales limits provided are eligible for registration as Vintage 2007 CFIs.

¹⁷ The quantity of Offsets that are verified and registered in an amount that exceeds the Total Net Sales plus Use for Compliance of Exchange Offsets generated from a CCX Member's Owned and Operated Facilities, as established in this section, are marketable to non-Members of CCX as per the provisions of Super Reductions defined in section 4.11.2.

4.12 CCX Auctions (2006)

CCX Auctions of current Vintage and future Vintage Exchange Allowances may be conducted up to a maximum of four times per year. Prior to an Auction, CCX may create an auction pool of Exchange Allowances to be established by retaining a quantity equal to a percentage of the aggregate of each CCX Member's initial allocation of the specific Vintage(s) of Exchange Allowances to be auctioned. Proceeds from each Auction will be distributed to each CCX Member *pro rata*, reflecting each CCX Member's percentage share of the total quantity of Exchange Allowances in the initial pool.

Such Auctions shall be conducted through a sealed-bid process. CCX shall establish rules governing the implementation of these auctions, including schedules, bidding methods, and auction style.

4.13 Donations of CCX Carbon Financial Instruments

Registry Account Holders, excluding Exchange Participants, may donate CFIs to not-for-profit institutions. Registry Account Holders, excluding Exchange Participants, shall also be able to donate CFIs to any not-for-profit Registry Account Holder for compliance purposes provided that the donated CFIs be used only for compliance or retirement in CCX and cannot be traded or sold out of the Registry Account of the recipient.

All categories of CFIs may be donated, including Exchange Allowances, Exchange Offsets, Certified early Action credits, Special Reserves and Super Reductions. Such donations can only take place after the CFIs have actually been issued. Offset projects, project verification and issuance of associated CFIs must be completed before the CFIs can be donated.

Non-member recipients shall open a Registry Retirement Account into which the CFIs can be transferred and from which they cannot be removed. If a recipient chooses not to open a Registry Retirement Account, the CFIs will be retired to the donor's Registry Retirement Account.

In addition to being not-for-profit, recipients must be individuals or organizations that are financially and legally independent of the donor Registry Account Holder. Recipients do not have to meet the eligibility criteria for trading as retirement transactions do not take place through the CCX Trading Platform. CCX shall execute the transfer on behalf of the parties.

CFI Donations shall not affect the sales and banking limits of the donor.

(3/5/2004)

**APPENDICES
TO
CHAPTER 4**

Appendix 4.1 Hypothetical Example of the Phase I Single Firm Sales Limit and Increases in the Limit as the Program-wide Baseline Increases

Scenario:

Initial CCX Program-wide Emission Baseline is 250,000,000 metric tons CO₂ equivalent.

Upon expansion of CCX Membership during 2003, the Program-wide Emission Baseline rises to 300,000,000 metric tons CO₂ equivalent.

$$\begin{aligned} \text{Percentage increase factor} &= 300,000,000/250,000,000 \\ &= 1.2 \text{ (i.e. 20\% escalation of allowed net sales)} \end{aligned}$$

Year	Net Exchange Allowance (XA) sales limit: percent of Program-wide Emission Baseline that can be sold to CCX Members by a single Member	Initial quantity of net sales allowed for any single Member for each Vintage (Program-wide Emission Baseline is 250,000,000 metric tons)	Post-expansion quantity of net sales allowed for any single firm for each Vintage (Program-wide Emission Baseline is 300,000,000 metric tons)
2003	0.05%	125,000	150,000
2004	0.10%	250,000	300,000
2005	0.15%	375,000	450,000
2006	<u>0.20%</u>	<u>500,000</u>	<u>600,000</u>
	total: 0.50% of Program-wide Baseline Direct Emissions	total: 1,250,000	total: 1,500,000

Appendix 4.2 Hypothetical Example of Escalation of the Phase I Single Firm Sales Limit as Program-wide Emissions Rise above Baseline Levels

Scenario:

Initial CCX Program-wide Emission Baseline is 250,000,000 metric tons CO₂ equivalent.

During 2004, the single-firm sales limit of 0.10% of Program-wide Emission Baseline is 250,000 metric tons CO₂ equivalent (or 2,500 exchanges allowances).

Assumption: During 2004, actual CCX program-wide emissions rise to 255,000,000 metric tons CO₂ equivalent.

The Single Firm Sales Limit is escalated by the following factor:

Single Firm sales limit X (255,000,000/250,000,000) =

Single Firm sales limit X (1.02) = 250,000 metric tons CO₂ equivalent x 1.02 = 255,000 metric tons CO₂ equivalent (or 2,550 exchanges allowances)

Appendix 4.3 Hypothetical Example: Limitation on Banking During 2003, Maximum Recognized Emission Reductions and Super Reductions

Hypothetical Program-wide emission baseline:		250,000,000 metric tons CO ₂			
		2003	2004	2005	2006
1. Program-wide emission targets under CCX 1-2-3-4% reduction schedule		247,500,000	245,000,000	242,500,000	240,000,000
2. Program-wide emission reductions		2,500,000	5,000,000	7,500,000	10,000,000
Example: hypothetical CCX Member with 10,000,000 ton baseline					
3. Assumed annual emissions of the CCX Member (5% below its baseline)		9,500,000	9,500,000	9,500,000	9,500,000
4. CCX Member's allowance allocation with CCX 1-2-3-4% reduction schedule		9,900,000	9,800,000	9,700,000	9,600,000
5. CCX Member's unconstrained allowance position (line 4 minus line 3)		400,000	300,000	200,000	100,000
6. Maximum Recognized Emission Reduction (i.e reductions beyond annual targets) (% of Member's baseline)		300,000 (3%)	400,000 (4%)	600,000 (6%)	700,000 (7%)
7. Actual recognized reductions for sale or banking (Lesser of unconstrained allowance position (line 5) or maximum recognized recognized emission reductions (line 6))		300,000	300,000	200,000	100,000
8. Maximum allowed sales by any single firm as per Single Firm Sales Limit (% of program-wide baseline)		125,000 (0.05%)	250,000 (0.10%)	375,000 (0.15%)	500,000 (0.20%)
9. Binding sales constraint (lesser of line 7 or 8)		125,000	250,000	200,000	100,000
10. Actual sales (assumes 80% of binding sales constraint is sold)		100,000	200,000	160,000	80,000
		<i>BANKING LIMITATION APPLIES</i>		<i>NO BANKING LIMITATION</i>	
11. Banked amount (this value is line 9 minus line 10 during 2003, and is line 7 minus line 10 during 2004, 2005, 2006; banked allowances can be sold in subsequent years)		25,000	100,000	40,000	20,000
12. Amount placed in reserve for possible future release (line 6 minus {line 10 + line 11})		175,000			
13. "Super Reductions": quantity by which actual reductions beyond the CCX reduction schedule (Line 5) exceeds the maximum recognized emissions reductions (Line 6) (these surplus instruments may be marketed outside CCX)		100,000			
Final disposition of 400,000 mton surplus:		sold:		100,000 tons	
		banked:		25,000 tons	
		future reserve:		175,000 tons	
		Super Reductions		100,000 tons	

Chapter 5 CCX Registry, Trading Platform, Clearing and Settlement Systems

5.0 Purpose

This Chapter describes the purpose and operation of the CCX Registry, Trading Platform, Block Trades, Cash Transactions and Clearing and Settlement Systems.

5.1 General Provisions

The CCX Registry is an electronic database that serves as the official holder of record and Transfer Mechanism for Exchange Allowances (XAs), Exchange Offsets (XOs) and Exchange Early Action Credits (XEs) owned by CCX Members, Associate Members, Participant Members and Exchange Participants.

The CCX Trading Platform is an internet-accessible marketplace that is used to execute trades among CCX Registry Account Holders, as well as other classes of CCX Members as may be designated by the Board, and to complete and post trades having terms that are established through private negotiations off-system.

Three categories of Transactions can be executed in CCX. These categories may be revised by CCX as it deems necessary. CCX Trading Platform Trades are settled via the CCX Clearing Mechanism. Bilateral Trades are executed on the CCX Trading Platform by entities that have established each other as acceptable counterparties. Block Trades and Cash Transactions are Transactions that are privately negotiated between the parties outside the CCX Trading Platform. Block Trade terms are reported to and posted on the CCX Trading Platform.

All CCX Trading Platform Trades will be cleared and settled through the CCX Clearing Mechanism whereby payment by the buyer is made and the seller will be paid. Cash Transactions are settled directly between the applicable parties. All Trading Platform Trades and Cash Transactions shall require delivery of Carbon Financial Instruments in the CCX Registry. CCX shall effect delivery through the CCX Registry by the day following the Trade or Cash Transaction.

5.2 Rule Interpretation and Amendments

Unless provided otherwise, the CCX Committee on Trading and Market Operations shall be responsible for recommending modifications to or interpretations of rules in this Chapter 5 or new rules.

5.3 CCX Registry

5.3.1 Function of the Registry (2006)

The CCX Registry is an electronic database that serves as the official holder of record and transfer mechanism for Exchange Allowances (XAs), Exchange Offsets (XOs) and Exchange Early Action Credits (XEs) owned by Members, Associate Members, Participant Members and Exchange Participants.

Each CCX Registry Account Holder is assigned a Registry Account and may establish additional Accounts and/or Sub-accounts as may be needed to facilitate management of Carbon Financial Instruments. Information contained in each Registry Account will be accessible only by parties authorized by the Registry Account Holder. CCX will publicly report certain aggregate information on Transfers across Registry Accounts, but shall not publicly report Registry activity of any single Registry Account Holder.

All Exchange Allowances and Exchange Offsets will be listed in each Registry Account by Carbon Financial Instrument Vintage. Exchange Offsets will be identified by Project type. Transfers of Carbon Financial Instruments shall be undertaken by CCX by the first business day subsequent to execution of transactions on the CCX Trading Platform.

As provided in Chapter 4 of this *Rulebook*, True-up occurs when each Member or Associate Member designates CCX Carbon Financial Instruments to be Surrendered in an amount equal to the total annual emissions of that Member or Associate Member. Subject to restrictions on banking 2003 Vintage Exchange Allowances (as set forth in Chapter 4), Carbon Financial Instruments that remain unused and unsold subsequent to True-up are automatically banked by retaining the Carbon Financial Instruments in the Registry Account.

CCX or CCX Registry Account Holders may lend or borrow CCX Carbon Financial Instruments to or from other Registry Account Holders in a manner(s) prescribed by CCX from time to time.

5.3.2 Account Structure (2006)

Each CCX Registry Account lists the Carbon Financial Instruments of a Registry Account Holder. The unit of emissions measurement, reporting, price quotation and trading in CCX shall be metric tons carbon dioxide equivalent. Each CCX Carbon Financial Instrument will represent one hundred metric tons of carbon dioxide (CO₂) equivalent and will reside in the CCX Registry in a manner that designates the annual Vintage.

5.3.3 User Access and Operations

Each CCX Registry Account can be viewed only by parties authorized by the Registry Account Holder.

Each Registry Account Holder shall be responsible for controlling and monitoring log-in and password protocols. Further terms and conditions governing access and usage of the CCX Registry are provided in the CCX Systems User Agreement, which is provided in Appendix 5.1.

5.3.4 Management of Multiple Registry Accounts

CCX Registry Account Holders may establish and utilize multiple accounts in the CCX Registry.

5.3.5 Transfer Instructions and Confirmations (2006)

Transfers of CCX Carbon Financial Instruments across CCX Registry Accounts may only be conducted on the Trading Platform or by conveyance of appropriate Registry Transfer instructions to CCX. For Transfers of Carbon Financial Instruments across Registry Accounts that are not controlled by the same CCX Registry Account Holder, Registry Transfer instructions shall be generated automatically by the CCX Trading Platform upon execution of a Transaction on the CCX Trading Platform.

For Transfers of Carbon Financial Instruments between Accounts controlled by the same CCX Registry Account Holder such Account Holder shall submit appropriate Registry Transfer instructions to CCX.

Registry Transfer for Cash Transactions are addressed in Section 5.9 of this chapter.

5.3.6 Not Used (2009)

5.3.7 Phase I-Only Members Registry Account De-Activation (2007)

The CCX Registry Account(s) of any Member that has not committed to the Phase II Program will be de-activated at the close of business twelve months after the date established for its 2006 True Up. All CFI contracts in the Member's Registry Account at that time will be permanently retired.

The CCX Registry Account(s) of any Associate Member that has not committed to the Phase II Program will be de-activated at the close of business on the last trading day of the calendar year 2007. All CFI contracts in the Associate Member's Registry Account at that time will be permanently retired.

5.3.8 Registry Accounts for Delivery Against the Chicago Climate Futures Exchange Carbon Financial Instrument Futures Contract (2008)

The Exchange will allow Clearing Members of the Chicago Climate Futures Exchange (CCFE) to establish a CCX Registry Account(s) for parties that are not CCX Members for the sole purpose of receiving and making delivery of CFIs against the CCFE Carbon Financial Instrument futures contract. (Refer to the CCFE Rulebook for the definition of “Clearing Member”.)

5.4 CCX Trading Platform

5.4.1 CCX Trading Platform Overview (2006)

The CCX Trading Platform is an anonymous, fully electronic system for posting and accepting bids to buy and offers to sell CCX Products, including Carbon Financial Instruments. See Appendix 5.2 for Carbon Financial Instrument contract specifications. All purchases and sales executed on the Trading Platform will be cleared and settled through the Clearing Mechanism and will be transferred accordingly between Registry Accounts.

5.4.2 Authorized Traders (2006)

Eligible Registry Account Holders shall be provided access, consistent with the rules set forth herein, to the CCX Trading Platform for the purpose of posting, viewing and accepting bids and offers for tradable CCX Carbon Financial Instruments. (See Rule 2.6.1)

An eligible Registry Account Holder may authorize any of its employees and / or contracted agents to act as Authorized Traders in a manner prescribed by CCX. Each Authorized Trader shall have Trading Platform and Registry access privileges as determined by the relevant Registry Account Holder.

With respect to each Authorized Trader, the relevant Registry Account Holder shall:

- (1) guarantee and assume financial responsibility for all activity related to the CCX Trading Platform and Registry used by such Authorized Traders and any account identifier and password assigned to such Authorized Traders; and,
- (2) assist the Exchange in any investigation relating to an alleged violation of Applicable Law, regulations or rules of the Exchange, which assistance shall be timely and shall include using reasonable efforts to require such Authorized Trader to produce documents, answer questions by the Exchange or appear in connection with such investigation.

The Exchange may at any time revoke, suspend, limit, condition, restrict or qualify the Authorized Trader of any Registry Account Holder if, in the sole discretion of the Exchange, such action is in the best interest of the Exchange.

Effective at the close of business on the last trading day of the calendar year 2007, the Exchange

will revoke all Authorized Traders of all Members and Associate Members that have not committed to the Phase II Program.

Each CCX Registry Account Holder shall manage access to the CCX Trading Platform by its Authorized Traders in conformance with the terms provided in the Chicago Climate Exchange Trading Platform and Registry and Registry Account Holder Agreement. That Agreement is presented in Appendix 5.1.

5.4.3 Public Dissemination of Summary Price and Transaction Information

CCX will disseminate summary information on prices, transactions and volumes on the CCX webpage. The terms and parties to individual transactions in CCX are confidential and shall not be disclosed unless necessary pursuant to an Exchange investigation or judicial action.

5.4.4 Daily Price Limits and Closing Prices (2006)

CCX may establish daily price limits for its products. CCX will take reasonable measures to communicate daily price limits to its Registry Account Holders prior to implementation.

Daily closing prices will be determined in accordance with the CCX Product specifications.

5.5 CCX Terms and Conditions to Govern All Transactions (2006)

The terms and conditions contained in Figure 5.1 shall apply to all transactions entered into among CCX Registry Account Holders. Additional terms and conditions apply to CCX Offset Projects. Such additional terms and conditions are listed in Chapter 9 of this *Rulebook*.

Figure 5.1 CCX Transaction Terms and Conditions

- (1) Every transfer of Carbon Financial Instruments among CCX Registry Account Holders is the conveyance from seller to buyer of full legal title to all legal rights associated with Greenhouse Gas reduction and mitigation rights represented by CCX Carbon Financial Instruments transferred from transferor to transferee.
- (2) In the event a buyer fails to remit sufficient funds to CCX to pay for any purchase of Carbon Financial Instruments in a timely manner, CCX may, in its sole discretion and without prior demand or notice, exercise its right to sell, as legal title holder, Carbon Financial Instruments from the buyer's CCX Registry Account or otherwise transfer such Carbon Financial Instruments from the buyer's account for sale in an amount sufficient to cover any indebtedness owned by the buyer to CCX. Such sale may be public or private and may be made without advertising or notice to the buyer and in such a manner as CCX may, in its sole and absolute discretion, determine. The buyer agrees that CCX has no duty and is not required to liquidate positions in the buyer's CCX Registry Account and that the provisions of this paragraph are solely for the protection of CCX.
- (3) For transactions that are settled bilaterally between the parties, full legal title transfers from seller to buyer upon receipt of properly completed paperwork in a form prescribed by CCX.
- (4) Every transaction entered into by a CCX Registry Account Holder is governed by the provisions contained in this *Rulebook*.
- (5) CCX makes no representation as to the marketability or market value of CCX Carbon Financial Instruments or other CCX Products.
- (6) Clearing, settlement and payment and delivery procedures prescribed by CCX from time to time shall apply to all transactions on the CCX Trading Platform and other transaction types allowed by CCX.
- (7) Failure to conform to the rules provided herein may result in disciplinary action(s) including termination of membership in CCX and prohibition from all further participation in CCX.

5.6 Market Surveillance

The Provider of Regulatory Services designated by CCX shall conduct ongoing surveillance of all trading and Registry activity. In the event that the Provider of Regulatory Services designated by CCX identifies trading and Registry activity that may be in violation of CCX rules, it shall report such observations to the CCX Office of General Counsel, which may refer the matter to the CCX Trading and Market Operations Committee or other CCX Committees as appropriate.

5.7 CCX Clearing Mechanism (2006)

The CCX Trading Platform has been designed to function in the following manner:

- (1) all Exchange-cleared transactions executed on the CCX Trading Platform are to be cleared and settled in accordance with the provisions as prescribed from time to time by the Exchange;
- (2) the CCX Clearing Mechanism is to provide for no later than next business day delivery in the CCX Registry and next business day payment by buyer, to the account specified by CCX; and,
- (3) for Exchange-cleared transactions, seller is to receive payment for delivered Carbon Financial Instruments from the CCX Clearing Mechanism by the next business day.

In the event of failure by buyer to transfer appropriate funds to the CCX-specified Clearing Account, CCX may initiate other actions in accordance with Exchange procedures.

In the event the seller does not make satisfactory delivery of Carbon Financial Instruments, CCX may initiate other actions in accordance with Exchange procedures to effect a satisfactory delivery.

Additional terms and conditions that apply to CCX cleared transactions can be found in Figure 5.1 above entitled CCX Transaction Terms and Conditions

5.7.1 Eligible Carbon Financial Instrument Delivery

A seller of Carbon Financial Instruments may deliver the specific Vintage sold or any earlier-year Vintage provided the seller delivers only a single Vintage for any transaction.

5.8 Block Trades (2008)

5.8.1 Eligibility (2008)

Members that are parties to the Block Trade must have Trading Platform access.

5.8.2 Negotiations and Reporting (2008)

All Block Trades must be reported to the CCX immediately after the negotiations have been completed. CCX will review the information reported for the proposed Block Trade to determine if the trade details have satisfied CCX Block Trade requirements. Block Trades reported during the trading day will be posted on the ticker before the Market Close on trade day. If the Block Trade negotiations are completed after the Market Close on a trade day and prior to the Market Open on the following trade day, the Block Trade details must be reported no later than the Market Open of the following trade day.

CCX will report the Block Trade to the market place by electronic means to the Trading Platform identifying the contract to be traded and the quantity of the Block Trade.

The parties to a Block Trade must each submit the Block Trade details on a CCX approved form with signature and submit the Block Trade form in a manner prescribed by CCX, within thirty minutes of the completed negotiations. .

Block Trades that are reported or submitted within a time period prior to the Market Close as stipulated by CCX will be reported to the market place at the Market Open of the following trade day.

CCX will reject a Block Trade if it does not satisfy the Block Trade requirements or the reported details or if either Member submits incomplete trade detail or if the trade detail does not agree between the submitted Block Trade forms.

5.8.3 Block Trade Pricing (2009)

At the time a Block trade is reported to the Exchange, the price must be fair and reasonable in light of (i) the size of the block trade, (ii) the prices and sizes of other transactions with the same deliverable at the relevant time, (iii) the prices and sizes of transactions in other relevant markets, including without limitation a related over the counter or futures market, and (iv) the circumstances of the markets or the parties to the block trade.

5.8.4 Not Used

5.8.5 Not Used

5.8.6 Settlement and Delivery

Block Trades will be settled and delivered in the same manner as a Trading Platform trade (ie delivery on Trade date),

5.9 Cash Transactions (2008)

5.9.1 Eligibility (2009)

Parties that do not have access to the CCX Trading Platform may only purchase CFI contracts through Cash Transactions. T

Parties that qualify as Eligible Commercial Entities and have access to the CCX Trading Platform may purchase CFI contracts through Cash Transactions provided the CFI contracts are permanently retired.

5.9.2 Negotiations and Reporting

All Cash Transactions must be submitted to CCX within thirty minutes after the negotiations have been completed. If the Cash Transaction negotiations are completed after the Market Close on a trade day and more than thirty minutes prior to the Market Open on the following trade day, the Cash Transaction must be submitted no later than the Market Open.

5.9.3 Submission and Approval

Both parties to a Cash Transaction must submit the Cash Transaction details on a CCX approved form with signature and submit the form in a manner directed by CCX.

The price of the cash transaction is negotiated between the parties, however, it should be a fair and reasonable price which takes into consideration existing market conditions.

CCX will review the information submitted for the proposed Cash Transaction and if the trade details have satisfied the requirements of the CCX rules relating to Cash Transactions, CCX will approve the Cash Transaction.

CCX will reject a Cash Transaction if it does not satisfy the requirements of the CCX rules relating to Cash Transactions or if either party submits incomplete details or if the detail does not agree between the submitted forms.

5.9.4 Settlement and Delivery

The buyer of an approved Cash Transaction is directly responsible to the seller for the value of the Cash Transaction which is the CFI quantity (in metric tons) multiplied by the price per metric ton.

CCX will transfer the appropriate CFI contracts from the seller's Registry Account to the buyer's Registry Account for an approved Cash Transaction.

5.9.5 Restrictions on CFIs Acquired Through Cash Transactions (2009)

CFI contracts that are purchased by any party through a Cash Transaction are not permitted to be sold. The CFI contracts will be permanently retired from the Registry Account of the purchaser.

5.10 Other Transactions (2009)

All privately negotiated transactions that have CCX Products as an underlying value, including forward contracts, the exercise of option contracts, swap agreements and other agreements that may be executed on a bi-lateral basis off-exchange that result in the eventual delivery of CCX Products, must be reported by all parties to the transactions within thirty minutes of completion of written agreement of the terms of the transactions in a manner required by CCX.

5.11 Market Maker Program

CCX may adopt a Market Maker program whereby one or more Registry Account Holders may be designated as Market Makers and assume obligations in order to support market liquidity and orderliness in the Exchange.

5.12 Crossing Orders

An Authorized Trader having trading authority for multiple Registry Accounts may not place a bid and offer for the same Vintage and the same price for different Registry Accounts without first entering one of the orders and waiting a minimum of sixty seconds before entering the opposite order.

APPENDICES

TO

CHAPTER 5

Appendix 5.1 Chicago Climate Exchange Trading Platform and Registry System Agreement for Registry Account Holders

This Agreement (“Agreement”) sets out the terms on which Chicago Climate Exchange, Inc. (“CCX”), which, pursuant to a license agreement with IntercontinentalExchange, Inc. (“Intercontinental”) as amended, operates Chicago Climate Exchange Registry and Trading Platform (the “Systems”), which are comprised of the CCX Trading Platform, an electronic system for the (i) execution (“Execution”) of transactions (“Exchange Transactions” or “Transactions”), (ii) the matching (“Confirmation”) of all executed trades (“Trade Confirmations” or “Trades”) with other Registry Account Holders (iii) the use of other services (“Other Services”) involving the Carbon Financial Instruments being offered (collectively, the “Products”), and the CCX Registry, which is an electronic database that will serve as the official holder of record and Transfer Mechanism for all CCX Carbon Financial Instruments, has agreed to provide the party identified below (the Registry Account Holders, as applicable) with access to the Systems. For the purposes of this Agreement, Trades submitted by Registry Account Holder for Confirmation or Other Services may include either or both Exchange Transactions (executed on the Exchange) and Non-Exchange Transactions (executed through private negotiation).

- 1) **ACCESS TO SYSTEMS.** Pursuant to its agreement with Intercontinental, CCX hereby grants Registry Account Holder a non-exclusive, non-transferable, revocable license to access the Systems as they may exist from time to time and to utilize (but not copy) any hardware, software, systems and/or communications links furnished by CCX to Registry Account Holder, from time to time (collectively, the “Trading Platform and Registry System”) in accordance with the Terms (as defined below), solely for the purpose of allowing Registry Account Holder to electronically post bids, offers and requests for quotations (and responses to any such requests) for Exchange Transactions in the Products, to enter into Exchange Transactions with other Registry Account Holders, to match and confirm Trades with other Registry Account Holder and to use the Other Services on the Exchange.

- 2) **TERMS OF ACCESS.** This Agreement, taken together with (i) the CCX Service and Pricing Schedules (the “Schedules”), (ii) any other Annexes to this Agreement and (iii) the Transaction Procedures, Product, and User Guides governing Execution, and (iv) the Confirmation Procedures, Product, and User Guides governing Confirmation, are collectively referred to herein as the “Terms” and will govern Registry Account Holder’s, access to and use of the Systems and the Exchange and any and all Exchange Transactions, Trade Confirmations, and Other Services utilized by Registry Account Holder. CCX may amend the Terms at any time by posting amendments on the Exchange, and any such amendments will be prospectively binding on a Registry Account Holder, provided that CCX will provide prior notice of any such amendments on the Exchange and provided further that CCX will provide at least two weeks’ prior notice, through electronic or other direct communication with a Registry Account Holder, of any such amendments that are likely to materially and adversely affect a Registry Account Holder, its rights, or obligations hereunder. Registry

Account Holder's use of the Exchange after the effective date of any such amendment shall constitute its ratification of and agreement to any such amendment. If CCX elects to require a Registry Account Holder to acknowledge and agree to an amendment, such amendment will not become effective until the Registry Account Holder has done so in the manner specified by CCX.

3) **REGISTRY ACCOUNT HOLDER'S, WARRANTIES AND COVENANTS.** Registry Account Holder hereby represents, warrants and covenants as follows:

- a. For the purposes of Execution of Exchange Transactions, Registry Account Holder is and will continue to be an "eligible commercial entity" as defined in Section 1a of the U.S. Commodity Exchange Act (as amended) and/or under relevant Commodity Futures Trading Commission Notices or Regulations unless and until Registry Account Holder notifies CCX otherwise. A summary of the definition of the term "Eligible Commercial Entity" is provided in Chapter 1 of this *Rulebook*. This is only a summary and Registry Account Holder should direct any questions to its legal advisors.
- b. Registry Account Holder will enter into Exchange Transactions solely as principal.
- c. Registry Account Holder acknowledges that the Exchange, the Systems and all information and content (including price and trading data) displayed and distributed thereon or in any way related to Exchange Transactions, Trade Confirmations, or Other Services (such information or content and information derived therefrom being referred to collectively herein as "Exchange Data") are, except as set forth in the final sentence of this Section 3(c), the exclusive proprietary and intellectual property of either CCX or Intercontinental constituting, *inter alia*, copyrights and trade secrets of either CCX or Intercontinental. Registry Account Holder has been granted a limited license to use the Systems, the Exchange, the Trading Platform and Registry System and the Exchange Data solely for the purposes set forth herein, and Registry Account Holder will have no other rights with respect to the Systems, the Exchange, or the Exchange Data. Without limitation of the foregoing, Registry Account Holder will access and utilize the Systems, the Exchange, the Trading Platform and Registry System and the Exchange Data solely for its own internal business activities in accordance with the Terms. Registry Account Holder agrees that it will not copy, modify, reverse engineer, reverse assemble or reverse compile the Systems, or any of the Exchange Data displayed on or issued by the Exchange, that it will not distribute, rent, provide access to, sell, retransmit, redistribute, release or license the Systems, any Exchange Data, or any part thereof to any third party (other than to its affiliates and agents subject to and in accordance with this Agreement). Registry Account Holder, further agrees that it will not, without limitation (other than for its own internal use in accordance with this Agreement), communicate, redistribute, or otherwise furnish, or permit to be communicated, redistributed or otherwise furnished, all or any portion of the Exchange Data, in any format, to any third party or in constructing or calculating the value of any index or indexed products. Registry Account Holder's partners, officers, directors, employees and agents shall maintain sole control and possession of, and sole access to, Exchange Data obtained through Registry Account Holder's access to the Systems. Notwithstanding the foregoing, it is understood and agreed that any and all data submitted to the Exchange by Registry Account Holder (including but not limited to bids and offers for Exchange Transactions, Exchange Transactions from Execution, and Trades to be matched for Confirmation) and all

information related to Transactions entered into by Registry Account Holder through the Exchange as well as all Trade data submitted to the Exchange shall be jointly owned by CCX and Registry Account Holder and each party shall have the right to use, sell, license, copy, retransmit or redistribute such information, subject to the provisions of Section 8 hereof, without accounting to the other. Any assignments necessary to confer such joint ownership rights are hereby made.

- d. Registry Account Holder will comply with the Terms and any and all laws, rules, regulations or orders applicable to Member's, Associate Member's, or Participant Member's access to and use of the Systems, the Exchange, and the Exchange Data.
- e. Registry Account Holder acknowledges and accepts that it shall be solely responsible for any and all costs or expenses associated with its accessing and utilizing the Exchange.
- f. Registry Account Holder acknowledges that CCX may, in its sole discretion, with or without cause or prior notice to Member, Participant Member, Associate Member, temporarily or permanently cease to operate the Exchange, the Systems temporarily or permanently cease to make certain Products or Transactions or Other Services or Exchange Data available or suspend, terminate or restrict Member's, Associate Member's, or Participant Member's access to and utilization of the Exchange and the Systems. Registry Account Holder acknowledges that its access to and utilization of the Exchange may be monitored by each of CCX, NASD and Intercontinental for its own purposes (including, without limitation, for purposes of monitoring levels of activity in categories of Exchange Transactions, Trade Confirmations, and Other Services and for purposes of maintaining the functional and operational integrity of the System and for purposes of complying with applicable laws and regulations) and not for the benefit of Registry Account Holder.
- g. Registry Account Holder has all necessary power and authority to execute and perform the terms and conditions of this Appendix, and these terms and conditions are its legal, valid and binding agreement, enforceable against Registry Account Holder in accordance with its terms. Neither the execution of nor performance under these terms and conditions by Registry Account Holder violates any law, rule, regulation or order, or any agreement, document or instrument, binding on or applicable to Registry Account Holder.
- h. Registry Account Holder agrees to provide information related to Registry Account Holder's, use of the Systems and the Exchange that is reasonably requested by CCX or Intercontinental, if such information is reasonably necessary in order to enable CCX or Intercontinental to maintain the integrity of the Systems or to comply with applicable laws or regulations, and such information will be accurate and complete in all material respects and subject to the Confidentiality provisions of Section 8. Should Registry Account Holder refuse to provide information, or if the information demonstrates a potential violation of the terms and conditions of this Agreement, then CCX, Intercontinental or their designated agents shall have the right, upon five (5) days notice, to conduct an on-site audit during regular business hours of Registry Account Holder's, compliance with this Agreement. Such audit may include inspection of, among other things, any use of the Systems, the Exchange and the Exchange Data. The rights of inspection shall extend only so far as may be necessary to ensure compliance by Registry Account Holder with the provisions of this Agreement.
- i. Registry Account Holder acknowledges that portions of the Systems and related technical

information, documents and materials are subject to export controls under the U.S. Export Administration Regulations. Registry Account Holder will (1) comply with all legal requirements established under these controls, (2) cooperate fully with each of CCX, NASD, and Intercontinental in any official or unofficial audit or inspection that relates to these controls and (3) not export, re-export, divert or transfer, directly or indirectly, any such item or direct products thereof to Cuba, Iran, Iraq, Libya, Sudan, Syria, the Taliban, Afghanistan, or any national thereof or to any country or national thereof that is embargoed by Executive Order. Registry Account Holder represents and warrants that it will not use the System in any such country nor will it permit any national of any such country to use the Systems for any purpose at any time. Upon notice to Registry Account Holder CCX may modify the list of such countries to conform to changes in the U.S. Export Administration Regulations.

- 4) **USER IDs AND PASSWORDS.** CCX shall issue to Registry Account Holder, through its employees designated as Authorized Trader(s) with respect to Registry Account Holder's use of the Systems ("Registry Account Holder Authorized Trader"), one or more user IDs and passwords (collectively, the "Passwords") for use exclusively by employees ("Authorized Traders") of Registry Account Holder. The initial Registry Account Holder's Authorized Trader(s) for Exchange Transactions, if applicable, and for Trade Confirmations, if applicable, are identified, respectively, on the signature page hereof and Registry Account Holder will notify CCX promptly of any change in its Registry Account Holder Authorized Trader(s). Registry Account Holder will be solely responsible for controlling and monitoring the use of the Passwords, will provide the Passwords only to its Authorized Traders, and will not provide the Passwords to any third party. Registry Account Holder will immediately notify CCX of any unauthorized disclosure or use of the Passwords or access to the Exchange or of the need to deactivate any Passwords. Registry Account Holder acknowledges and agrees that it will be bound by any actions taken through the use of its Passwords (except through the fault or negligence of CCX), including the Execution of Transactions, the Confirmation of Trades, and the use of Other Services, whether or not such actions were authorized. Registry Account Holder will only use the Passwords to access and use the Exchange from the jurisdictions specified by Registry Account Holder and accepted by CCX. The Registry Account Holder User Administrator shall be responsible for all communications between CCX and Registry Account Holder, and any notices or other communications sent to the Registry Account Holder User Administrator by CCX shall be binding on Registry Account Holder.
- 5) **TERM.** This Agreement will commence as of the date hereof and will continue thereafter through the life of the CCX Market Period (which, unless extended by mutual agreement of the parties, shall be the period 2003 through 2006, with provision made to allow final true-up trading to occur during the first two calendar quarters of 2007), provided that this Agreement shall remain in effect with respect to any Exchange Transactions or Trade Confirmations effected prior to the end of the CCX Market Period (and early 2007 trading period). Termination of this Agreement shall terminate all services provided by CCX to Registry Account Holder including Execution, Confirmation, and Other Services. Each party's continuing obligations under this Agreement and the Terms, including, without limitation, those relating to "Indemnification" and "Confidentiality", will survive the termination of this

Agreement.

6) EXECUTION OF TRANSACTIONS.

- a. Upon the Execution of a binding Transaction in accordance with the Terms, Registry Account Holder agrees that: (i) it will be obligated to pay to CCX the fees due on such Transaction, in accordance with the CCX Fee Schedule as then in effect regardless of whether the Transaction is performed, settled or otherwise completed by Registry Account Holder and its counterparty; and (ii) the resulting Transaction will constitute a legally binding obligation of Registry Account Holder, with respect to its counterparty, to complete the Transaction in accordance with its terms and subject to the terms of the CCX Transaction Terms and conditions between Registry Account Holder and its counterparty, provided that for bilaterally negotiated trades, CCX shall have no involvement in and no responsibility or liability for any matters related to the Transaction or the completion or documentation of the Transaction subsequent to its Execution through the Exchange, including but not limited to the creditworthiness of any participant, all of which shall be the sole responsibility of Registry Account Holder and/or its counterparty, as applicable. Registry Account Holder acknowledges and agrees that for bilaterally negotiated trades the counterparty to any Transaction may rely on Registry Account Holder's agreements hereunder as to the binding nature of such Transaction and agrees that the counterparty may directly enforce Registry Account Holder's obligations under such Transaction against Registry Account Holder.
- b. Registry Account Holder agrees that Transactions Executed through the Exchange shall be deemed to be "in writing" and to have been "signed" for all purposes and that any record of any such Transaction will be deemed to be in "writing". Registry Account Holder will not contest the legally binding nature, validity or enforceability of any Transaction Executed through the Exchange based on the fact that it was entered and Executed electronically and expressly waives any and all rights it may have to assert any such claim.
- c. All fees incurred by Registry Account Holder hereunder shall be paid by Registry Account Holder in accordance with the provisions of the CCX Fee Schedule.
- d. Registry Account Holder shall be liable for all taxes and duties (other than franchise and income taxes owed by CCX) arising out of this Agreement or any Exchange Transactions, Trade Confirmations, or Other Services utilized by Registry Account Holder through the Exchange, including, without limitation, taxes and duties levied by non-U.S. jurisdictions.

7) LIMITATION OF LIABILITY; INDEMNITY.

- a. REGISTRY ACCOUNT HOLDER ACKNOWLEDGES, UNDERSTANDS AND ACCEPTS THAT NEITHER CCX NOR INTERCONTINENTAL MAKES ANY WARRANTY WHATSOEVER TO REGISTRY ACCOUNT HOLDER AS TO THE SYSTEMS, EXCHANGE TRANSACTIONS, TRADE CONFIRMATIONS, OTHER SERVICES OR THE EXCHANGE, EXPRESS OR IMPLIED, AND THAT THE SYSTEMS, THE TRADING PLATFORM AND REGISTRY SYSTEM,

- EXCHANGE TRANSACTIONS, TRADE CONFIRMATIONS, OTHER SERVICES AND THE EXCHANGE ARE PROVIDED ON AN “AS IS” BASIS AT REGISTRY ACCOUNT HOLDER’S, SOLE RISK. EACH OF CCX AND INTERCONTINENTAL EXPRESSLY DISCLAIMS ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR OF NON-INFRINGEMENT. CCX, INTERCONTINENTAL, AND THEIR RESPECTIVE MANAGERS, OFFICERS, AFFILIATES, SUBSIDIARIES, SHAREHOLDERS, EMPLOYEES AND AGENTS MAKE NO WARRANTY WITH RESPECT TO, AND NO SUCH PARTY SHALL HAVE ANY LIABILITY TO REGISTRY ACCOUNT HOLDER (i) FOR THE ACCURACY, TIMELINESS, COMPLETENESS, RELIABILITY, PERFORMANCE OR CONTINUED AVAILABILITY OF THE SYSTEM OR THE EXCHANGE, (ii) FOR DELAYS, OMISSIONS OR INTERRUPTIONS THEREIN, (iii) FOR THE CREDITWORTHINESS OF ANY OTHER REGISTRY ACCOUNT HOLDER, OR (iv) FOR THE INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS, NEITHER CCX NOR INTERCONTINENTAL SHALL HAVE ANY DUTY OR OBLIGATION TO VERIFY ANY INFORMATION DISPLAYED ON THE EXCHANGE. REGISTRY ACCOUNT HOLDER ACKNOWLEDGES AND AGREES THAT THE EXCHANGE DOES NOT AND SHALL NOT SERVE AS THE PRIMARY BASIS FOR ANY DECISIONS MADE BY REGISTRY ACCOUNT HOLDER AND THAT CCX IS NOT AN ADVISOR OR FIDUCIARY OF REGISTRY ACCOUNT HOLDER.
- b. Subject to Section 7(c) of this Agreement, Registry Account Holder shall indemnify, protect, and hold harmless CCX, Intercontinental and their respective directors, officers, affiliates, employees and agents from and against any and all losses, liabilities, judgments, suits, actions, proceedings, claims, damages, costs (including attorney's fees) resulting from or arising out of any act or omission by any person obtaining access to the Exchange through the Passwords (other than through the fault or negligence of CCX or Intercontinental), whether or not Registry Account Holder has authorized such access.
 - c. IN NO EVENT WILL ANY PARTY BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, PUNITIVE OR CONSEQUENTIAL DAMAGES, EVEN IF IT HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.
 - d. Notwithstanding the terms of Section 7(a), in the event that CCX or Intercontinental is determined to be liable to Registry Account Holder for any cause, Registry Account Holder expressly agrees that in entering into this Agreement, the aggregate joint liability of CCX and Intercontinental, for all causes of action, will not exceed the total fees and other amounts (excluding any applicable taxes or duties) paid to CCX by Registry Account Holder in the previous six months from the date of the occurrence of the liability.

8) CONFIDENTIALITY.

- a. Any and all non-public information in any form obtained by either party or its employees from the other arising out of or related to the provision or use of the Systems or the Exchange, including but not limited to trade secrets, processes, computer software and other proprietary data, research, information or documentation

- related thereto, shall be deemed to be confidential and proprietary information (“Confidential Information”). Each party agrees to hold such Confidential Information in strict confidence and not to disclose such Confidential Information to third parties (other than to its employees, its affiliates and their employees or its agents) or to use such Confidential Information for any purpose whatsoever other than as contemplated by this Agreement and to obligate and advise each of its employees, affiliates and agents who may be exposed to such Confidential Information to keep such Confidential Information confidential. Registry Account Holder agrees and acknowledges that the Systems and the Exchange Data constitute Confidential Information of Intercontinental and CCX. The obligations of this Paragraph 8(a) shall survive expiration or termination of this Agreement.
- b. Confidential Information shall not include information which is: (i) in or becomes part of the public domain other than by disclosure by such party in violation of this Agreement; (ii) known to or obtained by such party previously without an obligation of confidentiality; (iii) independently developed by such party outside of this Agreement; (iv) required to be disclosed by applicable law or regulation, or pursuant to a subpoena or order of a court or regulatory, self-regulatory or legislative body of competent jurisdiction, or in connection with any regulatory or self-regulatory request for information; (v) information submitted by Registry Account Holder that is displayed by CCX on the Exchange or otherwise distributed or sold by CCX, regarding bids, offers, Exchange Transactions, Trade Confirmations in accordance with its standard policies and procedures, provided that such displays will not identify Registry Account Holder.
- 9) **NOTICES.** All notices delivered with respect to this Agreement shall be in writing and either (i) hand delivered or forwarded by registered or certified mail; or (ii) sent via electronic mail, in either case to the relevant address provided by a party for such purpose.
- 10) **THIRD PARTY BENEFICIARIES.** Notwithstanding anything in this Agreement to the contrary, CCX and Registry Account Holder agree that Intercontinental is a third party beneficiary with respect to this Agreement and may rely upon its provisions in enforcing its rights and remedies hereunder. Except as provided in the foregoing sentence, nothing in this Agreement shall be considered or construed as conferring any right or benefit on a person not a party to this Agreement or imposing any obligations on CCX or Registry Account Holder to persons not a party to this Agreement (other than (i) the right of a counterparty (Registry Account Holder) to a Transaction under Section 6(a) of this Agreement, (ii) the right of another counterparty (Registry Account Holder) with regard to a Transaction under Section 6(a) of this Agreement.
- 11) **FORCE MAJEURE.** Neither CCX, Intercontinental nor any Registry Account Holder shall be deemed to be in default of any provision hereof or be liable for any delay, failure in performance, or interruption of service resulting directly or indirectly from acts of God, civil or military authority, civil disturbance, war, strikes, fires, other catastrophes, power failure or any other cause beyond its reasonable control.
- 12) **WAIVER.** No waiver by either party of any default by the other in the performance of any

provisions of this Agreement shall operate as a waiver of any continuing or future default, whether of a like or different character.

- 13) ASSIGNMENT.** This Agreement may not be assigned by either party without the other party's express prior written consent; provided, however, that either party may assign this Agreement to any entity (i) controlling, controlled by, or under common control with such party, or (ii) which succeeds to all or substantially all of the assets and business of such party, provided that, in the case of any such assignment by Registry Account Holder, the assignee agrees in writing to assume the assignor's obligations under, and to be bound by the provisions of, this Agreement (as it may be amended from time to time). This Agreement shall be binding upon and shall inure to the benefit of the parties and their respective successors and permitted assigns in accordance with its terms.
- 14) GOVERNING LAW.** Unless otherwise specified in an annex, this Agreement is deemed entered into in Chicago, Illinois and shall be governed and construed in all respects by the laws of the State of Illinois, without giving effect to principles of conflict of law.
- 15) DISPUTE RESOLUTION.** Unless otherwise specified in an annex, any dispute, claim or controversy between the parties relating to this Agreement shall be resolved through binding arbitration conducted in accordance with the Arbitration Rules of the American Arbitration Association. Any such arbitration shall be conducted in Chicago, Illinois or at such other location as may be agreed to by the parties and the arbitrators. For the avoidance of doubt, this arbitration clause only applies to CCX and the Registry Account Holder and does not apply to any disputes arising between Registry Account Holder on the Exchange or any other disputes between parties other than CCX and the Registry Account Holder. Notwithstanding the foregoing, each party acknowledges that a breach of this Agreement may cause the other party irreparable injury and damage and therefore may be enjoined through injunctive proceedings in addition to any other rights and remedies which may be available to such other party at law or in equity, and each party hereby consents to the jurisdiction of any federal or state courts located in Chicago, Illinois with respect to any such action. The parties expressly waive their right to trial by jury in any such action.
- 16) HEADINGS.** The headings in this Agreement are intended for convenience of reference and shall not affect its interpretation.
- 17) SEVERABILITY.** If any provision of this Agreement (or any portion thereof) shall be invalid, illegal or unenforceable, the validity, legality or enforceability of the remainder of this Agreement shall not in any way be affected or impaired thereby.
- 18) COUNTERPARTS.** This Agreement may be executed in multiple counterparts, each of which shall be deemed an original, but all of which together shall constitute one agreement binding on the parties hereto.

Appendix 5.2 Carbon Financial Instrument Contract Specifications

Product Type	Cash Product
Contract Size	100 metric tonnes
Quotation	US dollars
Minimum Tick Increment	\$.05 per tonne = \$5.00 per contract
Symbol	CFI
Trading Hours	8:30 a.m. – 2:00 p.m. Central Time
Products Offered	Vintages for 2003 - 2010
Product Availability	All vintages offered are eligible for trading.
Transaction Methods	<p>Transaction participation eligibility is limited to CCX members who qualify as eligible commercial entities.</p> <ol style="list-style-type: none"> 1. CCX offers an internet-based, electronic trading system for submission of bids and offers for anonymous, cleared agreements executed on price and time priority. 2. Electronic bilateral agreements between members 3. Pre-negotiated block trades and cash transactions may be negotiated at any time, but must be reported to CCX in accordance with its rules.
Deliverable Instruments	CCX Carbon Financial Instruments
Delivery Process	<p>All transactions are delivered through the CCX Clearing System and are held by the CCX Registry on the trade day.</p> <p>Earlier dated vintages may be delivered against later vintage trades.</p>
Clearing Process	<p>Transactions (with exception of bilateral agreements) are cleared on trade day. Full contract value settlement occurs on the next business day. CCX substitutes as a counter party to all transactions and guarantees performance until settlement is completed.</p> <p>Bilateral agreement financial arrangements are settled by the participating parties.</p>
Closing Price	<p>For each Vintage, the closing price will be based on the following criteria.</p> <ol style="list-style-type: none"> a. The last transaction executed on the Trading Platform during a trading session. b. If at the close the best bid is above the last trade price or the best offer is below the last trade price, then the closing price will be the best bid / best offer price. c. If no trades occur in the trading session, the closing price is the previous day's closing price unless the best bid is above the previous day's closing price or the best offer is below the previous day's closing price, then the closing price will be the best bid / best offer price. d. The Exchange reserves the right to take into account other factors in determining closing prices. <p>A block trade price will not serve as a closing price.</p>

Price Limits	20% up and down from the previous trading day's closing price. If the daily limit calculation results in a value that is not equal to a \$.05 increment, the minimum daily trading limit will be rounded down to the next \$.05 increment and the maximum trading limit will be rounded up to the next \$.05 increment.
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This contract specification is only intended to present limited features of the CCX product. For details, consult the CCX Rulebook and CCX Notices.

Chapter 6 CCX Member Emission Baselines, Purchased Electricity Baselines and Opt-ins

6.0 Purpose (2007)

This chapter establishes the rules and procedures for calculating the Greenhouse Gas Emissions and, if applicable, Electricity Purchases Baselines, Reduction Schedules and allocation of Exchange Allowances for each Exchange Member.

6.1 General Provisions (2007)

Subject to the provisions established in this Chapter, each CCX Member's Phase I Emission Baseline should represent the entity-wide average Greenhouse Gas emissions during calendar years 1998, 1999, 2000 and 2001.

Subject to the provisions established in this Chapter, each CCX Member's Phase II Emission Baseline should represent entity-wide Greenhouse Gas emissions determined by a one-time election of one of the following calculation methods:

1. The entity-wide average emission level during calendar years 1998, 1999, 2000 and 2001; or
2. The entity-wide emission level realized in calendar year 2000.

Each CCX Member's Emissions Baseline is to be determined in a manner that is consistent, in terms of calculation method and sources included, with the information provided in Periodic Emission Reports to be submitted to CCX for all years of participation. The Baseline is to be calculated using data and methods that are replicable, transparent, credible and in conformance with the provisions provided in this Chapter and in other related Chapters in this *Rulebook* in a manner and time frame prescribed by the Exchange.

Baselines are to be adjusted to reflect facility acquisitions and sales, and shall exclude emissions associated with combustion of Renewable Fuels. Baseline changes due to facility acquisition or sales that occur subsequent to the initial allocation of Exchange Allowances from CCX shall cause a modification to the CCX Member's allocation of Exchange Allowances. Section 7.1 of this *Rulebook* addresses changes in emissions monitoring methods.

6.2 Rule Interpretation and Modifications

Unless provided otherwise, the CCX Environmental Compliance Committee shall be responsible for recommending interpretations and modifications of rules established in this Chapter to the CCX, which in its discretion, shall have final decision-making authority.

6.3 Included Emissions and Renewable Fuels

6.3.1 Included Emissions (2007)

To the extent that they are associated with facilities and activities in a Member's emissions inventory (reflecting rule requirements or opt-ins) Emissions of the following Greenhouse Gases will be reflected in each Member's and Emission Baseline and Periodic Emission Reports:

- carbon dioxide (CO₂)
- methane (CH₄)
- nitrous oxide (N₂O)
- hydrofluorocarbons (HFCs)
- perfluorocarbons (PFCs)
- sulfur hexafluoride (SF₆)

Emissions of all Greenhouse Gases will be converted to metric tons carbon dioxide equivalent using the one-hundred-year Global Warming Potential values established by the Intergovernmental Panel on Climate Change. These values are listed in Chapter 7, Emissions Monitoring and Reporting. Emissions monitoring and reporting will be conducted pursuant to Chapter 7.

6.3.2 Renewable Fuels (2007)

Greenhouse Gas emissions associated with combustion of Renewable Fuels, as defined herein, shall be reported as zero emissions in the Emission Baselines and Periodic Emission Reports. Renewable Fuels for CCX purposes are:

- wood, wood wastes and wood-derived fuels¹
- agricultural residues and grasses
- landfill and agricultural methane²
- ethanol (bioalcohol) and biodiesel

If Renewable Fuels are combusted at facilities included in a CCX Member's baseline and such facilities utilize continuous emissions monitors (CEMs), CCX Members shall subtract the CO₂ emissions associated with combustion of Renewable Fuels from the total CO₂ emissions as measured and quantified by CEMs and reported to CCX. The quantity of CO₂ emissions associated with combustion of fuel blends that include Renewable Fuels shall be determined using emission coefficients developed by the World Resources Institute in conjunction with the World Business Council for Sustainable Development (hereinafter referred to as the "WRI/WBCSD Protocols") and other approved sources.

¹ As provided in Section 6.7 of this *Rulebook* CCX Members may elect to include N₂O and CH₄ emissions associated with fossil fuel and biomass combustion.

² As provided in Section 9.7 of this *Rulebook*, the issuance of Exchange Offsets to CCX-qualifying methane collection and combustion systems will be based on the net Greenhouse Gas reduction benefits of such Projects.

6.4 Included Emission Sources (2007)

CCX Members with Owned Emissions from Large Emission Sources located in the United States of America are required to include these sources in their CCX Emission Baseline and Period Emission Reports. Inclusion of emissions in non-U.S. locations is required for Members not domiciled in the U.S., as per requirements set forth in this section. Options for including emissions in various geographic locations are also set forth below.

Each CCX Member is to include in its Emission Baseline and Periodic Emission Reports its Owned Emissions from all Large Emission Sources in which the CCX Member's Equity Ownership Percentage is greater than or equal to 20%. Exceptions to this requirement may be recommended, on a case-by-case basis, by the CCX Environmental Compliance Committee if a CCX Member's Equity Ownership Percentage of a Large Emission Source or Large Electricity Purchase Activities is less than or equal to 50% and data on emissions or electricity purchases from the jointly owned facility are not accessible to the CCX Member. (2/2/2004)

Each CCX Member primarily engaged in electric power generation shall include its Owned Emissions from all facilities in which the CCX Member's Equity Ownership Percentage represents 25 megawatts or more of nameplate generating capacity.

In the case of Jointly Owned Facilities, Owned Emissions are defined on the basis of a Member's Equity Ownership Percentage. Appendix 6.1 provides example calculations of a CCX Member's Owned Emissions in cases of Jointly Owned Facilities.

Upon enrollment in the Exchange, each CCX Member may elect to Opt-in the following emission sources for the duration of the Phase I Program, which shall be included in the Member's Emission Baseline, Emission Reduction Schedule and Periodic Emission Reports:

- (1) direct emissions from Small Emission Sources;
- (2) direct emissions from activities in which the CCX Member holds a minor ownership percentage (Minor Ownership Emissions);
- (3) emissions associated with activities in Canada, Mexico; and
- (4) non-CO₂ emissions associated with fossil fuel combustion (N₂O and CH₄).

For the Phase II Program, a Member may elect to Opt-in emission sources noted in the previous paragraph and international emission sources, other than Canada and Mexico, for the duration of the Phase II Program, which shall be included in the Member's Emission Baseline, Emission Reduction Schedule and Periodic Emission Reports. (See Section 6.4.6)

As provided in Section 4.10 of this *Rulebook*, each CCX Member not primarily engaged in electric power generation may elect to include electricity purchases as a Supplemental Reduction Objective, subject to the same Baseline rules, Emission Reduction Schedule and Market Efficiency provisions applied to Direct Emissions.

Upon enrollment in CCX, each Exchange Member will submit to CCX a Statement of Included Emissions and Emission Baseline in a manner prescribed by the Exchange.³ Each CCX Member shall report Baseline emissions by facility, and may also report by Emitting Activity⁴ but must do so for activities involving multiple locations, such as vehicle fleets. Each CCX Member will also notify the Exchange of facilities acquisitions and sales, and Opt-in information. All such data will be subject to audit by the Provider of Regulatory Services designated by CCX.

6.4.1 Included Emissions and Baselines for CCX Members That Own Large Emission Sources in the United States (2006)

Each CCX Member that owns Large Emission Sources in the United States shall include in its CCX Emission Baseline and Periodic Emission Reports its Owned Emissions associated with all such activities in the United States and its territories, subject to rules governing Included Emissions and Jointly Owned Facilities as listed in this Chapter. Each CCX Member that owns Large Emission Sources in the U.S. and is domiciled in another country shall also include Large Emission Sources in its home country.

6.4.2 Included Emissions and Baselines for CCX Members That Own Large Emission Sources Only in Canada

Each CCX Member that owns Large Emission Sources exclusively in Canada shall include in its Emission Baseline and Periodic Emission Reports its Owned Emissions from all such activities, subject to CCX rules governing Included Emissions and Jointly Owned Facilities.

6.4.3 Included Emissions and Baselines for CCX Members That Own Large Emission Sources Only in Mexico

Each CCX Member that owns Large Emission Sources exclusively in Mexico shall include in its Emission Baseline and Periodic Emission Reports its Owned Emissions from all such activities, subject to CCX rules governing Included Emissions and Jointly Owned Facilities.

6.4.4 Included Emissions and Baselines for CCX Members with Other Geographic Conditions

³ When applicable, a CCX Member in the commercial forestry sector will submit baseline information on carbon stored in its commercial forest parcels. See Chapter 8.

⁴ Activities include, but are not limited to, the following: electric power and steam generation; space heating and cooling; water heating and cooling; catalytic and thermal oxidizers; catalytic cracking and hydrogen plants used in crude oil refining; operation of a heavy vehicle fleet; manufacture of adipic acid; manufacture of semiconductor wafers; operation of lime kilns, calciners and dryers; and operation of tree harvesting equipment.

A CCX Member that owns Large Emission Sources in geographic areas not included in CCX rules, the CCX Environmental Compliance Committee will consider recommendations to amend Included Emissions.

Table 6.1 summarizes the nature of facilities inclusion, Opt-in and geographic provisions applied to CCX Members.

Table 6.1 CCX Facilities Inclusion, Opt-in and Geographic Provisions

CCX Member's U.S. facilities and domicile: Country of CCX Member Operations		CCX Member owns Large Emission Sources in the U.S.	CCX Member is domiciled in Non-U.S. Location and owns Large Emission Sources in the U.S.	CCX Member's Owned Emissions are exclusively in Non-U.S. Location
Direct emissions	U.S	Must include these sources	Must include its large U.S. sources	N.A.
	U.S. Small Emission Sources	May Opt-in on an activity-wide basis	May Opt-in these sources on an activity-wide basis	N.A.
	U.S. Minor Ownership emissions	May Opt-in on an activity-wide basis	May Opt-in these sources on an activity-wide basis	N.A.
	U.S. non-CO ₂ emissions	May Opt-in on an activity-wide basis	May Opt-in these sources on an activity-wide basis	N.A.
	Canada and Mexico	May Opt-in all Large Emission Sources in Canada, and/or Mexico; may Opt-in categories of Small Sources, Minor Ownership and non-CO ₂ if large sources Opted-in	Must include all home country Large Emission Sources; may Opt-in categories of Small Sources, Minor Ownership and non-CO ₂ in non-U.S./ non-home locations	Must include all Large Emission Sources in approved Non-U.S. Locations; may Opt-in categories of Small Sources, Minor Ownership and non-CO ₂
	Other Non-U.S. Locations	May Opt-in all Large Emission Sources in approved Other Non-U.S. Locations; may Opt-in categories of Small Sources, Minor Ownership and non-CO ₂ if large sources Opted-in	Must include all home country Large Emission Sources; may Opt-in categories of Small Sources, Minor Ownership and non-CO ₂ in non-U.S./ non-home locations	Must include all Large Emission Sources in approved Non-U.S. Locations; may Opt-in categories of Small Sources, Minor Ownership and non-CO ₂
Electricity purchases*	U.S	May Opt-in its U.S. Electricity Purchases: if elected, must Opt-in all Large Electricity Purchases; may include total electricity purchases	May Opt-in its U.S. electricity purchases: if elected, must Opt-in all Large Electricity Purchases; may include total electricity purchases	N.A.

	Canada	May Opt-in Large Electricity Purchases (or total purchases) in Canada <i>only if its Large direct emission sources in Canada are opted-in</i>	May Opt-in Large Electricity Purchases (or total purchases) in non-U.S./non-home locations <i>only if its Large Direct Emission sources in that country are opted-in</i>	May Opt-in Large Electricity Purchases (or total purchases) in non-U.S./non-home locations <i>only if its Large Direct Emission sources in that country are opted-in</i>
	Mexico	May Opt-in Large Electricity Purchases (or total purchases) in Mexico <i>only if its Large Direct Emission Sources in Mexico are opted-in</i>	May Opt-in Large Electricity Purchases (or total purchases) in non-U.S./non-home locations <i>only if it Opt-in its Large Direct Emission Sources in that country</i>	May Opt-in Large Electricity Purchases (or total purchases) in non-U.S./non-home locations <i>only if its Large Direct Emission sources in that country are opted-in</i>
	Other Non-U.S. Locations	May Opt-in Large Electricity Purchases (or total purchases) in approved Other Non-U.S. Locations <i>only if its Large Direct Emission Sources are opted-in</i>	May Opt-in Large Electricity Purchases (or total purchases) in non-U.S./non-home locations <i>only if it Opt-in its Large Direct Emission Sources in that country</i>	May Opt-in Large Electricity Purchases (or total purchases) in non-U.S./non-home locations <i>only if its Large Direct Emission sources in that country are opted-in</i>

*Applies only to entities not primarily engaged in electric power production.

6.4.6. Included Phase II Emissions and Baselines for CCX Members with Other Geographic Conditions (2007)

In addition to Opt-ins of emission sources in Canada and Mexico recognized under the Phase I Program, the Phase II Program will allow the Opt-in of owned emission sources in the following international locations at the discretion of the Exchange.

- (1) Australia
- (2) Brazil
- (3) China
- (4) India
- (5) European Union countries

Other international locations may be added as determined by the Exchange.

A Member that elects to Opt-in emission sources from any of the approved international locations, and has the Exchange's consent, must include all of its owned emission sources in a particular international location.

6.4.6.1 Baseline Determination and Emission Reduction Schedule for Phase II Opt-in of Facilities in Other Geographic Locations (2007)

The determination of emissions baseline for opted-in facilities in approved international locations will be the same Phase II method election a Member chose under Section 6.1.

The annual emission reduction schedule for Opted-in facilities in approved locations will be the same as a Member's Phase II emission reduction schedule and will be effective with the Member's first Phase II program year.

6.4.6.2 International Facility That is Subject to an In-Country Mandatory Emissions Program (2007)

CCX will not recognize participation of facilities that are already subject to a defined and implemented mandatory emissions reduction program.

6.4.6.3 International Facility That Becomes Subject to an In-Country Mandatory Emissions Reduction Program After Being Included the Phase II Program (2007)

If a facility in an approved location that has been included in the Phase II Program subsequently becomes subject to a mandatory emissions program in the country in which it operates, CCX will release the facility from the CCX Phase II Program effective the date that the facility becomes subject to the mandatory emission reduction program. A Member will be responsible for reporting the facility's emissions up to the date the facility becomes subject to the mandatory program.

If an in-country mandatory emissions reduction program is retroactively applied to a date that a facility was included in the Phase II Program, CCX will not relieve a Member of its obligations under these rules for the affected facility for any retroactive period.

6.4.6.4 International Facility That Participates in an In-Country, Government Sponsored Voluntary Emissions Reduction Program (2007)

CCX will not allow a Member to realize double emissions allowances or credits for CCX-included facilities in approved locations that are already subject to a voluntary, government sponsored emissions reduction program.

If a Member includes facilities in an approved international location in which the facilities are already subject to a voluntary, government sponsored emissions reduction program, the Member must provide a written assurance to CCX that the Member has relinquished its rights to any and all emission allowances or credits that have been granted through the voluntary program for all purposes other than for compliance requirements within the voluntary program.

6.5 Determination of Emission Baselines

6.5.1 General Provisions (2007)

For the Phase I Program each CCX Member's Emission Baseline will be the annual average of its Owned Emissions during years 1998, 1999, 2000 and 2001. The Baseline will be adjusted

for each year of the Phase I Program as a result of conditions identified in this Rulebook Section that have occurred. Baselines reported to CCX are to be rounded off to the nearest one hundred tons. When applicable, Electricity Purchase Baselines are to be rounded to the nearest one hundred megawatt-hours.

For the Phase II Program, a CCX Member that participated in the Phase I Program may make a one-time Phase II Program Baseline determination election that will apply for the entire Phase II Program. A Member may elect to continue to use its Phase I Program Baseline, as described in the above paragraph, for the Phase II Program or may elect to adopt its Owned Emissions for calendar year 2000, adjusted for conditions identified in this Rulebook Section that have occurred (e.g. acquisitions, divestitures and / or emergence of applicable, mandatory emission limits).

A CCX Member that initially participates in the CCX emissions reduction program through the Phase II Program may make a one-time Phase II Program Baseline determination election that will apply for the entire Phase II Program. A Member may elect to:

1. Determine its baseline on the annual average of its Owned Emissions during years 1998, 1999, 2000 and 2001. The Baseline will be adjusted as a result of any of the conditions identified in this Rulebook Section that have occurred during all Phase I Program years (e.g. acquisitions, divestitures and / or emergence of applicable, mandatory emission limits); or
2. Adopt its Owned Emissions for calendar year 2000, adjusted for conditions identified in the Rulebook Section that have occurred (e.g. acquisitions, divestitures and / or emergence of applicable, mandatory emission limits).

6.5.2 Determination of Emission Baselines for Facilities Placed Into Service During the Baseline Period

The CCX Emission Baseline for facilities placed into service after January 1, 1998 but before January 1, 2001 will be the annual average of emissions for the facility's first two complete calendar years of operation. The CCX Emission Baseline for facilities placed into service on or after January 1, 2001 and before January 1, 2002 will be the emissions of such facilities during the first complete calendar year of operation.⁵

6.5.3 Baseline Treatment for Facilities Permanently Shut Down by the Member During or After the Baseline Period (2006)

The Baseline Period emissions for facilities that were shut down during the Baseline Period are included in each CCX Member's Emission Baseline. The total emissions released by the facility

⁵ As provided in Section 4.9 of this *Rulebook*, emissions of New Electricity Generating Facilities are subject to certain exemptions.

during the Baseline period (in metric tons carbon dioxide (CO₂)) divided by four (4) are to be added to the Emission Baseline calculated for all other Included Emissions.

When applicable, the same method shall be used to calculate Electricity Purchase Baselines associated with facilities that were shut down during the Baseline Period.

An example of this process is provided in Appendix 6.3A.

Facility closure after the Baseline Period does not require adjustment of the Member's Emission Baseline or allowance allocation.

6.5.4 Baseline Modification Due to Facility Acquisition (2006)

In the case of acquisition of an emitting facility by a CCX Member, the Baseline emissions of that facility will be added to the Member's pre-acquisition Baseline. Each CCX Member whose Baseline is increased due to acquisition of facilities will be allocated additional Exchange Allowances in an amount corresponding to the Emission Baseline and CCX Emission Reduction Schedule associated with the acquired facility.

During the annual reporting and True-Up periods, each CCX Member shall notify the CCX Compliance Office of facility sales using standard documentation provided by the Exchange. When a facility acquisition occurs during a calendar year, emissions from that facility are to be included in the CCX Member's Emission Inventory as soon as practicable. The Member's increased allocation of Exchange Allowances will be calculated on a *pro-rata* basis in correspondence with the portion of the year for which the acquired facility's emissions are included in the Member's Emission inventory.⁶

An example of this process is provided in Appendix 6.3B.

6.5.5 Baseline Modification in the Case of Facility Sale (2006)

In the case of sale by a CCX Member of an operating facility that is included in the Member's Emissions Baseline, the Emission Baseline of that facility will be subtracted from the Member's overall Baseline.

⁶ For example, if a CCX Member includes emissions from an acquired facility as of October 1, 2003, that Member would be allotted additional Exchange Allowances pro-rata in an amount equal to the acquired facility's Emission Baseline multiplied by $\{.99 \times (92/365)\}$ as the facility would be owned by the CCX Member for 92 days of year 2003. In this case the increased allocation of Exchange Allowances for years 2004, 2005 and 2006 would be in an amount equal to 98%, 97% and 96% of the acquired facility's Baseline emissions, respectively.

If the Member had been leasing the facility prior to the acquisition and the facility had been included in the Baseline, then no Baseline adjustment would be necessary upon the acquisition.

When a CCX Member's Baseline is reduced due to sale of a facility that was included in the Member's Baseline, CCX will retire, on a *pro rata* basis, the Exchange Allowances that were issued on the basis of emissions from the facility that was sold by the CCX Member.

During the annual reporting and True-Up periods, each CCX Member shall notify the CCX Compliance Office of facility acquisitions using standard documentation provided by the Exchange. When a facility sale occurs during a calendar year, emissions from that facility are to be included in the CCX Member's Emission Inventory up to a proximate date of sale, but no later than the actual transfer of control of the facility. The Member's decreased allocation of Exchange Allowances will be calculated on a pro-rata basis in correspondence with the portion of the year for which the disposed facility's emissions are no longer included in the Member's inventory.⁷

An example of this process is provided in Appendix 6.3C.

6.5.6 Baseline Adjustments (2006)

Adjustments to a CCX Member's Baseline and Exchange Allowance allocations as a result of facility acquisitions and dispositions shall be administered in the CCX Registry on an annual basis during the pre-True-up period. The Exchange's timing for posting CCX Registry adjustments does not alter a CCX Member's requirement to report facility acquisitions and dispositions in a timely manner as required in Rulebook Sections 6.5.4 and 6.5.5.

6.6 Determination of Baselines when Baseline Period Emissions Support Data Is Missing (2007)

The methods prescribed in this section are to be employed in instances when support data on Owned Emissions and, as applicable, electricity purchases are not available for a portion of the CCX Baseline Period. A statement attesting that the data are unavailable in suitable form shall be signed by a corporate officer (or by a designated representative for each CCX Member that operates U.S. electric power plants regulated under the 1990 Clean Air Act Amendments). The documentation and methods prescribed in this section shall be subject to audit by the Provider of Regulatory Services designated by CCX and will be reviewed by the CCX Environmental Compliance Committee.

⁷ For example, if a CCX Member sells a facility having Member-Owned Emissions and relinquishes control of that facility as of September 16, 2004, logistical considerations may make it impractical for the Member to include emissions from that facility as of September 1, 2004. In such case, the Member's allocation of Exchange Allowances would be reduced pro-rata in an amount equal to the disposed facility's Emission Baseline multiplied by $\{.98 \times (122/365)\}$ as the facility would not be owned by the CCX Member for 122 days of year 2004. The reduced allocation of Exchange Allowances for years 2005 and 2006 would be in an amount equal to 97% and 96% of the sold facility's emissions, respectively.

If after the facility divestiture, the Member leases the facility for the same or similar operations, the Member's Baseline would not be adjusted.

Emissions for periods of missing support data must be calculated using available emissions data that best correspond to the activities for which data are missing. If data from a particular facility or activity are incomplete, the CCX Member must use available emissions data from that facility or activity to estimate emissions for the period for which data are missing.

In cases where emissions support data are entirely or nearly entirely missing for the years 1998, 1999, 2000 and 2001 (e.g. if emissions data for a particular activity or facility are entirely unavailable or are available for one year or less of the Baseline Period), or where the appropriate treatment of the CCX Member's particular circumstances are not clearly addressed by the rules provided herein, the CCX Member shall notify CCX and shall work jointly with the CCX Environmental Compliance Committee to develop a method for addressing such data gaps.

Figure 6.1 summarizes the methods to be used for various missing Baseline data conditions.

Figure 6.1 Methods to be Used to Calculate Baseline Period Annual Emissions or Electricity Purchases in Cases of Missing Support Data

Missing support data time period	Support data availability	Method to be employed to calculate annual emissions
Portions of any Baseline Period year	Emissions or electricity purchase data are available for less than a full year but are available for 220 days or more in that year.	Annualize the available data.
1999 or 2000 (when the elected baseline is 1998 – 2001)	Data unavailable or available for less than 220 days.	Interpolate by computing the average from data for the surrounding years.
1998 or 2001 (when the elected baseline is 1998 – 2001)	Data unavailable or available for less than 220 days.	Extrapolate from adjacent year using 1% growth rule.
All Baseline Period Years	Data are unavailable or available for less than 220 days for all of the Baseline years.	Back-cast protocol from subsequent years or CCX Member shall work with the CCX Environmental Compliance Committee to jointly develop a

		recommended method.
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6.6.1 Emissions Support Data Missing for a Portion of Any Single Year of the Baseline Period (2007)

The following methods are to be used if emissions or electricity purchase support data are missing for portions of any year during the CCX Baseline Period.

If emissions support data for a particular facility or activity are available for a period of more than 60% of a year (i.e. 220 days or more of emissions are covered), the available data are to be annualized by applying the following multiplication process:

- (1) for data missing during years 1998, 1999 and 2001: multiply $\{365/(\text{covered days})\}$ by (emissions from covered days); and,
- (2) for data missing during 2000: multiply $\{366/(\text{covered days})\}$ by (emissions from covered days).

The term “covered days” means days for which emissions data are available. If less than 220 days of emissions data are available, methods described in Section 6.6.2 below are to be applied, using year-long emissions data from surrounding and/or adjacent years (as applicable).

An example is provided in Appendix 6.5A.

6.6.2 Emissions Support Data Missing for an Entire Year or Available for Less Than 220 Days in Any Year (2007)

6.6.2.1 Emissions Support Data Missing for an Entire Year or Available for Less Than 220 Days in Years 1999 or 2000 (2007)

For elected baseline period of 1998 through 2001 and when emissions support data are missing for an entire year or are available for less than 220 days in either 1999 or 2000, the imputed emissions for that year are determined by interpolation by forming an average of the emission quantities from the prior and subsequent years.

An example is provided in Appendix 6.5B.

6.6.2.2 Emissions Support Data Missing for an Entire Year or Available for Less Than 220 Days in 1998 or 2001 (2007)

For elected baseline period of 1998 through 2001 and when emissions support data are missing for an entire year or are available for less than 220 days in 1998 or 2001, imputed emissions for

that year are determined by applying a 1% per year emissions growth rate protocol. When emissions data are absent for 1998, the imputed emissions for 1998 are defined as: $0.990099 \times$ year 1999 emissions. When emissions data are absent for 2001, the imputed emissions for 2001 are defined as: $(1.01) \times$ (year 2000 emissions).

6.6.2.3 Emissions Support Data Missing or Available for Less Than 220 Days for all of the Baseline Period (2007)

When emissions data are unavailable or available for less than 220 days for all of the Baseline Period, imputed emissions for these years are determined by applying a 1% per year back calculation protocol. For example if data is absent for 2001, but available in 2002, the imputed emissions for 2001 are defined as: $(0.990099) \times$ (year 2002 emissions).

A Member may propose an alternative Baseline calculation methodology to the CCX Environmental Compliance Committee.

6.7 Opt-in Programs (2006)

Each CCX Member may elect to include as a Supplemental Reduction Objective additional activities through the following Opt-in programs:

- (a) Small Emission Source Opt-in (Direct Emissions);
- (b) Minor Ownership Opt-in;
- (c) Electricity Purchase Opt-in (for CCX Members not primarily engaged in electricity production);
- (d) geographic Opt-in (direct emissions and electricity purchases in NAFTA countries); and,
- (e) non-CO₂ emissions Opt-in.

Unless otherwise provided herein, all Opt-in elections shall be made upon enrollment in the Phase I Program and Phase II Program by the CCX Member.

6.7.1 Small Emission Source Opt-in

Each CCX Member may choose to Opt-in Owned Emissions from Small Emission Sources. Such elections shall be for any entire Activity, i.e. shall include all emissions from functionally similar Activities. Each Member shall be required to submit a statement of total emissions, explaining its estimate of emissions, including an account of the method used to make the estimate, from excluded small sources and providing reasons why such small sources should be excluded. This statement must be certified by an officer of the Member. Members may not be required to provide evidence for their estimates of the size of the small sources. (2/23/2004)

6.7.2 Minor Ownership Emissions Opt-in (2006)

Each CCX Member may Opt-in Owned Emissions associated with facilities for which the Member's Equity Ownership Percentage is less than 20%. For each CCX Member primarily engaged in electricity production, the 20% Equity Ownership Percentage also represents less than 25 megawatts rated capacity. If such election is made, the Member must include emissions from all the functionally similar facilities for which its Equity Ownership Percentage is less than 20%.

6.7.3 Electricity Purchase Opt-in (2006)

Each CCX Member not primarily engaged in electric power generation may choose to Opt-in all its Large Electricity Purchases or its total electricity purchases as a Supplemental Reduction Objective. Operation of the Electricity Purchase Opt-in Program is described in Section 4.10 of this *Rulebook*.

Electricity produced using specified renewable energy sources can be treated as zero emission electricity by a CCX Member that elects to Opt-in electricity purchases. Each CCX Member that elects to Opt-in electricity purchases shall include in its Electricity Purchase Baseline (defined below) and periodic electricity purchase reports electricity acquired from CCX-specified Renewable Electricity Production Systems as zero emissions, provided the Member demonstrates that the electricity is produced solely for the Member or is otherwise dedicated to the Member. Electricity produced by the following Renewable Electricity Production Systems shall qualify under this provision:

- Solar
- Hydropower
- Wind
- Renewable Fuels, which, for purposes of CCX are:
 - wood, wood wastes and wood-derived fuels⁸
 - agricultural residues and grasses
 - landfill and agricultural methane
 - ethanol (bioalcohol) and biodiesel

Each CCX Member that elects to include its electricity purchases as a Supplemental Reduction Objective shall determine its Phase I Program Baseline Electricity Purchases by calculating the simple average of such electricity purchases, expressed in megawatt-hours, during the calendar years 1998, 1999, 2000 and 2001.

The Electricity Purchase Baseline for facilities associated with electricity purchases that are placed into service after January 1, 1998 but before January 1, 2001 will be the annual average of the CCX Member-Owned Electricity Purchases associated with those facilities during the first two years of the facility's operation. The Electricity Purchase Baseline for facilities associated with electricity purchases that are placed into service on or after January 1, 2001 and

⁸ CCX Members may elect to include N₂O and CH₄ emissions associated with fossil fuel and biomass combustion.

before January 1, 2002 will be the CCX Member-Owned Electricity Purchases associated with those facilities during the first complete calendar year of operation. Baseline Electricity Purchases will be adjusted to reflect acquisition or sale of facilities that are associated with electricity purchases by applying the provisions contained in Sections 6.5.4 and 6.5.5.

Phase II Program Baseline Electricity Purchases will be determined in the a same manner as a CCX Member's Phase II Emissions Baseline election per Section 6.1.

6.7.4 Opt-In Small Emissions Sources in Canada and Mexico (2006)

Each CCX Member that chooses to Opt-in Owned Emissions from Large Emission Sources in Canada or Mexico may also Opt-in Small Emission Sources, Minor Ownership emissions, non-CO₂ emissions and, provided the Member is not primarily engaged in electric power generation, electricity purchases in those countries in a manner consistent with the rules provided herein. (2006)

6.7.5 Non-CO₂ Emissions Opt-in

Each CCX Member may elect to include N₂O and CH₄ emissions associated with combustion of fossil and biomass fuels. Each CCX Member that operates electricity transmission and distribution equipment may Opt-in Owned Emissions of SF₆ from such equipment.⁹ Opt-in of such emissions will require the CCX Member to include such emissions in its Emission Inventory from all functionally similar activities for the entire CCX Market Period (2003, 2004, 2005 and 2006).

6.7.6 Purchased Steam Opt-in (9/22/2003)

A Member may elect to Opt-in emissions associated with production of purchased steam, which shall be quantified on the basis of the fuel combusted in production of the purchased steam.

⁹ For certain CCX Members activities that release SF₆ emissions may constitute a Large Emission Source. In such cases these emissions must be included in the Member's CCX Emission Inventory and Reduction Objective.

**APPENDICES
TO
CHAPTER 6**

Appendix 6.1 Examples: Emissions Ownership in Cases of Jointly Owned Facilities

Example 6.1.1

Scenario 1: Company A is a manufacturer and owns 60% of the equity of a production plant (40% is owned by another entity). The plant emits a total of 80,000 metric tons of CO₂ per year.

Company A owns $.60 \times 80,000$ tons = 48,000 tons metric tons of CO₂ and includes 60% of the plant's annual emissions in its company-wide Emission Baseline and Periodic Emission Report.

Scenario 2: Company A is a manufacturer and owns 13% of the equity of a production plant (87% is owned by another entity). The facility emits a total of 80,000 metric tons of CO₂ per year.

Company A owns $.13 \times 80,000$ tons = 10,400 tons metric tons of CO₂. Its Equity Ownership Percentage is below 20%. Company A can either:

- (i) exclude the emissions of this plant from its company-wide Emission Baseline and Periodic Emission Reports; or,
- (ii) under the minor ownership Opt-in provision, Company A may include the emissions from this plant in its Emission Baseline and Periodic Emission Reports if (and only if) it includes the emissions from all the functionally similar activities for which its Equity Ownership Percentage is less than 20%.

Scenario 3: Company A is a manufacturer and owns 40% of the equity of a production plant (60% is owned by another entity). The facility emits a total of 80,000 metric tons of CO₂ per year. However, Company A cannot readily access the information needed to determine the CO₂ emissions released by the plant.

Solution: upon a case-specific decision by the CCX Environmental Compliance Committee, Company A can have the emissions associated with the production plant excluded from its Emissions Inventory.

Example 6.1.2

Company A owns three power production units (Unit 1, Unit 2, and Unit 3) at one plant site. Each unit has a rated capacity of 100 megawatts. CO₂ emissions from each of the three units are 600,000 metric tons per year.

Scenario 1. Company A owns 100% of units 1 and 2, and 40% of unit 3.

Company A's emission ownership is:

Unit 1 = 600,000 metric tons

Unit 2 = 600,000 metric tons

Unit 3 – 40% ownership represents 40mw of capacity, Company A must include its share of unit 3's emissions; therefore,

Unit 3 = $.40 \times 600,000 = 240,000$ metric tons

Company A total: = 1,440,000 metric tons.

Scenario 2. Company A owns 100% of units 1 and 2, and 15% of unit 3.

Company A's ownership of Unit 3 is less than 20% and that ownership percentage (15 megawatts of capacity) is less than 25 megawatts of capacity. Therefore, Company A can choose to either:

- (i) elect to include in its inventory 15% of the emissions from unit 3; or,
- (ii) exclude the emissions from unit 3 in its inventory.

Appendix 6.2 Not Used

Appendix 6.3A Example: Baseline Treatment for a Facility That was Permanently Shut Down by the Member During the Baseline Period

The CCX Member operated Plant 1 for a portion of the Baseline Period and the plant was permanently shutdown by the Member on March 31, 1999. In such cases, the following quantity is to be added to the Baseline calculated for all other Included Emissions:

total emissions released by the facility during the Baseline Period (in metric tons CO₂)
 divided by four (4)

	1998 Emissions	1999 Emissions	2000 Emissions	2001 Emissions	Total Emissions During the Baseline Period	CCX Baseline (total Baseline Period emissions divided by four)
Plant 1	50,000	12,500 (through March 31)	0	0	62,500	15,625
Plant 2	50,000	90,000	85,000	92,000	317,000	79,250
Total	100,000	102,500	85,000	92,000	379,500	94,875

Plant 1 Baseline calculation:

$$(50,000 + 12,500) / 4 = 15,625$$

$$\text{Plant 2 Baseline calculation} = (50,000 + 90,000 + 85,000 + 92,000) / 4 = 79,250$$

$$\text{Total Baseline: } 15,625 + 79,250 = 94,875 \text{ (94,900 rounded to nearest hundred)}$$

Appendix 6.3B Example: Baseline Adjustments in the Case of Acquisition of a Facility That was Operated During the Baseline Period

Scenario: Company A’s Emission Baseline is 1,000,000 metric tons CO₂, comprised of emissions from three sources:

Facility 1 = 300,000 metric tons CO₂ (30% of total Baseline)

Facility 2 = 500,000 metric tons CO₂ (50% of total Baseline)

Facility 3 = 200,000 metric tons CO₂ (20% of total Baseline)

Total XA allocation to Company A:

Year	XA Allocation
2003	990,000
2004	980,000
2005	970,000
2006	960,000

Assumption: Company A acquires another facility (“Facility 4”) on June 21, 2003, and includes the emissions of Facility 4 in its Emission Inventory as of July 1, 2003. Facility 4 is assumed to have Baseline Emissions of 200,000 tons. Facility 4’s emissions are included in Company A’s emissions for a total of 184 days of 2003.

Company A’s Baseline is adjusted to reflect the addition of Facility 4 on a weighted average basis for 2003 and fully for years 2004 – 2006.

Facility 4 weighted average baseline for 2003 = 200,000 x (184/365) = 100,822

Year	Original Baseline	Adjusted Baseline
2003	1,000,000 mt CO ₂	1,100,822 mt CO ₂
2004	1,000,000 mt CO ₂	1,200,000 mt CO ₂
2005	1,000,000 mt CO ₂	1,200,000 mt CO ₂
2006	1,000,000 mt CO ₂	1,200,000 mt CO ₂

The Allocation of XAs to Company A for years 2003, 2004, 2005 and 2006 is increased in the following manner:

Additional allocation for 2003 = 200,000 x .99 x (184/365) = 99,814

Additional allocation for 2004 = 200,000 x .98 = 196,000

Additional allocation for 2005 = 200,000 x .97 = 194,000

Additional allocation for 2006 = 200,000 x .96 = 192,000

Year	Original Allocation	Additional Allocation	Post-acquisition Allocation
2003	990,000	99,814	1,089,814
2004	980,000	196,000	1,176,000
2006	970,000	194,000	1,164,000
2006	960,000	192,000	1,152,000

These adjustments are made by adding to the CCX Member's Account 99,814 Vintage 2003 XAs, 196,000 Vintage 2004 XAs, 194,000 Vintage 2005 XAs and 192,000 Vintage 2006 XAs.

Appendix 6.3C Example: Baseline Adjustments and Reduced Exchange Allowance Allocations in the Case of the Sale of a Facility That Was Operated During the Baseline Period

Scenario: Company A's Emission Baseline is 1,000,000 metric tons CO₂, comprised of emissions from three sources:

Facility 1 = 300,000 metric tons CO₂ (30% of total Baseline)

Facility 2 = 500,000 metric tons CO₂ (50% of total Baseline)

Facility 3 = 200,000 metric tons CO₂ (20% of total Baseline)

Total XA allocation to Company A:

Year	XA Allocation
2003	990,000
2004	980,000
2005	970,000
2006	960,000

Assumption: Facility 3 is sold at the end of 2004. The Baseline and Allocation of XAs to Company A for years 2005 and 2006 is reduced by 20% (reflecting Facility 3's share of total Baseline Emissions) to:

Year	Original Baseline	Post-sale Baseline
2005	1,000,000 mt CO ₂	800,000 mt CO ₂
2006	1,000,000 mt CO ₂	800,000 mt CO ₂

Year	Original Allocation	Post-sale Allocation
2005	970,000	776,000
2006	960,000	768,000

These adjustments are made by removing from the CCX Member's Account 194,000 Vintage 2005 XAs and 192,000 Vintage 2006 XAs.

Appendix 6.4 Not Used

Appendix 6.5A Examples of the Application of the Method to be Employed for Emissions Data Missing for a Portion of Any Single Year of the Baseline Period

Situation 1: emissions data are available for 245 days of 1998, but are missing for 120 days;

Facts: data are available for 220 days or more; total emissions from the facility for the 245 day period are 245,000 metric tons CO₂.

Applicable method: annualize the data using the following method:

Imputed 1998 emissions = $(365/245) \times 150,000 = 223,469$ metric tons CO₂.

Situation 2: emissions data are available for 91 days of 1999

Applicable method: data are available for less than 220 days; apply methods provided in Section 6.5.

Appendix 6.5B Examples of the Application of the Method to be Employed When Emissions Data are Missing for an Entire Year or Available for Less Than 220 Days in Years 1999 or 2000

Example

Situation: emissions data for a particular facility are not available for 2000 (or are available for less than 220 days).

Applicable method: year 2000 emissions for the facility are imputed by interpolating on the basis of emissions data from that facility for years 1999 and 2001.

Hypothetical example:

Year	Measured emissions	Emission quantification for missing data period
1998	100,000 metric tons CO ₂	
1999	103,000 metric tons CO ₂	
2000	<i>Data missing</i>	<i>Imputed year 2000 emissions = (103,000 + 105,000)/2 = 104,000 mtCO₂</i>
2001	105,000 metric tons CO ₂	
<p>CCX Emission Baseline = (100,000 + 103,000 + 104,000 + 105,000)/4 = 103,000mtCO₂</p>		

Chapter 7 Emissions Monitoring and Reporting

7.0 Purpose (2007)

This Chapter provides the methods to be used by Chicago Climate Exchange Members to quantify Greenhouse Gas emissions and the protocols for reporting emissions and electricity purchases (when applicable) to CCX.

(Associate Members should refer to Chapter 11 – Associate Members.)

7.1 General Provisions

7.1.1 Rule Interpretation and Modifications

Unless otherwise provided in this *Rulebook*, applicable CCX Committees shall be responsible for recommending interpretations and appropriate modifications of rules established in this Chapter to the Exchange. The CCX Environmental Compliance Committee is responsible to review all proposed interpretations and modifications and shall have final decision-making authority regarding this Chapter.

7.1.2 Use of Prescribed Methods (2006)

CCX Members shall employ the emission monitoring and reporting methods and procedures described in this Chapter.

Some of the prescribed emissions monitoring methods are based on the calculation tools contained in the “*Corporate GHG Accounting and Reporting: Corporate Inventory Module*” developed by the World Resources Institute in conjunction with the World Business Council for Sustainable Development. These tools are hereinafter referred to as the “WRI/WBCSD Protocols”.¹

7.1.3 Changes in Methods Employed (2006)

The CCX Environmental Compliance Committee may recommend modification of monitoring methods.

A CCX Member may request the Environmental Compliance Committee to adopt alternative emission monitoring, reporting methods and/or procedures.

¹ CCX has received permission for Exchange Members to use the WRI/WBCSD Protocols. However, CCX Members are responsible for their use of these tools. WRI maintains the intellectual property rights to the Protocols and CCX Members must comply with the applicable intellectual property laws in using these Protocols.

7.1.4 Baseline and Annual Emissions Reporting for New Members

A CCX Member must submit Baseline emissions reports and annual emissions reports for previous program years within ninety calendar days of the date that CCX approves the membership.

7.1.5 Monitoring for Exchange Offset Projects, Exchange Early Action Credit Projects and Commercial Forestry Biomass Carbon Sequestration (2007)

Monitoring methods to be employed in CCX-registered Offset Projects and Early Action Credit Projects are provided in Chapter 9 of this *Rulebook*. Monitoring methods for biomass carbon for Members that include commercial forests carbon are provided in Chapter 8.

7.2 Emissions Reporting

7.2.1 General Provisions (2006)

Each CCX Member shall submit to CCX, on an annual basis (unless specified otherwise), emissions and electricity purchases using standard reporting forms provided by CCX. Emissions shall be reported for each included Greenhouse Gas, and total emissions shall be reported in metric tons carbon dioxide (CO₂) equivalent. Reported emissions are to be rounded to the nearest whole number of tons. Rounding to the nearest hundred should only happen when calculating the final total for emissions. Conversion factors should be accurate to two decimal places. Final reported entity-wide electricity purchases are to be rounded to the nearest whole number of megawatt-hours. Rounding to the nearest hundred megawatt-hours should only happen when calculating the final total for electricity purchases. (2/4/2004, 6/22/2005)

As applicable, each CCX Member is to assemble data for the CCX reporting forms by preparing summaries of data from Continuous Emissions Monitors (CEMs) or through use of the WRI/WBCSD Protocols, unless otherwise notified by CCX.

CCX Members are to maintain records that can be promptly accessed by the Provider of Regulatory Services designated by CCX. Such records shall contain the data, calculations, emission coefficients, spreadsheets and other information that provide the basis for substantiating emissions and electricity purchases reported to CCX.

Underlying data and calculations prepared in accordance with CCX-prescribed emissions monitoring methods shall be subject to external audit by the Provider of Regulatory Services designated by CCX.

7.2.2 Reporting Direct Emissions and Opted-in Electricity Purchases (2007)

Each CCX Member is required to report in its Baseline and Emission Reports its Owned Emissions associated with combustion, processes and fugitive emissions unless such emissions are addressed in other provisions of the Rulebook (e.g. landfill and agricultural methane).

If a CCX Member not primarily engaged in electricity production elects to participate in the CCX Electricity Purchase Opt-in Program it shall report its Owned Electricity Purchases in its Baseline and Emission Reports.

7.2.3 Emissions Reporting Procedures (2006)

Each CCX Member shall submit its Emission Reports to the Exchange using forms provided by CCX. Emission Reports are to be submitted to CCX in a manner and time prescribed by the Exchange. Each CCX Member must report emissions by facility. Members may also report emissions by activity, but must do so when the activity occurs at non-fixed locations (e.g. emissions from vehicle fleets) as applicable.

For CCX Members primarily engaged in electric power production, CCX emission reports for U.S. facilities must be signed by the Member's designated representative as defined in Title IV of the 1990 Clean Air Act, as Amended (P.L. 101-549). For other CCX Members, each Emission Report must be signed by a corporate officer.

Each CCX Member in the commercial forest sector that utilizes the Model-based Accounting Approach as described in Chapter 8 of this *Rulebook* will annually report changes in Carbon Stocks on its included commercial forest lands. Verification of these reports, the associated estimation procedures and underlying data will be made by third party entities approved by CCX and will be subject to audit by the Provider of Regulatory Services designated by CCX. (Monitoring protocols for biomass carbon in commercial forests are provided in Chapter 8 of this *Rulebook*.)

7.3 Included Gases (2007)

Emissions of the following Greenhouse Gases owned by each CCX Member will be included in its Emission Baselines and Emission Reports, as applicable unless such emissions are addressed in other provisions of the Rulebook (e.g. landfill and agricultural methane):

- carbon dioxide (CO₂)
- methane (CH₄)
- nitrous oxide (N₂O)
- hydrofluorocarbons (HFCs)
- perfluorocarbons (PFCs)
- sulfur hexafluoride (SF₆)

All Greenhouse Gases will be converted to metric tons of carbon dioxide (CO₂) equivalent using

the one-hundred-year Global Warming Potential values listed in Table 7-1.

As provided in Section 6.6 of this *Rulebook*, each CCX Member has the option to include the non-CO₂ emissions (N₂O and CH₄ emissions) associated with fossil fuel and biomass combustion in its Emission Baseline and Emission Reports, provided such inclusion is applied consistently during the Emission Baseline Period and the Phase I Program and, or, the Phase II Program.

7.4 Emissions Monitoring Principles (2007)

Each CCX Member shall quantify and report Greenhouse Gas emissions in units of metric tons of carbon dioxide (CO₂) equivalent, rounded to the nearest one hundred metric tons.

Table 7.1 Factors to be Used in CCX to Convert Greenhouse Gases to Carbon Dioxide Equivalence (One-hundred Year Global Warming Potential of Greenhouse Gases Relative to Carbon Dioxide (CO₂))

Gas	Global Warming Potential IPCC 1995	Global Warming Potential IPCC 2001
Carbon dioxide (CO ₂)	1	1
Methane (CH ₄)	21	23
Nitrous Oxide (N ₂ O)	310	296
HFC-23	11,700	12,000
HFC-32	650	550
HFC-41	150	97
HFC-43-10mee	1,300	1,500
HFC-125	2,800	3,400
HFC-134	1,000	1,100
HFC-134a	1,300	1,300
HFC-152a	140	120
HFC-143	300	330
HFC-143a	3,800	4,300
HFC-227ea	2,900	3,500
HFC-236fa	6,300	9,400
HFC-236ea	100	1,200
HFC-245fa	790	950
HFC-245ca	560	640
CF ₄	6,500	5,700
C ₂ F ₆	9,200	11,900
C ₃ F ₈	7,000	8,600
C ₄ F ₁₀	7,000	8,600
c-C ₄ F ₈	8,700	10,000
C ₅ F ₁₂	7,500	8,900
C ₆ F ₁₄	7,400	9,000
NF ₃	8,000	10,800
SF ₆ (Sulfur hexafluoride)	23,900	22,200
C ₄ F ₉ OCH ₃	500	390
C ₄ F ₉ OC ₂ H ₅	100	55

Sources: Intergovernmental Panel on Climate Change (IPCC), Second and Third Assessment Reports; Emissions of Greenhouse Gases in the United States, U.S. Energy Information Administration

CCX Members and Associate Members may elect to use either the IPCC's 1995 Global Warming Potentials or 2001 Global Warming Potentials provided that only the 1995 Global Warming Potentials or only the 2001 Global Warming Potentials are used for all relevant emissions and are applied consistently for the baseline and the Phase I Program and the Phase II Program.. (6/22/2005)

The methods prescribed herein rely on direct monitoring and conversion of directly observed activity data that are converted to emissions using emission coefficients in the WRI/WBCSD Protocols. When more than one method consistent with these provisions is available, the CCX Member's Emission Reports shall indicate which method is used. The selected methods shall be used consistently throughout the Baseline Period and for each Emission Report to CCX.

If a CCX Member chooses to use as an input to its emission calculations a measure of the energy content of consumed fuels (e.g. gigajoules, million Btu), it must calculate its emissions by applying the emission coefficient associated with the higher heating value of such fuels. The Member must remain consistent in applying this value to the calculation of its emissions during the baseline period and in the preparation of its Emission Reports to CCX.

7.5 Emissions Monitoring Methods (Except Entities Primarily Engaged in the Electric Power Production and Oil and Gas Sectors)

If a CCX Member's emitting facilities are equipped with Continuous Emission Monitors, those monitors shall be used to quantify emissions from those facilities provided that such monitors are inspected and calibrated in accordance with best practices, unless provided otherwise by CCX rules. When applicable, the emissions quantified through use of CEMs shall be adjusted to reflect the CO₂ emissions resulting from combustion of Renewable Fuels, as defined in Section 6.3.2.

If a CCX Member's emitting facilities are not equipped with CEMs, CCX Members will quantify the emissions listed in this Section 7.5 using the WRI/WBCSD Protocols.

7.5.1 CO₂ Emissions from Stationary Combustion (2006)

Except for combustion of fuels in electric power and steam generation devices operated by CCX Members primarily engaged in electric power production (see Section 7.8 below), CCX Members that own emissions from facilities not equipped with CEMs will use the WRI/WBCSD Protocols to calculate CO₂ emissions from stationary combustion.

The relevant sections of the protocols can be found at:

- Guidance section:

- <http://www.ghgprotocol.org/includes/getTarget.asp?type=d&id=MTY1MDI>
Automated worksheets:
<http://www.ghgprotocol.org/includes/getTarget.asp?type=d&id=MjAyMzM>

CCX Members should use GHG Protocol Worksheet 1 (Direct Emissions) only, subject to the conditions and amendments listed in the subsections below.

7.5.1.1 Weight, Volume and Heat Content Bases (2007)

Each CCX Member may use any of the fuel weight, fuel volume or heat content measures and associated emission coefficients provided in the WRI/WBCSD Protocols to determine the quantity of its total CO₂ emissions, provided that underlying support data and calculations are of audit quality.

7.5.1.2 Emissions from Combustion of Municipal Solid Waste (2006)

Solid waste incinerators and waste-to-energy facilities that have CEMs for CO₂ in place shall quantify gross emissions using the CEMs. The net CO₂ emissions from such facilities that are to be included under CCX rules shall be determined by subtracting from gross emissions the emissions associated with combustion of Renewable Fuels as defined in Section 6.3.2.

Solid waste incinerators and waste-to-energy facilities that do not have in place CO₂ CEMs will determine net CO₂ emissions by multiplying an emissions coefficient by the quantity of combusted solid waste. In such cases CCX Members may apply site-specific emissions coefficients that are based on documented evidence of the composition of the combusted waste (i.e. reflecting the proportion of the waste stream that is Renewable Fuels) or by applying standard emission coefficients prescribed by the CCX Environmental Compliance Committee.

7.5.2 CO₂ Emissions from Mobile Combustion (2006)

CO₂ emissions from vehicles operated by each CCX Member are Included Emissions sources if they represent Large Emission Sources (as defined in Section 1 of this *Rulebook*) and they represent an integral part of the Member's operations, or the Member elects to Opt-in such emissions. Vehicle emissions will be quantified using the WRI/WBCSD Protocols for calculating CO₂ emissions from mobile combustion.

The relevant sections of the protocols can be found at:

- Guidance section:
<http://www.ghgprotocol.org/includes/getTarget.asp?type=d&id=MTM2ODg>
- Automated worksheets:
<http://www.ghgprotocol.org/includes/getTarget.asp?type=d&id=MTM2ODc>

Unless otherwise provided by CCX, application of the WRI/WBCSD Protocols must base calculations of CO₂ emissions on fuel consumption data. Should this not be practicable for any CCX Member, the Member shall prepare, subject to CCX approval, a proposed alternative method that is consistent with the principles presented in Section 7.4 above.

The prescribed CCX methods for mobile source emissions are contained in WRI/WBCSD Protocols sections IVA. Step 1 and Step 2. Application of such steps shall not employ distance traveled procedures unless use of such method by an individual CCX Member is specifically sanctioned by the Exchange as an alternative calculation methodology.

CCX Members are to use fuel receipts, fuel expenditure records and direct measurement methods to quantify fuel consumption. Records of these quantification methods are to be maintained by the Member for audit by the Provider of Regulatory Services designated by CCX.

7.5.3 N₂O Emissions from the Production of Adipic Acid and Nitric Acid (and Conversion of N₂O to CO₂ Equivalence) (2006)

CCX Members engaged in the production of adipic acid and/or nitric acid must either quantify N₂O emissions:

- (i) through use of continuous emission monitors (CEMs) provided such monitors are inspected and calibrated in accordance with best practices; or,
- (ii) through application of the WRI/WBCSD Protocols for calculating N₂O emissions from the production of adipic acid.

The relevant sections of the protocols for adipic acid can be found at:

- Guidance section:
<http://www.ghgprotocol.org/includes/getTarget.asp?type=d&id=MTM2ODg>
- Automated worksheets:
<http://www.ghgprotocol.org/includes/getTarget.asp?type=d&id=MTM2ODc>

The relevant sections of the WRI/WBCSD protocols for calculating N₂O emissions from the production of nitric acid can be found at:

- Guidance section:
<http://www.ghgprotocol.org/includes/getTarget.asp?type=d&id=MTM3MTE>
- Automated worksheets:
<http://www.ghgprotocol.org/includes/getTarget.asp?type=d&id=MTM3MTI>

If the CCX Member employs site-specific emission factors instead of the WRI/WBCSD Protocol default emission factors, the Member must maintain documentation describing laboratory tests or other methods used to determine such site-specific emission factors for CCX audit purposes.

CCX Members shall also maintain documentation describing the underlying parameters employed in the WRI/WBCSD Protocol calculations, including production data and continuous emission monitor and abatement equipment effectiveness and usage data for CCX audit purposes.

7.5.4 PFC Emissions from the Production of Semi-conductor Wafers (and Conversion of PFCs to CO₂ Equivalence) (2006)

Each CCX Member engaged in the production of semiconductor wafers must quantify PFC emissions, which are converted to metric tons of CO₂ equivalent, through use of one of the following three methods:

- (i) through use of continuous emission monitors, provided such monitors are inspected and calibrated in accordance with best practices;
- (ii) through application of the WRI/WBCSD Protocols for Calculating PFC emissions from the production of semi-conductor wafers².

The relevant sections of the protocols can be found at:

- Automated worksheet:
<http://www.ghgprotocol.org/includes/getTarget.asp?type=d&id=MTM3MjA;>

or,

- (iii) through application of the methods provided by the Intergovernmental Panel on Climate Change, “PFC, HFC, SF₆ Emissions From Semiconductor Manufacturing (which is Section 3.6 of *IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*, which can be found at www.ipcc-nggip.iges.or.jp/public/gp/gpgaum.htm).

Each CCX Member engaged in the manufacture of semi-conductor wafers shall maintain all documentation describing the underlying parameters employed in its emission calculations, including production data and abatement equipment effectiveness and usage data for CCX audit purposes.

7.5.5 CO₂ Emissions from the Production of Cement (2006)

Each CCX Member engaged in the production of cement shall calculate CO₂ emissions using the WRI/WBCSD Protocols for the cement industry.

The relevant sections of the protocols can be found at:

² These calculation guidelines have been prepared by World Semiconductor Council (WSC), which retains all intellectual property rights.

- Guidance section:
<http://www.ghgprotocol.org/includes/getTarget.asp?type=d&id=MTM2OTc>
- Automated worksheet:
<http://www.ghgprotocol.org/includes/getTarget.asp?type=d&id=MTM2OTY>

CCX Members shall not apply the WRI/WBCSD Protocols provision under Section 3.4 of the Cement CO₂ Protocol Guidance document that relates to “Indirect GHG savings through utilization of AFR”. As per item 7.2.2 above, each CCX Member in the cement industry shall not include indirect CO₂ emissions in its Emission Baseline or Periodic Emission Reports (as discussed in Sections 4 and 5 in the WRI/WBCSD Cement CO₂ Protocol Guidance document). For CCX purposes, ownership of emissions at Jointly Owned Facilities shall be determined on the basis of provisions in Chapter 6 of this *Rulebook*.

Each CCX Member engaged in manufacture of cement shall maintain all documentation describing the underlying data and parameters employed in its emission calculations for CCX audit purposes.

7.5.6 CO₂ Emissions from the Production of Iron and Steel

CCX Members engaged in the production of iron and steel shall calculate CO₂ emissions using the WRI/WBCSD Protocols for calculating CO₂ emissions from the production of iron and steel.

The relevant sections of the protocols can be found at:

- Guidance section:
<http://www.ghgprotocol.org/includes/getTarget.asp?type=d&id=MTM3MDY>
- Automated worksheets:
<http://www.ghgprotocol.org/includes/getTarget.asp?type=d&id=MTM3MDU>

CCX Members shall apply Method A of the WRI/WBCSD Protocols, which requires the Member to use data on the quantity of reduction agent used in production.

CCX Members engaged in production of iron and steel shall maintain all documentation describing the underlying parameters employed in the WRI/WBCSD Protocol calculations, including materials usage data and data used in establishing custom emission factors for CCX audit purposes.

7.5.7 CO₂ Emissions from the Production of Lime (2006)

CCX Members engaged in the production of lime shall employ the WRI/WBCSD Protocols for Calculating CO₂ emissions from the Production of Lime.

The relevant sections of the protocols can be found at:

- Guidance section:
<http://www.ghgprotocol.org/includes/getTarget.asp?type=d&id=MTM3MDg>
- Automated worksheets:
<http://www.ghgprotocol.org/includes/getTarget.asp?type=d&id=MTM3MDk>

CCX Members engaged in the production of lime shall maintain all documentation describing the underlying parameters employed in the WRI/WBCSD Protocol calculations, including production data, stoichiometric ratio data and lime content data for CCX audit purposes.

7.5.8 CO₂ Emissions from the Production of Ammonia (2006)

CCX Members engaged in the production of ammonia may quantify CO₂ emissions through use of continuous emission monitors (provided such monitors are inspected and calibrated in accordance with best practices) or through application of the WRI/WBCSD Protocols for Calculating CO₂ emissions from ammonia production.

The relevant sections of the protocols can be found at:

- Guidance section:
<http://www.ghgprotocol.org/includes/getTarget.asp?type=d&id=MTM2OTQ>
- Automated worksheets:
<http://www.ghgprotocol.org/includes/getTarget.asp?type=d&id=MTM2OTM>

CCX Members engaged in manufacture of ammonia shall maintain all documentation describing the underlying parameters employed in the WRI/WBCSD Protocol calculations, including fuel purchase records, production data and any data used to form a plant-specific emission factor for CCX audit purposes.

7.5.9 HFC-23 Emissions from the Production of HCFC-22 (and Conversion to CO₂ Equivalence) (2006)

CCX Members engaged in the production of HCFC-22 must either quantify HFC-23 emissions through use of continuous emission monitors (CEMs), provided such monitors are inspected and calibrated in accordance with best practices, or through application of the WRI/WBCSD Protocols for calculating HFC-23 emissions associated with production of HCFC-22.

The relevant sections of the protocols can be found at:

- Guidance section:
<http://www.ghgprotocol.org/includes/getTarget.asp?type=d&id=MTM3MDM>
- Automated worksheets:
<http://www.ghgprotocol.org/includes/getTarget.asp?type=d&id=MTM3MDI>

CCX Members shall to use Approach 1 or Approach 2 of the WRI/WBCSD Protocols, if practicable. Should this not be practicable, the CCX Member will consult with the CCX Environmental Compliance Committee to develop appropriate alternatives as described in Section 7.1.3.

CCX Members engaged in HFC-22 production shall maintain all documentation describing the underlying parameters employed in the WRI/WBCSD Protocol calculations, including data from instantaneous measurements of emission flows and concentrations and data supporting the calculation of aggregate emissions based on periodic gas samples for CCX audit purposes.

7.5.10 CO₂ Emissions from Silicon Smelting (2007)

CCX Members shall quantify GHG emissions from silicon smelting by calculating the difference in weight between carbon inputs to the process from non-renewable sources and the carbon waste left at the end of the process. It is assumed that the difference between these two figures represents the weight of carbon from non-renewable sources oxidized (i.e., converted to carbon dioxide) in the process. This can be converted into the weight of carbon dioxide emitted by multiplying the weight of carbon oxidized by 44/12, the conversion factor to convert carbon into carbon dioxide.

The calculation is as follows:

$$\text{CO}_2 \text{ process emissions from silicon smelting} = (\text{carbon inputs from non-renewable sources}) - (\text{carbon waste produced}) * 44/12.$$

The non-renewable inputs of carbon into the silicon smelting process are coal, coke and carbon anodes. The renewable inputs of carbon include charcoal from wood and wood chips which are not counted as GHG emissions. The carbon waste remaining at the end of the process includes those parts of the anodes not consumed as well as other waste. To obtain the weight of carbon in the inputs and waste, their weight must be multiplied by their carbon content. These figures are all auditable. Therefore:

$$\text{CO}_2 \text{ emissions from silicon smelting} = ((\text{weight of carbon inputs from non-renewable sources} * \text{carbon content}) - (\text{weight of carbon waste} * \text{carbon content})) * 44/12.$$

CCX Members engaged in silicon smelting shall maintain all support documentation describing the underlying parameters employed in the WRI/WBCSD Protocol calculations for CCX audit purposes.

7.6 Greenhouse Gas Emissions from Primary Aluminum Metal Production (2006)

CCX Members engaged in production of primary aluminum shall quantify emissions of CO₂, PFCs and SF₆ through application of the WRI/WBCSD Protocols for calculating direct greenhouse gas emissions from primary aluminum metal production.

The relevant sections of the protocols can be found at:

- Guidance section:
<http://www.ghgprotocol.org/includes/getTarget.asp?type=d&id=MjEyMTM>
- Automated worksheets:
<http://www.ghgprotocol.org/includes/getTarget.asp?type=d&id=MjEyMTQ>

CCX Members engaged in primary aluminum production shall maintain all support documentation describing the underlying parameters employed in the WRI/WBCSD Protocol calculations, including information on potline types, production quantities, values used for pitch and coke usage in anode formulation for CCX audit purposes.

7.7 Emissions Monitoring for the Forest Products Sector

7.7.1 Direct Emissions Monitoring (2006)

CCX Members in the forest products sector shall calculate GHG emissions using the WRI/WBCSD Protocols for the pulp and paper sector.

The relevant sections of the protocols can be found at:

- Guidance section:
<http://www.ghgprotocol.org/includes/getTarget.asp?type=d&id=MTYwNjQ>
- Automated worksheets:
<http://www.ghgprotocol.org/includes/getTarget.asp?type=d&id=MTYxOTQ>

The emissions to be included in CCX Emission Baselines and Periodic Emission Reports are:

- (1) CO₂ emissions from stationary fossil fuel combustion, kraft mill lime kilns and calciners (pursuant to the Opt-in provisions in Section 6.7 of this *Rulebook*, CCX Members may elect to include CH₄ and N₂O emissions from combustion of fossil fuels and biomass fuels);
- (2) CO₂ emissions from make-up CaCO₃ or Na₂CO₃ used in the pulp mill (provided such make-up chemicals are of fossil origin; its make-up chemicals are of biomass origin the CO₂ released when they are used is treated as zero emission);
- (3) CO₂ emissions from on-site vehicles and machinery and emissions from other core operations (as applicable under the included emissions provisions provided in Section 6.3.1 of this *Rulebook*); and,
- (4) imports of CO₂.

CCX Members in the forest products sector shall maintain all documentation describing the underlying parameters employed in the WRI/WBCSD Protocol calculations for CCX audit purposes.

7.8 Emissions Monitoring in the Electric Power and Steam Generation Sector

7.8.1 CO₂ Emissions from Electric Power and Steam Generation Equipment

Electric power generating units shall quantify CO₂ emissions using data from continuous emission monitors (CEMs) as reported to the U.S. Environmental Protection Agency or other regulatory agencies as applicable. If CEMs data are not available, Members will quantify CO₂ emissions by using the fuel consumption methods contained in the U.S. Code of Federal Regulations 40 CFR Part 75 or equivalent methods. Application of these methods shall include documentation of the nature and frequency of relevant laboratory tests of fuel carbon content.

For combustion of natural gas or liquid fuels CCX Members may use either the WRI/WBCSD Protocols for stationary combustion or CEMs, as described in Section 7.5.1.

7.8.2 Sulfur Hexafluoride (SF₆) Emissions from Electrical Transmission Equipment (2006)

SF₆ emissions from electric power transmission equipment will be quantified using calculation methods and forms as prescribed by the Exchange from time to time.

The relevant calculation and form can be found at: http://www.epa.gov/electricpower-sf6/partnerssf6reporting_iform.xls.

7.9 Electricity Purchases

Each CCX Member not primarily engaged in electricity generation that elects to participate in the Electricity Purchase Opt-in Program shall establish its Electricity Purchase Baseline and formulate its reported Electricity Purchases reports using electricity purchase receipts, invoices and other auditable records, as applicable.

7.10 Emissions Monitoring for the Oil and Gas Sector

7.10.1 Exploration, Production and Refining

CCX Members with emissions resulting from exploration, production, refinement and transportation of oil and gas must quantify emissions from these activities using methods that are publicly accessible, such as e.g. methods published by the American Petroleum Institute.

CCX Members in the oil and gas sector must annually submit to CCX an emissions audit report prepared by a third party entity approved by CCX. Such reports will be subject to review by CCX. The CCX Environmental Compliance Committee shall consider proposals for enhancing the quality and practicality of the Periodic Emission Reports and the audit process.

7.10.2 Transport (Except Gas Pipelines) and Stationary Combustion of Conventional

Fuels

Methods described in Section 7.5.1 (CO₂ emissions from stationary combustion) and Section 7.5.2 (CO₂ emissions from mobile combustion) are to be employed to quantify Greenhouse Gas emissions, as applicable, from included facilities and vehicles used in the oil and gas sector.

7.10.3 Emissions Monitoring for Natural Gas Pipelines

The CCX Environmental Compliance Committee shall oversee the development of methods for quantifying greenhouse gas emissions from natural gas pipeline systems. The methods will address emissions from fuel combustion (e.g. at compressor stations) as well as fugitive emissions from routine operations and maintenance and audit activities.

Chapter 8 Commercial Forestry Sector

8.0 Purpose (2006)

This chapter:

- provides definitions and rules governing the quantification and reporting of changes in Carbon Stocks for the commercial forestry sector and the associated rules governing issuance and Surrender of Carbon Financial Instruments; and,
- establishes the conditions that a CCX Member in the commercial forestry sector must meet in order to be issued Exchange Allowances on the basis of increases in Forest Carbon Stocks as quantified using the Model-based Accounting Approach; and,
- establishes the conditions under which a CCX Member in the commercial forestry sector must meet in order to be issued Exchange Allowances for the sequestration of Carbon stored in Long Lived Wood Products

CCX Members in the commercial forestry sector may also earn Exchange Offsets on the basis of increased Carbon Stocks in CCX-registered Exchange Forestry Offset Projects on land that is not part of its commercial forest inventory. The rules and eligibility criteria governing Exchange Forest Offset projects are separate from those presented in this chapter and are presented in Chapter 9 of this *Rulebook*.

8.1 General Provisions (2006)

CCX Members in the commercial forestry sector must satisfy the requirements necessary for either the Carbon-stable Accounting Approach or the Model-based Accounting Approach.

CCX Members in the commercial forestry sector that elect to use the Carbon-stable Accounting Approach will not be issued Carbon Financial Instruments on the basis of changes in Carbon Stocks in its commercial forestry inventory. CCX Members in the commercial forestry sector that elect to use the Model-based Accounting Approach will be issued Carbon Financial Instruments on the basis of changes in Carbon Stocks in its commercial forestry inventory.

At the outset of each Market Period, each Member shall elect to report the Carbon Stocks on its commercial forest land using either the Model-based Accounting Approach or the Carbon-stable Accounting Approach. The approach selected shall remain the basis for the Member's reports on changes in Carbon Stocks for the duration of the Market Period.

Each Member shall issue a non-binding statement of intent at the outset of the Phase I and Phase II Market Periods to respect the principle of permanence, excluding catastrophic events and land

sales, to maintain beyond the length of the commitment period the quantity of Carbon Stocks it maintained during the Phase I and Phase II Market Periods.

The quantity of Exchange Allowances issued on the basis of increases in Carbon Stocks that can be sold on the CCX trading platform is limited by provisions in Section 8.14 of this chapter.

CCX Members must obtain certification of sustainable forest management from agencies or schemes that have been endorsed by the PEFC, the Forest Stewardship Council, or other certification schemes approved by the CCX Committee on Forestry¹ for their forest land managed for commercial purposes by the time of enrollment in CCX. The certification must be maintained throughout the CCX commitment period.

All reports of net changes in Carbon Stocks are subject to third-party verification by an independent CCX approved entity at the Member's expense. All reports are also subject to audit at CCX's expense by the Provider of Regulatory Services designated by CCX.

Each Member shall maintain, at least for the length of the Market Period, readily accessible records containing the data, calculations, conversion factors, spreadsheets and other information that substantiate reports to CCX of net changes in Carbon Stocks. Underlying data and calculations prepared in accordance with CCX-prescribed rules and procedures shall be subject to verification and external audit, at CCX's expense, by the Provider of Regulatory Services designated by CCX. Data shall be recorded at the Stand level and reported at the Stratum level.

8.2 Rule Interpretation and Modifications (2006)

Unless otherwise provided in this *Rulebook*, applicable CCX Committees shall be responsible for recommending interpretations and appropriate modifications of rules established in this Chapter to the Exchange. The CCX Forestry Committee is responsible for reviewing all proposed interpretations and modifications and shall have final decision-making authority regarding this Chapter, except for matters that may directly benefit the majority of Committee Members. Such matters may also be reviewed by another CCX Committee for final disposition.

All figures, formulae, coefficients, and statistical and quantification methods and procedures contained in this chapter and the attached Appendix 8.1 are subject to revision by the CCX Forestry Committee.

All references in this chapter to the rights and obligations of Members shall refer only to those CCX Members from the commercial forestry sector.

¹ The PEFC Council (Programme for the Endorsement of Forest Certification schemes) is an independent, non-profit, non-governmental organization, founded in 1999 which promotes sustainably managed forests through independent third party certification. The PEFC provides an assurance mechanism to purchasers of wood and paper products that they are promoting the sustainable management of forests. A complete list of CCX approved certification schemes is included as an annex.

8.3 Carbon-stable Accounting Approach (2006)

A Member with commercial forests in the United States may quantify and report changes in Carbon Stocks associated with individual CCX-registered Exchange Forestry Offset Projects on the condition that there is no net decrease in overall Carbon Stocks in the Member's commercial forest inventory.

In addition to the general provisions, each Member electing to use the Carbon-stable Accounting Approach shall provide a warranty signed by a corporate officer that, excluding land sales and catastrophic events, there will be no net decrease in overall Carbon Stocks held in the Member's commercial forestry inventory during the Market Period.

Each Member electing to use the Carbon-stable Accounting Approach shall be required annually to submit evidence that it has maintained certification of sustainable forest management and shall provide annual confirmation, signed by a corporate officer, that there will be no net decrease in overall Carbon Stocks held in the Member's commercial forestry inventory during the Market Period.

The statement that there is no decrease in overall Carbon Stocks held in a Member's commercial forestry inventory during the Market Period is subject to audit by CCX.

If a Member elects to report using the Carbon-stable Accounting Approach, it shall not be issued Carbon Financial Instruments on the basis of changes in Carbon Stocks associated with its commercial forest inventory for the duration of the Member's commitment period(s). However, such Members may be eligible for issuance of Exchange Offsets for approved forest offset projects on land that is not part of their commercial forestry inventory for the duration of the Member's commitment period(s). Rules governing issuance of Carbon Financial Instruments for members reporting changes in Carbon Stocks associated with Exchange Forestry Offset Projects are specified in Chapter 9 of this *Rulebook*.

Exchange Forestry Offset Projects owned by Members in the commercial forestry sector shall be considered as Owned and Operated facilities. The sale and use for Compliance of Exchange Offsets issued on the basis of Owned and Operated facilities are subject to limits specified in Section 4.11.6 of this *Rulebook*.

8.4 Model-based Accounting Approach (2006)

A Member may use the Model-based Accounting Approach to quantify and report net changes in Carbon Stocks in its commercial timber inventory. The net change in Carbon Stocks is defined by the equation:

Net change in Carbon Stocks = (increases in Carbon Stocks due to growth) minus (the quantity by which Carbon Stocks decreased due to harvest, pest, fire and adverse weather events).

Member's must quantify net changes in Carbon Stocks in their commercial inventory using the Model-based Accounting Approach. The growth-and-yield model² and timber inventory techniques used to obtain model parameters, must be approved by the CCX Forestry Committee. Members using models that have previously been approved by the CCX Forestry Committee must still obtain project approval from the CCX Forestry Committee for other aspects of their project. Timber inventory techniques shall include a plan for direct measurement of tree growth and a method for calculating the variance of estimates of increases in Carbon Stocks due to tree growth in a transparent and statistically valid manner.

Members electing to use the Model-based Accounting Approach must report changes in their commercial forest inventory on an annual basis. Exchange Allowances will be issued to a Member if for the calendar year the Member reports net increases in Carbon Stocks from the previous calendar year. If a Member reports for the calendar year a net decrease in Carbon Stocks from the previous calendar year the Member must Surrender Carbon Financial Instruments in an amount reflecting net decreases in Carbon Stocks from the previous year.

Rules governing issuance and Surrender of Carbon Financial Instruments for companies using the Model-based Accounting Approach are specified in Section 8.12 of this chapter.

Member's may elect to use a growth-and-yield model that is either proprietary or publically available. Each Member may quantify changes in Carbon Stocks in its total commercial forestry inventory using its own proprietary growth and yield models subject to the following conditions:

- (1) that such models can be audited; and,
- (2) that any information that might affect the net supply of Carbon Financial Instruments associated with changes in the Member's Carbon Stocks– including annual projections of net changes in Carbon Stocks, details of acquisitions or dispositions of land, records of catastrophic damage, and other records and information determined by the CCX Forestry Committee to be of specific relevance for determining the net supply of Carbon Financial Instruments– shall be made public to ensure market transparency and to avoid Price Congestion.

Each Member may quantify changes in Carbon Stocks in its commercial forestry inventory using CCX-approved publicly available growth and yield models shall submit reports for all land for which appropriate quantification methods and procedures have been approved by the CCX Forestry Committee.

² Growth-and-yield models approved by the CCX Forestry Committee include SiMS / GaPPS / PMRC for southern yellow pine, TWIGS for hardwoods (all U.S. regional variants approved), FVS for hardwoods (all regional variants approved), and the CO2 FIX model for tropical tree species.

8.5 General Standards for Quantifying and Reporting Changes

All methods and procedures approved by CCX for quantifying and reporting changes in Carbon Stocks shall conform to the following standards:

- (1) relevant mathematical and statistical formulae and models shall be publicly accessible (excluding exemptions granted under provisions of Section 8.10 of this chapter);
- (2) protocols for measuring and monitoring inventories and calculating variances of the estimates shall be publicly accessible (excluding exemptions granted under provisions of Section 8.10 of this chapter);
- (3) all aspects of the quantification of changes in the Member's Carbon Stocks shall be subject to verification by independent CCX-approved entities at the Member's expense; and,
- (4) the verified data and quantification methods are subject to audit by CCX.

8.6 Carbon Stocks Quantified and Reported (2006)

Net changes in carbon stocks shall be quantified only on the basis of increases in above-ground and below-ground living biomass occurring on lands included in the CCX project. The above-ground carbon pool may include stem wood, stem bark, and branches. The below-ground carbon pool may include roots.

Each Member shall retain full legal rights to the increases in its Carbon Stocks that are not currently quantified and reported for CCX purposes.

8.7 Pest, Fire and Weather

CCX Members in the commercial forestry sector will establish a baseline commercial forest inventory at the beginning of their commitment period. This baseline will be January 1, 2003 for Members that enroll in Phase I and January 1, 2007 for Members that enroll in Phase II only.

In cases of adverse weather events or outbreaks of fire and pest damage that do not reduce the quantity of Carbon Stocks on a parcel of forested land to levels below those documented for the baseline, the Member shall document the quantity of timber destroyed by the fire, pest or adverse weather event and Surrender an equivalent amount of Carbon Financial Instruments. The Member shall continue to quantify and report subsequent increases and decreases in Carbon Stocks on that land and shall be issued or must Surrender Carbon Financial Instruments accordingly.

In cases of catastrophic weather events or outbreaks of fire and pest damage that reduce the quantity of Carbon Stocks on a parcel of forested land to levels below those documented for baseline, the Member shall document the quantity of timber destroyed by the fire, pest or adverse

weather event. The Member shall Surrender Carbon Financial Instruments in an amount equivalent to the quantity of Exchange Allowances issued to that Member in previous years on the basis of the increase in Carbon Stocks on the affected land. Those Stands shall be excluded from future projections of annual changes in Carbon Stocks until the quantity of Carbon Stocks in those Stands reaches the reported quantities for baseline.

All reports of significant damage caused by pest, fire and adverse weather events shall be subject to review by the CCX Forestry Committee.

8.8 Reporting Schedule and Methods (2006)

Reports must be submitted in accordance with the CCX True-up scheduling process that is set out in Section 7.2.3 of this *Rulebook*. All changes in Carbon Stocks and Carbon sequestered in Long Lived Wood Products must be quantified and reported in metric tons of carbon dioxide equivalent.

Each Member shall specify in its reports which methods or procedures for quantifying changes in Carbon Stocks and Carbon sequestered in Long Lived Wood Products it has employed and shall identify and explain any modifications made to the CCX-approved methods or procedures. Such changes must be approved by the CCX Forestry Committee. When more than one method consistent with these provisions is available, the Member's annual reports shall indicate which method was used.

Each Member using more than one method to calculate changes in Carbon Stocks (e.g. a Member that uses a proprietary growth and yield model for its hardwood forests and the PMRC-based model for its southern pine forests) shall submit one report for each method used.

8.8.1 Reports Using Carbon-stable Accounting Approach (2006)

Each Member shall annually submit certification of sustainable forestry management as prescribed in Section 8.1.

8.8.2 Reports Using Model-based Accounting Approach (2006)

Each Member shall annually submit certification of sustainable forestry management as prescribed in Section 8.1.

For Members using publicly available growth and yield models, a modified version of the approved southern pine models shall be used to calculate Forest Carbon Sequestration for southern pine. A detailed protocol for the quantification of net changes in southern pine Carbon Stocks is provided in Appendix 8.1. The CCX Forestry Committee may develop protocols based on publicly available growth and yield models for other species, such as such as mixed hardwoods, red pine and fir/spruce, at its discretion. Reporting requirements for Member's using

the Model-based Accounting Approach are summarized in Figure 8.1 and described further in the Appendix.

Each Member employing proprietary timber inventory techniques to quantify net changes in Carbon Stocks shall develop forms for reporting in accordance with its own techniques. The CCX Forestry Committee shall approve the format and required content of such reports.

For the Phase I Program, companies using the Model-based Accounting Approach will use models to project Carbon Stocks on January 1, 2003 and December 31, 2006 and the changes in Carbon Stocks on an annual basis for 2003-2006. For the Phase II Program, companies using the Model-based Accounting Approach will use models to project Carbon Stocks on January 1, 2007 and December 31, 2010 and the changes in Carbon Stocks on an annual basis for 2007-2010. (1/30/2004)

Figure 8.1 Summary of Required Reports for Members Using Model-based Accounting Approach

<p><u>Initial Report:</u></p> <ul style="list-style-type: none">• Total Carbon Stocks on January 1, 2003 for Phase I Members.• Total Carbon Stocks on January 1, 2007 for Phase II Members. <p><u>Annual Report:</u></p> <ul style="list-style-type: none">• Projected or measured increase in Carbon Stocks for Compliance Year, adjusted for silvicultural practices and acquisitions and dispositions.• Reduction in Carbon Stocks in Compliance Year due to harvest, fire, pest and weather.• Net change in Carbon Stocks = (projected or measured increase in Carbon Stocks) – (quantity by which Carbon Stocks decreased due to harvest, fire, pest and weather).
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Each Member using the Model-based Accounting Approach to quantify net changes in Carbon Stocks must submit the reports specified below.

For the Phase II Program, companies using the Model-based Accounting Approach will use models to project Carbon Stocks on January 1, 2007 and December 31, 2010 and the changes in Carbon Stocks on an annual basis for 2007-2010.

8.9 Accounting for Variance in Sampling and Calculations of Growth (2006)

In order to ensure high levels of statistical confidence in the reported figures for net increases in Carbon Stocks due to tree growth, Growth and yield Model estimates of net annual changes in carbon from forestry project will be discounted to account for variance in model estimates by the

minimum of 20% or two times the reported statistical error³ of the baseline inventory data associated with a 90% confidence interval. No discount will be applied for instances when in-field inventories are conducted on an annual basis.

Any method for determining variance in sampling and calculations of growth, including the minimum confidence level required for use of such method, shall be approved by the CCX Forestry Committee.

8.10 Proprietary Information (2006)

With the exception of certain elements to be determined by the Executive Committee at the recommendation of the CCX Forestry Committee, all aspects of the methods, procedures and data used to quantify changes in Carbon Stocks shall be publicly available. The CCX Forestry Committee will determine whether certain information will remain proprietary. Proprietary information will be made available on a confidential basis to third-party Verifiers and the Provider of Regulatory Services designated by CCX for audit purposes.

As part of the procedure for determining whether particular information is proprietary in nature, Members shall not be required to reveal that information directly to other Members from the commercial forestry sector. Such information shall be disclosed on a confidential basis to Members and advisors designated by the CCX Forestry Committee to assist in the determination. In cases of dispute about whether particular information should remain proprietary, Members shall agree to arbitration by Exchange Members for whom participation in such arbitration shall not present a conflict of interest as defined in Section 3.12 of this *Rulebook*.

8.11 Verification and Auditing

Each Member's reports of changes in Carbon Stocks are subject to third-party verification by an independent CCX-approved entity. Costs of verification shall be borne by the Member. All reports are also subject to audit by CCX and the NASD.

Each Exchange Member shall maintain readily accessible records containing the data, calculations, conversion factors, spreadsheets and other information that provide the basis for substantiating reports to CCX of changes in Carbon Stocks. Underlying data and calculations prepared in accordance with CCX-prescribed rules and procedures shall be subject to audit by CCX. All such records shall be maintained for at least two years after the applicable compliance year.

³ The statistical error (E) is defined as the difference between the mean carbon sequestration (X) and the lower confidence limit value (LCL) divided by the mean carbon sequestration (X). Thus, $E = [(X - LCL) / X]$.

8.12 Issuance and Surrender of Carbon Financial Instruments (2006)

Exchange Allowances shall be issued each year to each Member using the Model-based Accounting Approach that realizes positive net changes in Carbon Stocks, i.e. increases in Carbon Stocks due to growth are greater than the reductions in Carbon Stocks due to harvest, fire, pest and adverse weather events. The Exchange Allowances will be issued upon receipt of a verifier's report and review by the Exchange and its Provider of Regulatory Services. Members are responsible for Surrendering Carbon Financial Instruments if Carbon Stocks due to growth are less than the reductions in Carbon Stocks due to harvest, fire, pest, and adverse weather events.

One Exchange Allowance will be issued per one hundred metric tons of CO₂ equivalent increase in Carbon Stocks. These Allowances will have the Vintage of the year in which the net increase in Carbon Stocks occurs. When applicable, each Member using the Model-based Accounting Approach shall annually Surrender Carbon Financial Instruments in an amount reflecting net decreases in Carbon Stocks from the previous year.

Allocations of Carbon Financial Instruments for the Phase I Market Period shall be adjusted retrospectively after the submission of the final report to reflect any retrospective adjustments in total net changes in Carbon Stocks from January 1, 2003 through December 31, 2006.

Allocations of Carbon Financial Instruments for the Phase II Market Period shall be adjusted retrospectively after the submission of the final report to reflect any retrospective adjustments in total net changes in Carbon Stocks from January 1, 2007 through December 31, 2010.

The quantity of Exchange Allowances issued on the basis of increases in Carbon Stocks that can be sold on the CCX trading platform is limited by provisions in Section 8.14 of this chapter.

8.13 Acquisition and Disposition of Forested Land

The quantification of changes in Carbon Stocks will be adjusted to reflect acquisition or disposition of forested land.

8.13.1 Acquisition of Forested Land

If a Member acquires a parcel of forested land during the Member's commitment period(s), that Member shall not be issued or shall not Surrender Carbon Financial Instruments for increases or decreases in Carbon Stocks on the land prior to its acquisition.

Following the acquisition of forested land, an inventory shall be taken and the Carbon Stocks on that land shall be quantified. Projected annual changes in Carbon Stocks reported to CCX shall be adjusted to take account of the projected changes in Carbon Stocks on the land acquired. Members shall be issued or shall Surrender for increases or decreases in Carbon Stocks on that

land from the date of acquisition through December 31, 2006 for the Phase I Market Period and through December 31, 2010 for the Phase II Market Period.

8.13.2 Disposition of Forested Land (2006)

If there had been a net increase in Carbon Stocks on a parcel of forested land between the baseline and the time of its disposition, this amount shall be deducted from the previously reported total amount of net changes in Carbon Stocks on the Member's land. In such cases, the Member shall Surrender an amount of Carbon Financial Instruments equivalent to the amount issued to that Member in previous years on the basis of the increase in Carbon Stocks on that parcel of forested land.

Disposition by a Member of a parcel of forested land on which there had been a net reduction in Carbon Stocks between the baseline and the time of its disposition will not result in any adjustments to the net reduction.

Following the disposition of forested land, projected annual changes in Carbon Stocks reported to CCX shall be adjusted to take account of the disposition. A Member shall not be issued or shall not Surrender Carbon Financial Instruments for increases or decreases in Carbon Stocks on forested land after the date of its disposition.

The Member will not be required to surrender accrued CFIs on the disposed land if the purchaser of the land:

1. enrolls the purchased land in CCX under CCX criteria; or
2. does not enroll the purchased land in CCX, but
 - a) maintains certification for sustainable management on the purchased land under a CCX-approved sustainability standard through the CCX commitment period; and satisfies **one** of the following criteria:
 - b) signs an attestation that carbon stocks are nondecreasing on this parcel from the time of purchase through the end of the CCX Market Period
 - c) the CCX Member is able to verify through remote sensing techniques that carbon stocks on the purchased land are nondecreasing on this parcel from the time of purchase through the end of the CCX Market Period
 - d) the Forestry Committee may consider acceptable alternatives to b) and c) on a case-by-case basis. Acceptable alternatives may include requiring a percentage of the accrued CFI's to be surrendered.

CCX does not require the member to return the accrued CFIs provided that the above conditions are met on an annual basis. If the requirements are not met at any remaining point in the CCX market period, then the member is responsible for surrendering the accrued CFIs.

8.13.3 Reporting Acquisitions and Dispositions (2006)

Each Member shall report any acquisitions and dispositions of forested land in the first report to CCX after the transaction. The report shall state any retrospective adjustments to be made in net changes in the Member’s Carbon Stocks as a result of the transaction.

Members using publicly available growth and yield models shall not adjust the revised Phase I figure for total Carbon Stocks on January 1, 2003, or Phase II figure for total Carbon Stocks on January 1, 2007, to take account of the quantity of Carbon Stocks on forested land at the time of its acquisition during the Market Period. The annual net increases or decreases in Carbon Stocks on acquired land shall be included in calculations of changes in Carbon Stocks subsequent to the date of acquisition.

Any forested land sold by a Member during the Market Period on which there had been a net increase in Carbon Stocks between the forest carbon stock baseline and the time of its disposition shall be considered as if it were not owned by the Member during the Member’s commitment period.

8.14 Limitations on Use of Carbon Financial Instruments Issued on the Basis of Net Changes in Carbon Stocks (2006)

For all Members using the Model-based Accounting Approach, and regardless of a Member’s Direct Emissions Baseline, the maximum net decreases in Carbon Stocks requiring Surrender of Carbon Financial Instruments shall be limited to the levels identified in Table 8.1.

For all Members using the Model-based Accounting Approach, and regardless of a Member’s Direct Emissions Baseline, the maximum net increases in Carbon Stocks that shall be recognized for the purpose of True-up and sales on the CCX is limited to the levels identified in Table 8.1.

Table 8.1 Maximum Levels of Annual Increases and Decreases in Carbon Stocks

Year	Maximum Annual Increase	Maximum Annual Decrease
	PHASE I MEMBER	
2003	3% of Member’s baseline	3% of Member’s baseline
2004	4% of Member’s baseline	4% of Member’s baseline

⁴ The table reflects a Member’s Phase II participation from the beginning of the Phase II program. Members joining the Phase II program prior to January 1, 2007 will have a different carbon stock maximum annual increase and decrease by CCX. All Phase II Members will be subject to the 9% maximum level of net purchases in 2010.

2005	6% of Member's baseline	6% of Member's baseline
2006	7% of Member's baseline	7% of Member's baseline
<u>PHASES I & II MEMBER</u>		
2007	7.25% of Member's baseline	7.25% of Member's baseline
2008	7.5% of Member's baseline	7.5% of Member's baseline
2009	8% of Member's baseline	8% of Member's baseline
2010	9% of Member's baseline	9% of Member's baseline
<u>PHASE II MEMBER⁴</u>		
2007	4.5% of Member's baseline	4.5% of Member's baseline
2008	6% of Member's baseline	6% of Member's baseline
2009	7.5% of Member's baseline	7.5% of Member's baseline
2010	9% of Member's baseline	9% of Member's baseline

The limitations specified above on the Surrender, sale or use for True-up of Carbon Financial Instruments shall be applied separately to the limitations on the Surrender, sale or use for True-up of Carbon Financial Instruments associated with changes in Direct Emissions and Electricity Purchase Opt-ins (Sections 4.8, 4.10 & 4.11.2 of this *Rulebook*).

The Single Firm Sales Limit (Section 4.11.3 & 4.11.4 of this *Rulebook*) and the limitations on Banking (Section 4.11.5 of this *Rulebook*) shall be applied to Exchange Allowances issued on the basis of increases in Carbon Stocks separately to the application of these limitations to other Carbon Financial Instruments issued to a Member.⁵

Subject to rules that may be developed by CCX, Exchange Allowances issued on the basis of increases in Carbon Stocks in excess of the limits on the sale of such Exchange Allowances as specified above may be marketed as Super Reductions in accordance with Section 4.11.2.1 of this *Rulebook*.

8.14.1 Alternative Method for Defining Maximum Net Increases in Carbon Stocks

For Members that use the Model-based Accounting approach, the maximum net increases in Carbon Stocks that shall be recognized for the purpose of True-up and sales on the CCX can, with approval of the CCX Forestry Committee, be defined on the basis of a Synthetic Direct Emission Baseline.

The Synthetic Direct Emission Baseline is defined as a quantity of metric tons of carbon dioxide emissions calculated using the following equation:

⁵ i.e. a Member that has reached its Single Firm Sales Limit with regard to Exchange Allowances sold on the basis of a reduction in Direct Emissions, shall nevertheless be able to sell Exchange Allowances issued on the basis of increases in Carbon Stocks up to the quantity specified by the Single Firm Sales Limit, and vice versa.

Total heat content of all fuels combusted on-site (in gigajoules) x 0.0273

Where total heat content is the heat content associated with total fuel consumption (to include fossil fuels and biomass-based fuels) during a year that is representative of the CCX Direct Emissions baseline period. The quantity of total heat content of all fuels combusted on-site that is reported to CCX must be supported by documented evidence provided by a third party entity that has experience in developing greenhouse gas emission inventories.

8.15 Crediting Carbon Stored in Long Lived Wood Products

Members may elect to register carbon offsets from long-lived wood products using the CCX conversion factors. Members must provide, on an annual basis, third party verified information documenting the quantity of long-lived wood products produced under each product category. Members registering carbon in long-lived wood products will not be required to maintain an escrow in the forest carbon reserve pool for the quantity of credits from the long-lived wood products portion of their total forest carbon.

Members are eligible to receive Carbon Financial Instruments from the production of long-lived wood products provided that they satisfy the requirements for either the Carbon-stable Accounting Approach or Model-based Accounting Approach. Members may be issued Carbon Financial Instruments for the production of harvested wood from their own managed forest land. Member's may also be issued Carbon Financial Instruments on purchased timber provided that:

- a. The seller of the wood transfers the rights of the sequestered carbon in the wood in the sales contract to the Member; and,
- b. The Member is eligible to be issued Carbon Financial Instruments for purchased timber from forests that have certification for sustainable forest management from one of the schemes outlined in the appendix. Carbon Financial Instruments may be issued for the production of long lived wood products *pro rata* across all long lived wood products; and,
- c. Independent third party verification for purchased wood will be done through chain of custody certification. Chain of custody practices for commercial forest companies must be certified by the Forest Stewardship Council or the Sustainable Forestry Initiative if purchased wood is to be credited.

8.15.1 Quantification

Members must quantify Carbon sequestered in the production of long-lived wood products using CCX prescribed default product utilization coefficients. CCX parameters developed to estimate the Carbon sequestered in long lived wood products are contained in the appendix. The parameters presented in the appendix are applicable only in the United States.

Recognized product categories for crediting include the following:

1. Softwood lumber/ Laminated veneer lumber/glulam lumber/ I joints
2. Hardwood lumber
3. Softwood plywood
4. Oriented strandboard
5. Nonstructural panels
 - a. Hardwood veneer/plywood
 - b. Particleboard/Medium density fiberboard
 - c. Hardboard
 - d. Insulation board
6. Paper

A hypothetical example of quantification procedures is provided in Appendix 8.2.

18.5.2 Reporting Schedule and Methods

Reports must be submitted in accordance with the CCX annual environmental compliance processes set out in Section 7.2.3 of the CCX Rulebook. Carbon in long-lived wood products must be quantified and reported in metric tons of carbon dioxide equivalent. Each Member shall specify in its reports which methods or procedures for quantifying applicable carbon pools it has employed and shall identify and explain any modifications made to the CCX-approved methods or procedures. Such changes must be approved by the CCX Forestry Committee. When more than one method consistent with these provisions are available, the Member's annual reports shall indicate which method was used.

**APPENDIX
TO
CHAPTER 8**

Appendix 8.1 Protocol for Quantifying Net Changes in Carbon Stocks

This protocol describes the methods and procedures for quantifying net changes in Carbon Stocks. This protocol is intended only for use in the Market Period and should be read in conjunction with Chapter 8 of this *Rulebook*. This protocol is an initial tool for quantifying changes in Carbon Stocks and may be amended as the Market Period progresses to take account of lessons learned.

All references in this Appendix to the rights and obligations of Members shall refer only to those CCX Members from the commercial forestry sector electing to quantify net changes in Carbon Stocks through the use of publicly available growth and yield models.

Reporting Schedule

Each Member shall submit the reports specified below with respect to land forested with southern pine that the Member owns or to which the Member owns sequestration rights.

Initial Report

Each Member shall submit an initial report specifying:

- (1) estimated total Carbon Stocks on January 1 of the first year of the commitment period; and,
- (2) projected annual changes in Carbon Stocks from January 1 of the first year of the commitment period through December 31 of the final year of the commitment period;
- (3) Estimated total of Carbon sequestered from Long Lived Wood Products.

Annual Reports (2006)

Each Member shall submit an annual report, on a calendar year basis, for each Compliance Year during the Member's commitment period quantifying the net change in Carbon Stocks. The report shall specify:

- (1) previously projected increases in Carbon Stocks due to tree growth for the Compliance Year;
- (2) any adjustments made in the above projections to take account of particular silvicultural treatments such as Thinning and fertilization not previously reported and to take account of acquisitions and dispositions, calculated in accordance with the procedures specified in Sections 8.13.1 and 8.13.2 of this *Rulebook* respectively;
- (3) decreases in Carbon Stocks during the Compliance Year due to harvest, pest, fire and weather;

- (4) net changes in Carbon Stocks in the Compliance Year = (adjusted projections of increases in Carbon Stocks) minus (quantity of decreases in Carbon Stocks due to harvest, fire, pest and weather); and,
- (5) projected changes in Carbon Stocks for the coming year, adjusted for acquisitions and dispositions, silvicultural treatments and harvest, fire, pest and weather.
- (6) Documentation of production of long-lived wood products under CCX recognized categories in the compliance year
- (7) Third party chain-of-custody verifying the amount of wood procured from certified forests under CCX recognized categories in the compliance year
- (8) Estimated Carbon sequestered in long-lived wood products derived from the CCX default prescribed product utilization coefficients.

Appendix Figure 8.1 Summary of Annual Report

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| <ol style="list-style-type: none">(1) Previous projection of increases in Carbon Stocks.(2) Adjustments to item 1 to account for silvicultural treatments, acquisitions and dispositions.(3) Decreases in Carbon Stocks.(4) Net changes in Carbon Stocks = item 2 – item 3.(5) New projection of changes in Carbon Stocks for the coming year to account for items 2 and 3.(6) Production of Long Lived Wood Products(7) Sales contract documentation(8) Estimated Carbon sequestered in Long Lived Wood Products |
|--|

General Principles

Net changes in carbon stocks shall be quantified only on the basis of increases in above-ground and below-ground living biomass occurring on lands included in the CCX project. The above-ground carbon pool may include stem wood, stem bark, and branches. The below-ground carbon pool may include roots.

Incidental hardwood and dead trees shall be excluded from all projections and calculations.

The conversion factor for converting the weight of carbon in Above-ground Biomass to weight of carbon dioxide (CO₂) equivalent shall be 3.666667.

The conversion factor for converting dry weight of harvested timber to weight of carbon shall be 0.5.

Each Member with forested land in the West Gulf region, which comprises the natural range of loblolly pine and the introduced range of slash pine west of the Mississippi River, including

Texas, Louisiana, Oklahoma and Arkansas, shall develop a method to adjust the approved southern pine models to take into account specific growing conditions of that region.

Procedures for Initial Report

The Member's most recent inventory data prior to January 1 of the first commitment year shall be used as inputs to the approved models in order to generate the estimated total Carbon Stocks on January 1 of the first commitment year and the projected annual changes in Carbon Stocks during the subsequent years of the commitment period.

Calculations

The data specified above shall be entered to the approved pine models which will project the total volume of Above-ground Biomass on January 1 of the first commitment year and the projected annual changes in volume of Above-ground Biomass for each year in the commitment period.

The total volume of Above-ground Biomass shall be converted to the weight of Carbon Stocks as measured in tons of carbon dioxide (CO₂) equivalent in a two-stage process:

- (1) from volume of Above-ground Biomass to the weight of carbon stored in the Above-ground Biomass; and,
- (2) from the weight of carbon stored in the Above-ground Biomass to the Carbon Stocks as measured in tons of carbon dioxide (CO₂) equivalent.

The standard conversion factor specified in this Appendix shall be used to convert the weight of carbon stored in the Above-ground Biomass to the weight of Carbon Stocks as measured in tons of carbon dioxide (CO₂) equivalent. The CCX Forestry Committee shall agree on standard conversion factors to convert the volume of Above-ground Biomass to the weight of carbon stored in the Above-ground Biomass.

Reporting

The initial report shall be submitted on a standard form to be developed by the CCX Forestry Committee.

Procedures for Annual Reports

The net change in Carbon Stocks for each commitment year shall be calculated by deducting the amount by which Carbon Stocks decreased in the Compliance Year through harvest, fire, pest and adverse weather events from the increase in Carbon Stocks projected for that year by the approved southern pine models.

Adjustments to the Projected Annual Increase of Carbon Stocks (2006)

The projection of the annual increase in Carbon Stocks for the Compliance Year contained in the most recent report submitted by the Member to CCX shall be amended to take account of silvicultural treatments that have taken place in that year, such as, but not limited to, mid-rotation fertilization and Thinning. The equations of the approved models contain provisions to adjust for such treatments. These treatments shall be carefully documented. (2/4/2004)

As necessary, the CCX Forestry Committee may develop a procedure for adjusting the projected annual increase in Carbon Stocks to account for the effects of different types of Thinning.

Accounting for Acquisitions and Dispositions

Adjustments shall be made to the projection of the annual increase in Carbon Stocks for the Compliance Year in accordance with the procedures specified in Sections 8.13.1 and 8.13.2 of this *Rulebook* to account for acquisitions and dispositions respectively.

Quantifying Reductions Due to Harvest, Pest, Fire and Weather

Members shall retain all records connected to the estimation, measurement and quantification of all forms of reduction in Carbon Stocks due to harvest, fire, pest and adverse weather events included in the report, including auditable harvesting records. There are two categories of reduction in Carbon Stocks which shall be documented as follows:

Harvest (2006)

The amount of wood harvested is quantified either by weighing the harvested timber or by conversion of volume estimates made using commonly accepted methods. This figure shall then be adjusted according to a standardized equation derived from approved models to account for the Crown. No other premium or statistical adjustment to account for variance shall be applied to the measurements of harvest.

The weight of the wood harvested shall be converted into the amount of Carbon dioxide (CO₂) equivalent removed or sequestered from the atmosphere in order to yield that weight of wood in a three stage process:

- (1) from “green weight” (i.e. including moisture) of the harvested timber into “dry” weight (i.e. not including moisture);
- (2) from dry weight to the amount of carbon stored in the harvested timber; and,
- (3) from the amount of carbon stored in the timber to the amount of Carbon dioxide (CO₂) equivalent sequestered as the harvested timber grew.

The equations of the approved models contain conversion factors for converting green weight to dry weight. The standard conversion factors specified in this protocol shall be used to perform the other two stages of the conversion process. (2/4/2004)

Pest, Fire and Weather

The equations of the approved models include standard factors to account for normal damage caused by insects and other pests that is not so severe as to require that the Member shall take new measurements of the inventory in the affected Stand. There is, therefore, no need for Members to record such damage. Members shall document and quantify the impact of rust infection and other infection or pest damage that is not adequately accounted for within the approved southern pine models.

Members shall adjust projected changes in Carbon Stocks to account for damage caused by pest, fire and adverse weather events in accordance with the procedure specified in Section 8.5 of this *Rulebook*.

Projected Annual Increase in Carbon Stocks for the Next Compliance Year

The projected annual increase in Carbon Stocks for the next Compliance Year shall be recalculated using the approved models, adjusting the inputs to account for silvicultural practices, reductions in Carbon Stocks due to harvest, pest, fire and adverse weather events, and acquisitions and dispositions.

Reporting

Annual reports shall be submitted on standard forms to be developed by the CCX Forestry Committee.

Appendix 8.2 – Quantifying Sequestered Carbon Stored in Long Lived Wood Products

The quantity of long-lived wood products to be included in the determination of net carbon stock changes will be the fraction of carbon in long-lived wood products in use and landfills at the end of 100 years, based on the U.S. Department of Energy 1605b technical guidelines for forest products. The quantification tables presented in this appendix are applicable for product carbon sequestered in the United States only.

Table 8 – 1: List of Product Categories Included in CCX Long-Lived Wood Products Protocols⁶

		A	B	C	D
Product Category	Units	Factor to convert units of product to metric tons of carbon	Factor to convert units of product to metric tons carbon dioxide	Fraction remaining after 100 year end use and landfills	CCX Woods Products Crediting Factor (metric tons of CO₂)
Softwood lumber / laminated veneer lumber/	thousand board feet	0.443	1.624	0.639	1.038
Hardwood lumber	thousand board feet	0.765	2.805	0.554	1.554
Softwood plywood	thousand square feet, 3/8-inch basis	0.236	0.865	0.645	0.558
Oriented strand board	thousand square feet, 3/8-inch basis	0.275	1.008	0.696	0.702
Non structural panels (average)	thousand square feet, 3/8-inch basis	0.289	1.060	0.592	0.628
Hardwood veneer/ plywood	thousand square feet, 3/8-inch basis	0.286	1.049	0.592	0.621
Particleboard / medium density fiberboard	thousand square feet, 3/4-inch basis	0.587	2.152	0.592	1.274
Hardboard	thousand square feet, 1/8-inch basis	0.138	0.506	0.592	0.300
Insulation board	thousand square feet, 1/2-inch basis	0.220	0.807	0.592	0.478
Paper	Tons, air dry	0.496	1.819	0.151	0.275

⁶ Source: Technical Guidelines for Voluntary Reporting of Greenhouse Gas Program. Forestry Tables- Table 1.7, Table 1.8. Department of Energy, March 2006

		A	B	C	D
Product Category	Units	Factor to convert units of product to metric tons of carbon	Factor to convert units of product to metric tons carbon dioxide	Fraction remaining after 100 year end use and landfills	CCX Woods Products Crediting Factor (metric tons of CO₂)
Softwood lumber / laminated veneer lumber/	thousand board feet	0.443	1.624	0.639	1.038
Hardwood lumber	thousand board feet	0.765	2.805	0.554	1.554
Softwood plywood	thousand square feet, 3/8-inch basis	0.236	0.865	0.645	0.558
Oriented strand board	thousand square feet, 3/8-inch basis	0.275	1.008	0.696	0.702
Non structural panels (average)	thousand square feet, 3/8-inch basis	0.289	1.060	0.592	0.628
Hardwood veneer/ plywood	thousand square feet, 3/8-inch basis	0.286	1.049	0.592	0.621
Particleboard / medium density fiberboard	thousand square feet, 3/4-inch basis	0.587	2.152	0.592	1.274
Hardboard	thousand square feet, 1/8-inch basis	0.138	0.506	0.592	0.300
Insulation board	thousand square feet, 1/2-inch basis	0.220	0.807	0.592	0.478
Paper	Tons, air dry	0.496	1.819	0.151	0.275

Notes:

- i. Conversion from carbon to carbon dioxide uses standard conversion factor of 3.6667
- ii. CCX wood products crediting factor (column D) is the product of columns B and C

Hypothetical example for estimating Long-lived wood product carbon for Commercial Forest Companies with CCX registered forest land

Consider a Member with the following production statistics for a reporting year:

Production from harvest wood from owned/managed forest land

- | | |
|------------------------------|---|
| 1. Non structural panels | : 1,500,000 thousand square feet 3/8 inch |
| 2. Hardwood Lumber | : 2,000,000 thousand board feet |
| 3. Medium density fiberboard | : 2,500,000 thousand square feet 3/4 inch |

Production from purchased wood

- | | |
|------------------------------|---|
| 1. Non structural panels | : 2,500,000 thousand square feet 3/8 inch |
| 2. Hardwood Lumber | : 1,000,000 thousand board feet |
| 3. Medium density fiberboard | : 500,000 thousand square feet 3/4 inch |

Let us assume that all of the owned forest land by member is certified as sustainably managed under a PEFC endorsed program. However, for the sake of this hypothetical example let us consider two scenarios with regards to purchased logs.

Scenario 1: All of the purchased logs are certified as sustainably managed under a CCX approved program and independently verified through chain of custody.

Scenario 2: Fifty percent of the purchased logs are certified as sustainably managed under a CCX approved program and independently verified through chain of custody.

The estimation of carbon stocks to be recognized under the protocol for long-lived wood products is presented as follows.

Step 1. Estimate the eligible stock of Long-Lived Wood Products for recognition under the protocol. The example assumes evidence of CCX approved certification program for sustainable forest management exists.

Column	Product category	Non structural panels (<i>thousand square feet 3/8 inch</i>)	Hardwood Lumber (<i>thousand board feet</i>)	Medium density fiberboard (<i>thousand square feet 3/4 inch</i>)
A	Scenario 1 and 2: Production from Own Sources	1,500,000	2,000,000	2,500,000
B	Scenario 1: 100% Purchased logs certified for sustainable forest management (<i>Eligible purchased logs = 100%*Wood Products from Purchased logs</i>)	2,500,000	1,000,000	500,000
C	Scenario 2: 50% Purchased logs certified for sustainable forest management (<i>Eligible purchased logs = 50%*Wood Products from Purchased logs</i>)	1,250,000	500,000	250,000

Using the above figures, we can estimate total eligible production of wood products for crediting as follows:

Product	Units	Scenario 1 (A + B)	Scenario 2 (A + C)
Non structural panels	(<i>thousand square feet 3/8 inch</i>)	4,000,000	2,750,000
Hardwood Lumber	(<i>thousand board feet</i>)	3,000,000	2,500,000
Medium density fiberboard	(<i>thousand square feet 3/4 inch</i>)	3,000,000	2,750,000

Step 2: The total eligible production of long-lived wood products is converted to metric tons of CO₂ using the CCX product conversion factors established in Appendix 1.

Product	CCX Products Conversion factor	Credits from long lived wood products (metric tons of CO ₂)	
		Scenario 1	Scenario 2
Non structural panels	0.628 per thousand square feet 3/8 inch	2,512,000	1,727,000
Hardwood Lumber	1.554 per thousand board feet	4,662,000	3,885,000
Medium density fiberboard	1.274 per thousand square feet ¾ inch	3,822,000	3,503,500
Total		10,996,000	9,115,500

Appendix 8.3. CCX Approved Certification Schemes for Sustainable Forest Management⁷

Country	Name	Schemes
Australia	<u>Australian Forestry Standard Limited</u>	<u>Australian Forest Certification Scheme</u>
Austria	<u>PEFC Austria</u>	<u>Austrian Forest Certification Scheme (2006)</u>
Belarus	<u>Belarusian Association of Forest Certification</u>	
Belgium	<u>WoodNet - Commission PEFC Belgique</u>	<u>Belgian Forest Certification Scheme</u>
Brazil	<u>National Institute of Metrology, Standardization and Industrial Quality</u>	<u>Cerflor - Brazilian Program of Forest Certification</u>
Canada	<u>CSA International; SFI Canada</u>	<u>CSA Sustainable Forest Management Program</u>
Chile	<u>CertforChile Forest Certification Corporation</u>	<u>CertforChile</u>
Czech Republic	<u>PEFC Czech Republic</u>	<u>Czech Forest Certification Scheme (2006)</u>
Denmark	<u>PEFC Denmark</u>	<u>Danish Forest Certification Scheme</u>
Estonia	<u>Estonian Forest Certification Council</u>	<u>Estonian Forest Certification Scheme</u>
Finland	<u>Finnish Forest Certification Council</u>	<u>Finnish Forest Certification Scheme</u>
France	<u>PEFC France</u>	<u>French Forest Certification Scheme (2006)</u>
Gabon	<u>PAFC Gabon</u>	<u>PAFC Gabon Forest Certification Scheme</u>
Germany	<u>PEFC Germany e.V</u>	<u>Revised German Forest Certification Scheme (2005)</u>
Ireland	<u>PEFC Council of Ireland</u>	
Italy	<u>PEFC Italy</u>	<u>Italian Forest Certification Scheme</u>
Latvia	<u>PEFC Latvia Council</u>	<u>Latvian Forest Certification Scheme</u>
Lithuania	<u>PEFC Lietuva (PEFC Lithuania)</u>	<u>Lithuanian Forest Certification Scheme</u>
Luxembourg	<u>PEFC Luxembourg</u>	<u>Luxembourg Certification Scheme for Sustainable Forest Management</u>
Malaysia	<u>Malaysian Timber Certification Council</u>	

⁷ http://www.pefc.org/internet/html/members_schemes/4_1120_59.htm

Norway	<u>PEFC-Norway</u>	<u>Norwegian Living Forest Standard and Certification Scheme</u>
Poland	<u>PEFC Polska</u>	<u>Polish Forest Certification Scheme</u>
Portugal	<u>Portuguese Forestry Sector Council</u>	<u>Portuguese Forest Certification Scheme</u>
Russia	<u>Partnership on the Development of PEFC Forest Certification</u>	
Slovakia	<u>Slovak Forest Certification Association</u>	<u>Slovak Forest Certification Scheme</u>
Slovenia	<u>Institute of Forest Certification Slovenia</u>	<u>Slovenian Forest Certification Scheme</u>
Spain	<u>PEFC España</u>	<u>Spanish Forest Certification Scheme</u>
Sweden	<u>Swedish PEFC Co-operative</u>	<u>Swedish Forest Certification Scheme</u>
Switzerland	<u>PEFC Switzerland and HWK- Zertifizierungsstelle</u>	<u>Swiss Q-label certification scheme</u>
United Kingdom	<u>PEFC UK Ltd.</u>	<u>UK Scheme for Sustainable Forest Management</u>
		<u>PEFC UK certification scheme for sustainable forest management (revised 2006)</u>
United States	Sustainable Forestry Board (SFB) American Forest Foundation (AFF)	SFI - Sustainable Forestry Initiative ATFS – Standard of Sustainability for group tree farms
International	Forest Stewardship Council (FSC)	Forest Stewardship Council (FSC)

Chapter 9 CCX Exchange Offsets and Exchange Early Action Credits

9.0 Purpose (2006)

This Chapter:

- defines CCX Exchange Offsets (XOs) and Exchange Early Action Credits (XEs);
- provides XO and XE Project eligibility rules and other technical specifications; and,
- describes CCX Project registration, verification, audits and aggregation of CCX Exchange Offsets.

Chicago Climate Exchange recognizes the following categories of Exchange Offsets:

- Exchange Methane Offsets (XMO)
- Exchange Soil Offsets (XSO)
- Exchange Forestry Offsets (XFO)
- Exchange Early Action Credits (XE)
- Exchange Offsets for Electricity Produced from Renewable Energy (XRE)
- Exchange Emission Reductions (XER)
- Exchange Fuel Conversion Offsets (XFCO)
- Exchange Fluorocarbon Destruction Offsets (XFDO)

Other types of offset projects may be recognized as they become technically and commercially available.

9.1 General Provisions (2006)

All Projects proposed for registration with CCX are subject to approval by the CCX Offsets Committee.

An entity that has an emission profile greater than 10,000 metric tons CO₂ equivalent annually makes it eligible to be a CCX Member. Such entity may register and trade CCX Exchange Offsets only if the entity is a Member of CCX unless it qualifies under the provisions of CCX Rule 9.7.1.1.^{1,2}

¹ Emissions reductions realized at facilities that are included in a Member's CCX emission inventory are not Offset Projects as they cause a decrease in recognized emissions and a decrease in the number of Carbon Financial Instrument contracts needed for compliance.

² CCX will not accept registration of Offsets or Offset Projects that are owned (in full or partially) by an entity that is eligible to be a CCX Member but is not a Member. This prohibition also extends to entities that may have no direct ownership but have a beneficial interest in such Offset Project(s). A CCX Member that is a partial owner of an eligible Offset Project may register with CCX its legally-owned Offsets from the project, regardless of whether

Certain Offset Projects undertaken by CCX Members prior to 1999 will be eligible to earn Exchange Early Action Credits in accordance with the provisions of Section 9.7.

Provisions contained in Section 4.11.5 of this *Rulebook* govern use of Exchange Offsets and Exchange Early Action Credits in the CCX True-up process. Eligible Projects that are operated by CCX Members and CCX Offset Providers are defined as “Owned and Operated” Projects. Usage and sales of XOs and XEs issued to CCX Member Owned and Operated Projects are addressed in Section 4.11.6 of this *Rulebook*.

Registration of a project must be submitted in accordance with CCX processes and procedures. A CCX-approved Verifier shall conduct verifications (including in-field inspections when prescribed) of enrolled Projects. Such verifications shall document Project start dates (when applicable) and other records as may be specified by CCX. The CCX-approved Verifier will submit a report in accordance with CCX procedures. Unless otherwise specified by the Exchange, the cost of the annual verification shall be borne by the Project Owner.

CCX, or its Provider of Regulatory Services, shall undertake audits for the purpose of confirming that CCX-approved Verifiers have properly documented Project eligibility and effectiveness in conformance with CCX rules. All Projects registration documents, verification reports, related documents and documentation of quantification methods shall be subject to inspection and audit. Additional provisions governing audits of Exchange Offset Projects are provided in Chapter 10 of this *Rulebook*.

9.2 Rule Interpretation and Modifications (2006)

Unless otherwise provided in this *Rulebook*, applicable CCX Committees shall be responsible for recommending interpretations and appropriate modifications of rules established in this Chapter to the Exchange. The CCX Offsets Committee is responsible for reviewing all proposed interpretations and modifications and shall have final decision-making authority regarding this Chapter.

9.3 Project Registration, Aggregation, Verification and Reporting (2006)

In order to earn CCX Exchange Offsets, the Project Owner or Aggregator (for the purposes of this Chapter, these terms may collectively be referred to as “Project Owner” unless specifically referred separately) of each CCX-eligible Project must

the other owner(s) of the project are CCX Members. For such projects, the CCX Member may register a quantity of offsets up to the amount that corresponds to its percentage ownership share or beneficial interest of the project.

- (1) be a CCX a Member, CCX Offset Provider or CCX Offset Aggregator ;
- (2) register the Project with CCX;
- (3) obtain independent verification of the Project by a CCX-approved Verifier; and
- (4) periodically report to CCX the status of the Project.

Unless otherwise allowed by the CCX Offsets Committee, a CCX Project Owner may directly register a Project with CCX without an Aggregator and may directly execute trades on the CCX Trading Platform as a CCX Member, a CCX Offset Provider or CCX Offset Aggregator if it qualifies under Section 2.6.1 for access to the Trading Platform.

If a CCX Project Owner does not meet this requirement, Project Registration and trading of CCX Exchange Offsets must be undertaken on its behalf by a CCX Offset Aggregator that meets the requirement.

With the exception of certain small Projects (as specified below), each Project Registration Filing and each periodic Project Report must be accompanied by a verification statement signed by a CCX-approved Verifier.

As specified below, registration of certain CCX Offset Projects must be accompanied by a Project eligibility statement prepared by a CCX-approved Verifier. The Project Registration Filing must also contain a signed attestation that the entity registering as the CCX Project Owner holds full legal title to the greenhouse gas mitigation rights registered as CCX Exchange Offsets that are associated with the facilities and sites included in the registered Project.

As specified below, the performance of each CCX Project must be quantified and reported (and, as prescribed, verified) in accordance with the provisions of this Chapter. Each Project Owner must submit a Project Report to the Project's Aggregator (for Projects registered through an Aggregator) or directly to CCX. Each Aggregator shall submit to CCX a summary report reflecting the status of and quantity of mitigation achieved by all Projects it represents, using forms to be provided by the Exchange.

Unless specifically authorized by the CCX Offsets Committee, Exchange Early Action Credits (XE) must be registered with CCX within twelve months of the Membership approval date. (2006)

9.3.1 CCX Offset Aggregator (2006)

Entities that meet the qualifications provided in Section 2.3 can be accepted as CCX Offset Aggregators. For-profit entities, cooperatives, governmental bodies and non-profit organizations may act as CCX Offset Aggregators. Eligible entities must apply for CCX Offset Aggregator status by filing applicable CCX forms.

As per the provisions described below, Carbon Reserve Pools established for CCX forest and soil carbon Projects shall be established for the entire pool of Offsets represented by each CCX

Offset Aggregator. CCX Offset Aggregators may charge fees for services they provide to Project Owners. CCX Offset Aggregators shall have the discretion to refuse to represent individual Projects.

A CCX Offset Aggregator will be assigned an account in the CCX Registry and must meet the eligibility requirements to have access to the CCX Trading Platform. A CCX Offset Aggregator shall undertake the following actions on behalf of CCX-registered Projects it represents

- (1) accept initial registration forms from owners of CCX-eligible Projects;
- (2) assemble Project Reports from Project Owners, retain copies of Project verification records;
- (3) submit Offset registration fees to CCX;
- (4) have sole authority to access the Registry Account(s)³ holding the Offsets issued to Projects it represents and to access the CCX Trading Platform as an Authorized Trader; and,
- (5) execute sales on the CCX Trading Platform on behalf of Project Owners and distribute sales proceeds to Project Owners in accordance with the terms agreed between the Aggregator and Project Owners.

The terms of the business and legal relationships between Aggregators and Project Owners are left to the discretion of those parties.

9.3.2 CCX Registered Offset Advisor (1/21/2004)

The role of a CCX Registered Offset Advisor is to:

- Act as a clearinghouse for project developers, providing advice and recommendations to CCX on the initial suitability and reputations of projects.
- Provide technical and logistical assistance to project developers who wish to submit projects for consideration or registration with CCX.

Addition of CCX Registered Offset Advisors and their geographic coverage is subject to approval of the CCX Offsets Committee. CCX Registered Offset Advisors are subject to the supervision of the CCX Offsets Committee.

CCX Registered Offset Advisors cannot act as aggregators, verifiers or offset providers.

9.4 Offset Issuance (2006)

CCX-eligible Offset Projects can be recorded in the CCX Registry and will be issued Exchange Offsets on the basis of the entire recognized mitigation tonnage realized during Phase I and

³ All categories of CCX members are entitled to one account in the CCX registry as part of their membership. Additional accounts may be established in the CCX Registry for a fee determined by CCX.

Phase II Market Periods. The quantity of mitigation achieved by each Offset Project shall be quantified on the basis of metric tons of carbon dioxide (CO₂) equivalent. Each Exchange Offset will represent one hundred metric tons of carbon dioxide (CO₂) equivalent and will be identified by annual Vintage. The minimum trading unit is one Exchange Offset or one CFI contract.

Exchange Offsets and Exchange Early Action Credits will be issued only if all required documentation is presented to CCX. Subject to provisions in Chapter 4 of this *Rulebook*, Exchange Offsets and Exchange Early Action Credits will be recognized as equivalent to Exchange Allowances when surrendered for Compliance. XOs and XEs may be used for Compliance in their designated Vintage year or in later years. The Vintage year assigned to XOs and XEs shall correspond to the year in which the associated Greenhouse Gas mitigation occurs subject to the provisions of Section 4.11.6 of this *Rulebook*, except that XEs earned prior to 2004 will be assigned a Vintage of 2004 (or later Vintages, subject to recommendations of the CCX Offsets Committee).

CCX may issue offsets on the basis of annual emission mitigation. CCX may also issue Offsets for certain projects more frequently with the submission of the required documentation to CCX.

9.5 CCX Offset Project Terms and Conditions

By registering a Project with CCX, each Project Owner agrees to and acknowledges the CCX Transaction terms and conditions provided in Section 5.5, Figure 5.1 as well as the additional Terms and Conditions provided in Figure 9.1.

Figure 9.1 Additional Terms and Conditions Associated with CCX Offset Projects and Exchange Offsets (2006)

- (1) The enrolled Project meets all applicable eligibility rules of the Chicago Climate Exchange.
- (2) CCX will issue to the CCX Registry Account of the Project Owner or its designated CCX Offset Aggregator a quantity of Exchange Offsets based on the entire recognized mitigation tonnage approved by CCX and that conforms to the Rules provided in this Chapter subject to the provisions of Section 4.11.6 of this *Rulebook*
- (3) Each sale of Exchange Offsets executed through the Chicago Climate Exchange shall represent a complete transfer of all legal rights associated with the mitigation of Greenhouse Gases that causes the issuance of CCX Offsets. The transferred legal rights are those corresponding to the quantity and Vintage of the Exchange Offsets issued in accordance with the terms and conditions provided in this section and other applicable Rulebook sections.
- (4) The Project Owner or its CCX Offset Aggregator may sell or retain the Exchange Offsets earned under the provisions of this agreement.

- (5) The Project Owner or its CCX Offset Aggregator may elect to deregister the Exchange Offsets once registered with CCX. The Project Owner or its CCX Offset Aggregator must deregister Exchange Offsets prior to entering into an agreement to sell the associated emission reductions outside of CCX.
- (6) The Project Owner shall retain full legal ownership of all rights associated with the mitigation of Greenhouse Gases that may accrue:
 - (a) on lands or via activities not included in the CCX-registered Project;
 - (b) in excess of the quantity of Exchange Offsets issued by CCX to CCX-registered Projects; or,
 - (c) during periods prior to registration of a project with CCX and subsequent to time periods for which the project realized Offsets through CCX participation.
- (7) CCX makes no warranty as to the marketability or market value of CCX Exchange Offsets.
- (8) Each Project Owner, and, when applicable, its CCX Offset Aggregator, is required to periodically submit a signed Project Report that confirms conformance with the terms herein. Representatives of CCX may conduct on-site inspection of registered Projects and related documents. Each Project Owner agrees to provide access in such cases in a prompt and cooperative manner. All CCX Exchange Offset Projects, Project Reports and verification reports are subject to inspection and audit by the Provider of Regulatory Services designated by CCX and by other independent experts as may be engaged by CCX.
- (9) CCX may request additional information and/or access to registered Projects for the purpose of advancing understanding of Greenhouse Gas mitigation Projects:
 - (a) Project Owners may decline such access without penalty; and,
 - (b) In no cases shall research findings cause a reduction in the quantity of Exchange Offsets to be issued to a registered Project.
- (10) Additional terms and conditions are prescribed for individual Project types in other sections of this Chapter.
- (11) Failure to conform to the rules provided herein may result in termination of enrollment in CCX and prohibition from all further participation in CCX.

9.6 Additional CCX-Eligible Projects (2006)

The CCX Offsets Committee may approve additional Project types and locations. In the process of evaluating additional project types, the CCX Offsets Committee may observe the following principles, which have been used in the establishment of the provisions of this Chapter:

- (1) eligibility criteria and Offset issuance quantities shall reflect the best available scientific and technical information, as evidenced by peer-review published studies and other high-quality research findings;

- (2) conservative Offset issuance rates (e.g. application of discounted Offset values, use of Forest Carbon Reserve Pool);
- (3) balancing requirements for adequate documentation and verification of environmental effectiveness with the goal of minimizing transaction costs;
- (4) compatibility with emerging international standards; and,
- (5) avoidance of negative environmental and social impacts.

9.6.1 Terms and Conditions for Accepting Emission Reductions from Projects approved by the Clean Development Mechanism As Exchange Offsets for Use or Sale in CCX (2008)

9.6.1.2 Approval by CCX Offset Committee

Use of emission reductions from projects approved by the Clean Development Mechanism (CDM) in Chicago Climate Exchange shall be allowed only if approved by the CCX Offsets Committee.

9.6.1.3 Eligible Projects, Crediting Rates

Unless specific circumstances warrant otherwise, CDM-approved projects that conform to existing CCX offset project categories shall be considered CCX-eligible, subject to the other Terms and Conditions provided herein.

Conversion of emissions reductions from CDM approved projects to CCX Carbon Financial Instrument contracts shall be conducted in a manner that results in net issuance of CCX CFI contracts to particular project types at rates that conform to the Exchange Offset issuance rates applied to projects specified in the CCX rulebook or as determined by the CCX Offsets Committee.

9.6.1.4 Ineligible Project Types

CDM approval notwithstanding, the following project types are not eligible to be registered on CCX unless the project also satisfies the CCX project methodologies:

- Hydro power
- Forestry
- Other CDM Approved projects or methodologies that result in net increases in emissions to the atmosphere

9.6.1.5 Avoidance of Double Counting

Interface between the CDM registry and CCX shall assure that CERs shall only be used for compliance once. Exchange of CERs for CFI contracts can occur through the following mechanisms, or another mechanism that may be deemed appropriate once the CDM registry is activated:

- (1) CERs may be exchanged for CCX CFI contracts by delivering CERs to a CCX account in the CDM registry and transfer on by CCX to a CDM registry retirement account. Upon retirement of the CERs, the entity that transferred CERs to the CCX CDM account will be issued CFI contracts to its CCX Registry Account.
- (2) CERs may be exchanged for CCX CFI contracts by presenting to CCX documentary evidence that demonstrates that CERs have been transferred to a CDM registry retirement account in the name of Chicago Climate Exchange (and for no other purpose). Upon presentation of such evidence, the entity that retired CERs will be issued CFI contracts to its CCX Registry Account.

9.6.1.6 Projects Which Use CDM or Other Emission Reduction Methodologies

Where a project is not CDM approved but uses a CDM emission reduction methodology or methodology other than one included in the CCX Rulebook, the project must receive a determination of eligibility by CCX and approval to use the proposed quantification methodology.

9.7 Exchange Methane Offsets (XMOs) (2007)

Exchange Methane Offsets will be issued to owners of GHG emission reductions achieved by landfill, agricultural and coal mine methane collection and combustion systems as provided below, or as approved by the CCX Offset Committee.

9.7.1 Landfill Methane Offsets (2007)

Exchange Methane Offsets will be issued to owners of GHG emission reductions achieved by landfill collection and combustion systems placed into operation on or after January 1, 1999. Landfill methane collection and combustion systems in the U.S. may be registered with CCX and may earn XMOs only for mitigation occurring during time periods for which the landfill was not required to collect and combust methane in accordance with U.S. regulations (federal, state, local or provincial) requiring such actions, such as New Source Performance Standards or other applicable regulation. Landfill methane combustion occurring in countries outside of the U.S. may earn XMOs only for mitigation that is not required under the any legal requirement of such country. XMOs will be issued on the basis of metric tons of methane destroyed, net of CO₂ released upon combustion, during the Phase I and Phase II Market Periods, at a net rate of 21 metric tons CO₂ for each metric ton of methane combusted.

Appendix 9.1A provides the protocol to be employed in quantifying landfill gas methane combustion for CCX XMO Projects.

9.7.1.1 Registration of CCX Offsets by Governmental Entities Having Minor Direct Emissions (2007)

Governmental entities that have Direct Emissions below 25,000 metric tons CO₂ during the most recently completed calendar year are allowed to register CCX-eligible landfill methane offset projects without having to commit their Direct Emissions to the CCX reduction schedule.⁴ Governmental entities availing themselves of this provision are required to retire 10% of their registered offsets on an annual basis, up to a maximum retirement amount of 5,000 metric tons CO₂ per year. A governmental entity will be limited to the sale of Carbon Financial Instrument contracts representing 50,000 metric tons of CO₂ per Vintage. In order to sell Carbon Financial Instrument contracts in excess of the 50,000 metric tons of CO₂, a government entity must apply and be approved as a CCX Member subject to the CCX emission reduction rules.

All CCX project eligibility (including start dates, absence of regulatory requirement to collect the methane) and verification rules apply. The Exchange has the right to limit the number of participants under this provision.

9.7.2 Agriculture Methane Emission Destruction (2007)

Eligibility

Projects eligible for agriculture methane offsets must have prior (baseline) manure management practices^{5,6}, where manure is handled as a liquid and with significant methane emitting potential, including:

1. Liquid/slurry storage
2. Pit storage below animal confinements (for periods exceeding one month)
3. Uncovered anaerobic lagoons

Eligible projects with baseline manure management systems other than those listed above may include only that portion of the manure handled by eligible systems in any baseline emission and Offset calculations.

⁴ This provision will not apply to an entity whose Direct Emissions are less than or equal to 10,000 metric tons CO₂ per year as per CCX Rule 9.1. If an entity experiences a material change in emissions, the entity must inform CCX and it may affect its status with respect to CCX Rule 9.7.1.1.

⁵ IPCC 2000, Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories (May 2000)

⁶ Table 10.18. Definitions of Manure Management Systems. 2006 IPCC Guidelines for National Greenhouse Gas Inventories.

Although the use of non-manure feedstocks may result in additional emission reductions, such use should be treated as a separate project activity and is not included in the specific calculation of agricultural methane Offsets for anaerobic manure digester projects.

Baseline calculation

The emissions baseline is the amount of methane that would be emitted to the atmosphere during the crediting period in the absence of the anaerobic digester project. For each year during the crediting period, baseline emissions for all anaerobic digesters are calculated as specified in paragraph (a) and paragraph (b) below, and the lower of the two values will be used:

- (a) Actual monitored amount of methane captured and destroyed by the project activity using existing CCX monitoring protocols and a global warming potential for methane of 21. The default methane combustion efficiency for flared biogas from anaerobic digesters is 90%. Higher efficiencies may be used if supported by manufacturer's specifications or other acceptable data. The default methane combustion efficiency for biogas utilized by electricity gensets is 100%.
- (b) The methane emission calculated *ex ante* based on the amount of the animal manure that would decay anaerobically in the absence of the project activity, using the most recent country-specific IPCC tier 2 approach.

Appendix 9.1B provides the protocol to be employed in quantifying methane combustion by agricultural methane projects.

The Project Verifier must document (among other items):

- (1) the Project Owner's clear ownership rights to Greenhouse Gas emission reductions associated with sites included in the Project;
- (2) eligibility of the site to earn CCX XMOs; and,
- (3) records of methane content and total gas flows or total electricity generation and engine manufacturer's efficiency rating (if applicable).

9.7.3 Coal Mine Methane Emission Destruction (2007)

9.7.3.1 Applicability

This protocol applies to methane recovered from active and abandoned coal mines using the following extraction techniques:

- (1) Pre-mining drainage wells (from the surface or underground) associated with mining activities at active coal mines;
- (2) Post-mining drainage wells (from the surface or underground) associated with mining activities including from sealed mine areas; and

- (3) Ventilation air methane from ventilation fans.

9.7.3.2 Eligibility

To be eligible to earn Offsets, any methane-extraction technique used at active coal mines must be approved for use by Mine Safety and Health Administration (MSHA) or equivalent non-U.S. mining regulatory agency rules. CCX eligibility requirements for methane to be included for registration are as follows:

- (1) Methane produced from pre-drainage wells will be limited to wells drilled after January 1, 1999.
- (2) Methane produced from pre-drainage wells will only be eligible after the well is mined through.
- (3) All methane produced from pre-drainage wells from within a -50 meter to +150 meter vertical range of the mined coal seam will become eligible when the well is mined through.
- (4) Methane produced outside the vertical limit can become eligible if the candidate project(s) demonstrate sufficient analytical evidence, consistent with IPCC Tier 3 Methodology, which connects methane generated outside the established vertical range to the mined seam in question.
- (5) All methane produced from qualifying wells at abandoned coal mines will be eligible.

9.7.3.3 Specific Registration Criteria

CCX requirements for crediting methane recovery from coal mines as Offsets include the following.

9.7.3.3.1 Phase I Registration and Trading

- (1) Pre-Mining Activities:
 - a. CMM collected from wells drilled after January 1, 1999, and mined around or through after January 1, 2003, can be registered and traded on CCX.
- (2) Post-Mining Activities:
 - a. CMM from any well drilled after January 1, 1999, and collected after January 1, 2003, can be registered and traded on CCX.
 - b. CMM from any well drilled prior to January 1, 1999, and collected after January 1, 2003, which is: 1) processed/refined through a low quality gas facility, constructed after January 1, 1999, or 2) utilized in a low quality combustion

process (i.e. reciprocating engine, boiler, flare), constructed after January 1, 1999, can be registered and traded on CCX.

- c. CMM from any well drilled prior to January 1, 1999 and collected after January 1, 2003, which is not 1) processed/refined through a low quality gas facility, constructed after January 1, 1999, or 2) utilized in a low quality combustion process (i.e. reciprocating engine, boiler, flare), constructed after January 1, 1999, cannot be registered and traded on the CCX.

9.7.3.3.2 CCX Phase II Registration and Trading

(1) Pre-Mining Activities:

- a. CMM collected from wells drilled on or after January 1, 1999, and mined through after January 1, 2007, can be registered and traded on the CCX.
- b. All CMM from any well drilled before January 1, 1999, and mined through on or after January 1, 2007, can be registered but not traded on the CCX.

(2) Post-Mining Activities:

CMM from any well drilled at any time, collected on or after January 1, 2007, which is processed / refined through a low quality gas facility, constructed after January 1, 1999, or utilized in a low quality combustion process placed into commercial operation on or after January 1, 1999, can be registered and traded on the CCX.

Appendix 9.1 C provides the protocol to be employed in quantifying methane combustion by coal mine methane projects.

9.7.4 XMO Project Registration, Verification and Project Reports

Registration of each CCX XMO Project must be accompanied by a Project eligibility statement prepared by a CCX-approved Verifier. The Project Registration Filing must include a signed attestation that the entity registering as the CCX Project Owner holds full legal title to the Greenhouse Gas mitigation rights registered as CCX Exchange Offsets that are associated with the facilities included in the registered Project. The filings must contain an attestation by a CCX-approved Verifier as to the quantity of mitigation achieved and Exchange Offset issuance that is prepared in conformance with the rules provided herein, and with the verification protocols prescribed by the Exchange.

9.8 Exchange Forestry Offsets (XFOs)

9.8.1 General Provisions

Exchange Forestry Offsets will be issued to owners of CCX-eligible Forestry Projects that are registered with the Exchange. As provided below, XFOs will be issued on the basis of increases in Carbon Stocks or avoided deforestation, quantified in metric tons of carbon dioxide (CO₂) equivalent, realized during the Phase I and Phase II Market Periods.

The rules and methods to be applied to quantification of Exchange Forestry Offsets are intended to be harmonized with those established for quantification of changes in Carbon Stocks by CCX Members in the forest products sector. Those rules and methods are provided in Chapter 8 of this *Rulebook*.

9.8.2 Afforestation Projects

9.8.2.1 General Provisions

1. Eligible forestry projects involving afforestation via plantings initiated on or after January 1, 1990, on forest land that had been degraded⁷ or in unforested condition on December 31, 1989, may earn CCX CFI's.
2. Under this protocol, eligible forestation activities must involve afforestation and should not involve any harvesting, including thinning, during the contract period. Projects enrolled under this protocol and subsequently harvested must meet the protocol requirements for managed forests. Projects that do not remain enrolled in the program under the managed forest protocol must surrender all Carbon Financial Instruments accrued on that parcel.
3. CCX CFI's will be issued to owners of CCX-eligible afforestation projects on the basis of verified documentation reporting the annual increase in carbon stocks in live tree⁸ and soil organic carbon⁹ portion of the carbon pool forest (expressed in metric tons of carbon dioxide) on eligible sites included in the project during the years 2003 through 2010.

⁷ Qualifications for degraded land will be determined by CCX Committee on Forestry on a case by case basis depending on the region and project attributes.

⁸ Live trees, as defined in Table 1.1 of the DOE 1605b report, refers to: "Live trees with diameter at breast height (d.b.h.) of at least 2.5 cm (1 inch), including carbon mass of coarse roots (greater than 0.2 to 0.5 cm, published distinctions between fine and coarse roots are not always clear), stems, branches, and foliage."

⁹ Soil organic carbon, as defined in Table 1.1 of the DOE 1605b report, refers to: "Belowground carbon without coarse roots, but including fine roots and all other organic carbon not included in other pools, to a depth of 1 meter."

4. All issuance of Exchange forestry offsets to CCX-eligible afforestation projects shall require the placement of 20% of earned Exchange Forestry Offsets in a Forest Carbon Reserve Pool. A Forest Carbon Reserve Pool will be established for the entire pool of projects represented by each offset provider and aggregator. Exchange Forestry Offsets held in a Forest Carbon Reserve Pool shall remain the property of the Project Owner, and all Exchange Forestry Offsets not terminated by CCX shall be released to the Project Owner near the end of the market period.
5. Upon registration of the afforestation project with CCX, the Offset Provider or Offset Aggregator must present to CCX an attestation that the carbon stocks in forest parcels included in a project will be subject to long-term maintenance. This includes a contractual agreement between the aggregator and each participating landowner to maintain the enrolled land as forest for at least 15 years from enrolled date and a signed letter of intent from each registered landowner. This contract and letter will be included in the project filing. A sample letter of intent is included as Appendix 9.2Aiii.
6. Annual carbon accumulation in afforestation projects in the U.S. may be quantified using the CCX Carbon Accumulation tables. Similar tables may be developed by CCX for other regions in the world. Entities that elect to use other quantification methods for afforestation projects must have the methodology approved by the CCX Forestry Committee.
7. The quantification of changes in carbon stocks will be adjusted to reflect acquisition or disposition of forested land on an annual basis as outlined below:
 - a. When forested land is acquired, the enrolled landowner may include eligible forest carbon accumulation provided that it meets all of the criteria set forth in this section.
 - b. If forested land is disposed by a land owner, then the offset provider or aggregator must return to CCX, for retirement, the quantity of offsets issued to the project for sequestered carbon for entire length of time that the land has been enrolled in the program.
 - i. However, disposed land from one pooled participant to another pooled participant that is also enrolled within CCX will be required to transfer CFI's to the other pooled participant. This may require transferring CFI's from one aggregator to another.
8. All enrolled land is subject to third party verification requirements by CCX-approved verifiers. Guidelines for verification are outlined below.

9.8.2.2 Project Registration Filings

Project Registration Filings must document project acreage, description of planted tree species and the tree ages, sizes, and planting density at the time of the Project Registration.

CCX will provide Forestry Project Registration documents, which shall include:

1. Description of afforestation activity;
2. Evidence that planting occurred after December 31, 1989;
3. Description of pre-Project condition of included lands;
4. Legal description of land included in the forest Project;
5. Identity of the land owner(s);
6. Legal evidence that the Project land is owned by the Project Owner, or, in instances where the Project owner is not the landowner, evidence that the CCX Forestry offsets to be generated by the Project are legally owned by the Project Owner;
7. Documentary contractual evidence between the aggregator and landowner that Project lands will remain as forest stock for at least 15 years;
8. Letter of intent from landowner to maintain forests beyond length of the CCX market period.

9.8.2.3 Included Carbon Pools

CCX CFIs will be issued on the basis of increases in carbon stocks in live tree and soil organic carbon portions of enrolled project lands. In addition to the CCX-prescribed terms and conditions, in all cases forest owners (or, as applicable, the ultimate owner of carbon sequestration rights associated with land included in a CCX Project) shall retain ownership rights for all sequestration occurring in any excluded carbon pools.

If an enrolled forest owner does not conform to the CCX Afforestation Offset performance rules, such event shall be promptly reported to CCX (such reporting shall occur through a project's aggregator if the project is registered through an aggregator). CCX will then cancel CFI's in an amount equal to the quantity of forest offsets previously issued to the project. The owner of the non-performing forest project shall be prohibited from further participation in CCX.

9.8.2.4 Forest Carbon Quantification Methods

U.S. based Afforestation Projects may quantify carbon sequestered in eligible forests through use of the CCX Carbon Accumulation tables. Similar tables may be developed for other regions of the world. The tables are presented in Appendix 9.2Ai.

9.8.2.5 Treatment of Catastrophic Losses and Forest Carbon Reserve Pool

Each CCX afforestation project (which can be an aggregated pool of forest projects) shall be required to place 20% of the offsets it earns into a CCX Forest Carbon Reserve Pool. Such offsets shall remain the property of the forest owner(s) (pool participants in the case of aggregated projects) and all forest offsets that remain in the Forest Carbon Reserve Pool shall be released to forest owners near the end of the market period.

CFIs in the Forest Carbon Reserve Pool will be used to compensate for any catastrophic losses. The maximum amount of such carbon loss to be recognized by CCX for catastrophic losses shall be no more than the total quantity of forest offsets available in the Forest Carbon Reserve Pool after the of annual verification.

9.8.2.6 CCX Forest Offset Aggregators

An aggregator is a CCX-registered entity that serves as an administrative representative, on behalf of Project Owners, of multiple Forest Projects. Projects that are represented in CCX by an aggregator are referred to as “pooled projects”. The “pool” refers to the multiple projects represented by the aggregator.

Each aggregator is assigned a CCX Registry Account which will hold all offsets issued to Projects it represents. Aggregators shall also be Authorized Traders in the CCX Trading Platform for such offsets. Aggregators shall be responsible for receiving from individual projects the CCX-required project reports, and for submitting to CCX summary reports of projects they represent. Necessary forms will be provided by CCX. The terms of the business and legal relationships between aggregators and Forest Owners are left to the discretion of those parties.

In addition to the terms and conditions presented in the CCX Rulebook Chapter on Offsets, the terms and conditions of provided in the following shall apply to CCX Exchange Forestry Offset Projects that are aggregated.

1. The aggregator acknowledges that it must annually submit a signed attestation that it is in conformance with the terms and conditions presented herein to CCX.
2. The aggregator acknowledges that actual increases and decreases in forest carbon stocks must be reported to CCX in accordance with CCX rules.

3. The aggregator acknowledges that a CCX-approved verifier must be selected to provide verification of the project, and be allowed access to forest lands and project documents for the purpose of undertaking project verification.
4. The aggregator acknowledges that a decrease in carbon stocks will result in cancellation of CFI's held in the Forest Carbon Reserve Pool. The aggregator is responsible for replenishing, within one year of cancellation, cancelled CFI's in the Forest Carbon Reserve Pool to maintain a 20% escrow. The aggregator may be required to surrender additional Carbon Financial Instruments to compensate for loss of carbon stocks if the quantity of forest offsets in the Reserve Pool is inadequate.
5. Aggregators are responsible for maintaining and available for verification, a sound database and monitoring management system capable of tracking each individual owner's forest land holding enrolled in the program. CCX will provide guidelines for the data that needs to be maintained by aggregators for enrolled forestry offset projects.

9.8.2.7 Guidelines for Verification on Afforestation Offset Projects

Objective and Scope of Work

Desk and field verification of CCX Afforestation projects on registered projects in the CCX Offset program must be conducted by a CCX approved verifier. Verification is intended to confirm the reported species mix and characteristics, verify acreage enrolled in program, confirm that forest management practices on enrolled land are in conformance with the program criteria, and to identify any acres not in compliance with eligibility criteria. Verification costs are borne by the project provider/aggregator.

Desk Review

All land enrolled by the selected applicant or forest offset provider are subject to an annual desk audit. Landowners that are unable to provide sufficient documentation will be ineligible. A checklist list of verification requirements is contained in Appendix 9.2Aii.

Field Verification

Field verification consists of inspecting at least 10% of both the participants and acreage enrolled in the program. This field inspection will occur when the project is approved, at the end of the CCX commitment period, and, subject to the recommendation of the CCX Committee on Forestry, for additional periods. The projects selected for field verification are chosen at the discretion of the verifier. Land will be inspected to confirm the appropriate use of the approved quantification method, species mix and age class, ownership, and the number of eligible acres. The field verification shall provide an opinion that the practices and requirements provided in the CCX project proposal have been implemented as intended.

Statement of Intent

Each project owner must sign a statement of intent declaring that the applicant intends to respect and abide by the protocol developed by CCX on all land enrolled in the program and that the applicant intends to preserve the Forest Stocks beyond December 31, 2010. A copy of the letter is included in Appendix 9.2Aiii.

State Programs

The CCX Committee on Forestry will review state forest programs that involve monitoring on a case-by-case basis to determine if the verification process associated with state programs could act as a substitute for CCX field verification.

9.8.3 Long Lived Wood Products

9.8.3.1 General Provisions

1. CCX forest offset providers/aggregators must register net forest carbon stock changes from growth that is quantified using the Model-based accounting approach described in the managed forest offset protocol.
2. All claimed long-lived wood products must be produced on sustainably managed forests as evidenced by certification from agencies or schemes that have been endorsed by the PEFC¹⁰ or other certification programs approved by CCX Committee on Forestry. Approved certification schemes are included as Appendix 9.2Ci.
3. The quantity of long-lived wood products to be included will be the fraction of carbon in long-lived wood products in use and landfills at the end of 100 years based on the Department of Energy 1605b technical guidelines for forestry. The wood product conversion factors will be based on prescribed default wood category utilization coefficients presented in the CCX calculator for participant members. These conversion factors by wood product categories are presented in Appendix 9.2Cii, 9.2Ciii, and 9.2Civ.
4. The forest offset provider/aggregator must provide, on an annual basis, third party verified information documenting the quantity of wood products harvested by category, species and region.

¹⁰ The PEFC Council (Programme for the Endorsement of Forest Certification schemes) is an independent, non-profit, non-governmental organization, founded in 1999 which promotes sustainably managed forests through independent third party certification. The PEFC provides an assurance mechanism to purchasers of wood and paper products that they are promoting the sustainable management of forests.

5. CCX aggregators who register wood products carbon are responsible for maintaining a sound database and monitoring management system capable of tracking annually each individual owner's forest land holding enrolled in the program, records of management activity, and any sales of harvested wood. All of these records must be available for audit. CCX will provide guidelines for the data that needs to be maintained by aggregators for enrolled small forestry offset projects.
6. CCX aggregators must establish contractual agreements with CCX-enrolled forest land owners that provide that carbon rights from long-lived wood products will be exclusively traded through the respective aggregator. Landowners must also establish exclusive contractual rights with the primary wood products manufacturer to the carbon rights associated with long-lived wood products. Any violation of program rules should be promptly reported to the Exchange. The CCX Committee on Forestry may prescribe additional measures to ensure that no double counting of carbon rights from carbon registered by enrolled participants is carried out.
7. Timber purchasers may acquire these rights from landowners provided that this can be documented according to chain of custody documentation outlined in this document. Long lived wood products carbon rights cannot be transferred beyond the primary wood products manufacturer at this time.

9.8.3.2 Quantification

Participant members electing to quantify and report carbon sequestration in long-lived wood products need to report harvest quantity by CCX recognized wood product categories. CCX CFIs will be issued for the calendar year based on the fraction of carbon in long-lived wood products in use and landfills after 100 years from the harvest wood.

Recognized wood product categories include

1. Softwood saw timber
2. Softwood pulpwood
3. Hardwood saw timber
4. Harwood pulpwood

Forest offset providers must use the DOE product-based estimates for estimating long lived wood products carbon. These estimates use the harvest volume of wood available for subsequent processing as the starting point for estimating carbon in long lived wood products. The main variables required for the estimation is independently verified measure merchantable wood under CCX-recognized wood product categories. Verification requirements may involve audit of sales receipts from the enrolled forest landowner. The receipts must specify the wood products categories (softwood saw log, softwood pulpwood, hardwood saw logs and hardwood pulpwood) being sold.

Using above procedures outlined in the DOE 1605b technical guidelines for forestry, CCX has developed factors that convert the volume of harvested wood by category, to long-lived carbon in use and landfills at the end of 100 years across wood categories. These factors are presented in Appendix 9.2Cii, 9.2Ciii, and 9.2Civ..

The quantity of carbon dioxide in long lived wood products at the end of 100 years is computed using the following formula:

$$\text{Carbon_Products}_R = \sum_C \text{Wood Product Category}_R \cdot C^* \text{Harvest Volume}_{R,C}$$

Where

R = Region

C = Wood product category (Softwood saw log; Softwood pulpwood, Hardwood saw log and Hardwood pulpwood)

Carbon in use and landfills after 100 years in long-lived wood products for participant members is determined as follows:

1. If the harvest is reported in volume, the harvest must be converted into weight using conversion factors reported in the appendix.
2. If the harvest is reported in weight, determine the dry tons of carbon in CCX recognized wood product categories. This process involves converting green tons of harvested wood to dry tons across CCX wood product categories using a factor of 0.5 and converting dry tons across wood product categories to carbon tons using a factor of 0.5.
3. Distribute carbon tons by wood product category.
4. Use CCX prescribed conversion factors to calculate the quantity in use and landfills after 100 years by wood product category.
5. Convert to metric tons of carbon dioxide. This is done by multiplying by 3.67 to convert from carbon to carbon dioxide and then by 0.907 to convert to metric tons.

9.8.3.2.1 Hypothetical Example 1 – Harvest Reported in Weight

Consider a harvest in the North East produced 4,000 tons green weight of round wood. Further assume that the harvest was distributed across wood product categories in following fashion:

1. Softwood saw timber: 7.9%
2. Softwood pulpwood: 5.1%
3. Hardwood saw timber: 46.5%
4. Harwood pulpwood: 40.5%

The 100 year in-use carbon dioxide in long-lived wood products (expressed in metric tons) is determined as follows.

Step 1: Convert green weight of roundwood to dry tons: $(4000 \text{ green tons} * 0.5 \text{ (green tons / dry tons)}) = 2,000 \text{ dry tons}$

Step 2: Convert dry tons to carbon tons: $(2,000 \text{ dry tons} * 0.5 \text{ (dry tons / carbon tons)}) = 1,000 \text{ carbon tons}$

Step 3: Distribute carbon tons across categories:

1. Softwood saw timber: 79 carbon tons
2. Softwood pulpwood: 51 carbon tons
3. Hardwood saw timber: 465 carbon tons
4. Harwood pulpwood: 405 carbon tons

Step 4: Estimate 100 year in use value by wood product category

1. Softwood saw timber: $79 \text{ tons of carbon} * 0.318 = 25.122 \text{ tons}$
 2. Softwood pulpwood: $51 \text{ tons of carbon} * 0.090 = 4.59 \text{ tons}$
 3. Hardwood saw timber: $465 \text{ tons of carbon} * 0.316 = 146.94 \text{ tons}$
 4. Harwood pulpwood: $405 \text{ tons of carbon} * 0.261 = 105.705 \text{ tons}$
- Total = 282.357 tons of carbon

Step 5: Convert to metric tons of Carbon dioxide:

$(282.357 * 3.67 * 0.907) = 939.88 \text{ metric tons of CO}_2$

9.8.3.2.2 Hypothetical Example 2 – Harvest Reported in Volume

Consider a harvest of maple-beech-birch forest in the Northeast that produced 200 MBF of hardwood sawtimber and 1,000 cords of hardwood pulpwood.

Step 1: Convert volumes to common unit (thousand cubic feet):

Sawtimber: $200 \text{ MBF} * 0.146 = 29.2 \text{ MCF}$

Pulpwood: $1,000 \text{ cords} * 0.075 = 75 \text{ MCF}$

Step 2: Convert volumes to metric tons of carbon:

Sawtimber: $29.2 \text{ MCF} * 18.96 \text{ lb c/cu ft} = 553.6 \text{ thousand pounds}$

$553.6 \text{ thousand pounds} / 2.204 = 251.2 \text{ metric tons carbon}$

Pulpwood: $(75 * 18.96) / 2.204 = 645.2 \text{ metric tons carbon}$

Step 3: Estimate 100 year in-use value by wood product category

Sawtimber: $251.2 * 0.316 = 79$ metric tons

Pulpwood: $645.2 * 0.261 = 168$ metric tons

Step 4: Convert to metric tons of carbon dioxide equivalent

$(79 + 168) * 3.67 = 909$ metric tons of carbon dioxide equivalent

9.8.4 Managed Forest Projects

9.8.4.1 General Provisions

1. Project owners and aggregators must provide evidence of sustainable forest management of all their managed forest land through certification from agencies or schemes that have been endorsed by the PEFC¹¹ (e.g. SFI), the Forest Stewardship Council, or other certification programs approved by the CCX Committee on Forestry. A complete list of CCX approved certification schemes is available in Appendix 9.2Ci. Carbon Financial Instruments may be issued retroactively prior to obtaining certification for sustainable management provided that sustainable certification exists when the project enrolls in CCX.
2. Project owners and aggregators may earn Exchange Forestry Offsets issued for managed forest projects on the basis of verified documentation for the net changes in carbon stocks (expressed in metric tons of carbon dioxide) on eligible sites included in the project during each of the years 2003 through 2010. The net change in carbon stocks is defined by the equation:

Net change in Carbon Stocks = (increases in Carbon Stocks due to growth) minus (the quantity by which Carbon Stocks decreased due to harvest, pest, fire and adverse weather events).

If an offset provider or aggregator reports for the calendar year a net decrease in Carbon Stocks from the previous calendar year, the project owner or aggregator must Surrender Carbon Financial Instruments in an amount reflecting net decreases in Carbon Stocks from the previous year. Offset providers or aggregators may use banked allowances for compliance in this situation.

¹¹ The PEFC Council (Programme for the Endorsement of Forest Certification schemes) is an independent, non-profit, non-governmental organization, founded in 1999 which promotes sustainably managed forests through independent third party certification. The PEFC provides an assurance mechanism to purchasers of wood and paper products that they are promoting the sustainable management of forests.

3. Quantification of net changes in forest carbon stock must involve a timber inventory and growth-and-yield modeling approach. Managed forest projects will be issued or debited CCX CFIs on the basis of net annual change in forest carbon stocks through the CCX Market Period (2003-2010). Growth and yield Model estimates of net annual changes in carbon from forestry project will be discounted to account for variance in model estimates by the minimum of 20% or two times the reported statistical error¹² associated with a 90% confidence interval of the baseline inventory data.

All managed forest projects are subject to approval of the CCX Committee on Forestry. No discount will be applied for instances when in-field inventories are conducted on an annual basis. Post-harvest cruises must be conducted for a particular landowner subsequent to a significant harvest or thinning.

4. All issuance of Exchange Forestry Offsets to CCX-eligible forestry projects, including managed forestry projects, shall require the placement of 20% of earned Exchange Forestry Offsets in a Forest Carbon Reserve Pool. A Forest Carbon Reserve Pool will be established for the entire pool of Projects represented by each offset provider and aggregator. Exchange Forestry Offsets held in a Forest Carbon Reserve Pool shall remain the property of the Project Owner, and all Exchange Forestry Offsets not terminated by CCX (in the event of a catastrophic loss) shall be released to the Project Owner during 2010. Should CCX extend beyond 2010, the Forest Carbon Reserve Pool will be maintained for projects that elect to remain enrolled in CCX.
5. Upon registration, Forest Offset Providers or Offset Aggregators must present to CCX an attestation that the carbon stocks in the managed forest project will be subject to long-term maintenance in a manner deemed acceptable by the CCX Forestry Committee. This includes a contractual agreement between the aggregator and each participating landowner to maintain the enrolled land in an approved sustainable certification program for at least 15 years from enrolled date and a signed letter of intent from each registered landowner. This contract and letter will be included in the project filing.
6. The quantification of changes in carbon stocks will be adjusted to reflect acquisition or disposition of forest land on an annual basis as outlined below:
 - a. When forested land is acquired, the enrolled landowner may include eligible forest carbon accumulation provided that it meets all of the criteria set forth in this document. When forest parcels are purchased, the carbon stocks on the purchased forest are not counted as growth for the year they are purchased, but are added into the baseline so that the net growth may be calculated in the subsequent year.

¹² The statistical error (E) is defined as the difference between the mean carbon sequestration (X) and the lower confidence limit value (LCL) divided by the mean carbon sequestration (X). Thus, $E = [(X - LCL) / X]$.

- b. If forested land is disposed by a land owner, then the offset provider or aggregator will be penalized by the total amount of offsets issued by CCX for sequestered carbon from those acres for entire length of time that the land has been enrolled in the program.

The offset provider or aggregator will not be required to surrender accrued CFIs on the disposed land if the purchaser of the land:

- i. Enrolls the purchased land in CCX under CCX criteria. Under such conditions, a transfer of credits from one aggregator to another may be required.
- ii. Does not enroll the purchased land in CCX, but;
 1. maintains certification for sustainable management on the purchased land under a CCX-approved sustainability standard through the CCX commitment period; and satisfies **one** of the following criteria:
 2. signs an attestation that carbon stocks are nondecreasing on this parcel from the time of purchase through the end of the CCX Market Period
 3. the Member is able to verify through remote sensing techniques that carbon stocks on the purchased land are nondecreasing on this parcel from the time of purchase through the end of the CCX Market Period
 4. the Forestry Committee may consider acceptable alternatives to 2) and 3) on a case-by-case basis. Acceptable alternatives may include requiring a percentage of the accrued CFI's to be surrendered.

CCX does not require the member to return the accrued CFIs provided that the above conditions are met on an annual basis. If the requirements are not met at any remaining point in the CCX market period, then the member is responsible for surrendering the accrued CFIs.

7. Forest offset aggregators are responsible to maintain a database of pooled participant records, maintain accurate records of enrolled project forest inventories, and keep track of management activities in enrolled forest lands. The database records, model inputs and all enrolled land are subject to third party verification requirements by CCX-approved verifiers.

8. If an enrolled participant's project land does not conform to the managed forest offset performance requirements, such event shall be promptly reported to CCX (such reporting shall occur through a project's aggregator if the project is registered through an aggregator). CCX will then cancel all CCX CFI's in an amount equal to the quantity of forest offsets previously issued to the project. The owner of the non conforming forest project shall be prohibited from further participation in CCX.

9.8.4.2 Baseline

Project participants must establish a baseline of forest carbon stocks for purposes of calculating net changes in forest carbon stocks and subsequent issuance of CFIs. Once established, this baseline will serve as the reference year for all purposes in the managed forest project pool during the CCX market period. The baseline is established as the biomass level in the enrolled parcels on December 31 of the year preceding their enrollment.

Participants are eligible to earn CFI's based on verified documentation of net changes in forest carbon stocks from the baseline year. Project proposal filing must present sufficient data on forest inventories and management activities on enrolled forest land while establishing the baseline. Baselines are subject to audit by a CCX approved verification agency.

9.8.4.3 Included Carbon Pools

Net changes in carbon stocks shall be quantified only on the basis of increases in above-ground and below ground living biomass occurring on lands included in the CCX project. The above-ground living biomass carbon pool includes stem wood, stem bark, and branches. The below-ground living biomass carbon pool includes coarse roots¹³. In addition to the terms and conditions established in this document, in all cases project owners (or, as applicable, the ultimate owner of carbons sequestration rights associated with forest land included in a CCX project) shall retain ownership rights for all sequestration occurring in any excluded carbon pools.

9.8.4.4 Forest Carbon Reserve Pool

Each CCX managed forest project (which could be an aggregated pool of forest projects) shall be required to place 20% of the offsets it earns into a CCX Forest Carbon Reserve Pool. Such offsets shall remain the property of the forest owner(s) (pool participants in the case of aggregated projects) and all forest offsets that remain in the Forest Carbon Reserve Pool shall be released to forest owners near the end of the market period.

¹³ Acceptable methods for the inclusion of below-ground biomass in the United States are defined in Jenkins JC, Chojnacky DC, Heath LS, Birdsey RA (2003) National-Scale Biomass Estimators for United States Tree Species. *Forest Science* 49(1):12-35. Acceptable methods for the inclusion of below-ground biomass for regions outside of the United States are defined in Cairns M, Brown S, Helmer E, Baumgardner G (1997) Root Biomass Allocation in the World's Upland Forests. *Oecologia* 111: 1-11.

CCX CFI contracts in the Forest Carbon Reserve Pool will be used to compensate for any catastrophic losses. In cases of adverse weather events or outbreaks of fire and pest damage that do not reduce the quantity of Carbon Stocks on a parcel of forested land to levels below those documented for the baseline, the Member shall document the quantity of timber destroyed by the fire, pest or adverse weather event and Surrender an equivalent amount of Carbon Financial Instruments. The Member shall continue to quantify and report subsequent increases and decreases in carbon stocks on that land and shall be issued or must surrender Carbon Financial Instruments accordingly.

In cases of catastrophic weather events or outbreaks of fire and pest damage that reduce the quantity of carbon stocks on a parcel of forested land to levels below those documented for baseline, the Member shall document the quantity of timber destroyed by the fire, pest or adverse weather event. An amount of CFIs in the Forest Carbon Reserve Pool equal to the amount of the destroyed by the catastrophic event will be cancelled. The CFIs in the Forest Carbon Reserve Pool represent the maximum amount of CFIs that will be cancelled in the event of a catastrophic loss.

Those stands shall be excluded from future projections of annual changes in Carbon Stocks until the quantity of carbon stocks in those stands reaches the reported quantities for baseline. All reports of significant damage caused by pest, fire and adverse weather events shall be subject to audit by a CCX approved verification agency.

9.8.4.5 Managed Forest Project Proposals

All managed forestry project proposals must be submitted to the CCX Committee on Forestry for review and recommendation. Project proposal filing must contain the following information:

1. Organizational Description

- Short description on the organization, its function and work related to forestation
- Description of program goals, management etc
- Program relationship between agency and landowners
- Social impacts of forest land on indigenous community
- Historical description of forest stands
- Description of how initial baseline determined

2. Description of Forested areas

- Species information
- Planting dates
- Acreage

- Legal ownership
- Maps and other pertinent information

3. Description of Forest Management Activity

- Harvesting cycle
- Description of thinning, clearing and other management activities
- End use of the wood

4. Quantification Model

- Brief description of the proposed quantification method
- Baseline measurement
 - Inventory frequency
 - Sampling techniques
 - Tree measurement techniques
 - Statistical precision
 - Backup equations
 - References and documentation

5. Description of Project and Proposed Aggregation Model

- Objectives of project
- Eligibility and landowner requirements
 - i. Sustainable Forest Management certification information
 - ii. Contractual requirements with aggregator
 - iii. Monitoring arrangement between aggregator and landowner
- Database description

9.8.4.6 CCX Forest Offset Aggregators

An aggregator is a CCX-registered entity that serves as an administrative representative, on behalf of Project Owners, of multiple CCX-qualifying Forest Projects. Projects that are represented in CCX by an aggregator are referred to as “pooled projects”. The “pool” simply refers to the multiple projects represented by the aggregator.

Each aggregator is assigned a CCX Registry Account which will hold all Offsets issued to Projects it represents. Aggregators shall also be Authorized Traders in the CCX Trading Platform for such offsets. Aggregators shall be responsible for receiving from individual projects the CCX-required project reports, and for submitting to CCX summary reports of projects they represent. A copy of this summary report is included as Appendix 9.2Di. The terms of the business and legal relationships between aggregators and Forest Owners are left to the discretion of those parties.

In addition to the terms and conditions presented in the CCX Rulebook Chapter on Offsets, the following terms and conditions shall apply to CCX Exchange Forestry Offset Projects that are aggregated.

6. The aggregator acknowledges that it must annually submit a signed attestation that it is in conformance with the terms and conditions presented herein to CCX.
7. The aggregator acknowledges that actual increases and decreases in forest carbon stocks must be reported to CCX in accordance with CCX rules.
8. The aggregator acknowledges that a CCX-approved verifier must be selected to provide verification of the project, and be allowed access to forest lands and project documents for the purpose of undertaking project audits.
9. The aggregator acknowledges that a decrease in carbon stocks due to catastrophic losses will result in cancellation of CCX CFI's held in the Forest Carbon Reserve Pool. The aggregator is responsible for replenishing cancelled CCX CFI's in the Forest Carbon Reserve Pool to maintain a 20% escrow within one year of cancellation. The aggregator may be required to surrender additional Carbon Financial Instruments to compensate for loss of carbon stocks if the quantity of forest offsets in the Reserve Pool is inadequate.
10. Aggregators are responsible for maintaining and available for audit, a sound database and monitoring management system capable of tracking each individual owner's forest land holding enrolled in the program at the stand level. A summary sheet outlining data requirements for each landowner is contained as Appendix 9.2Dii.
11. Aggregators must establish a baseline with each distinct pool of landowners that is enrolled. Quantification of baseline and net change in carbon stocks will be accounted separately for each project owner at the stand level within a registered pool of managed forest projects. On an annual basis, the baseline will be adjusted to reflect land acquisitions and dispositions within the enrolled pool.

9.8.4.7 Guidelines for Verification on Managed Forest Offset Projects

9.8.4.7.1 Objective and Scope of Work

Desk and field verification of CCX Managed Forest Offset projects on registered projects in the CCX Offset program must be conducted by a CCX approved verifier. Verification is intended to confirm the reported species mix and characteristics, verify acreage enrolled in program, confirm that forest management practices on enrolled land are in conformance with the program criteria, and to identify any acres not in compliance with eligibility criteria. Verification costs are borne by the project provider/aggregator.

9.8.4.7.2 Desk Review

All land enrolled by the selected applicant or forest offset provider are subject to an annual desk audit. Landowners that are unable to provide sufficient documentation will be ineligible. The desk audit must verify that the baseline and annual reports are in conformance with the managed forest offset protocol.

9.8.4.7.3 Field Verification

Field verification consists of inspecting at least 10% of both the participants and acreage enrolled in the program. This field inspection will occur when the project is approved, at the end of the CCX commitment period, and, subject to the recommendation of the CCX Committee on Forestry, for additional periods. The projects selected for field verification are chosen at the discretion of the verifier and will occur on land where harvesting has occurred whenever possible. Land will be inspected to confirm the appropriate use of the approved quantification method, species mix and age class, ownership, and the number of eligible acres. The field verification shall provide an opinion that the practices and requirements provided in the CCX project proposal have been implemented as intended.

9.8.4.7.4 Statement of Intent

Each project owner must sign a statement of intent declaring that the applicant intends to respect and abide by the protocol developed by CCX on all land enrolled in the program and that the applicant intends to preserve the Forest Stocks beyond December 31, 2010. A copy of the letter is included in Appendix 9.2Aiii.

9.8.5 Widely Spaced Tree Plantings

9.8.5.1 General Provisions

CCX Members and Participant Members may earn Carbon Financial Instruments for widely spaced tree planting projects initiated on or after January 1, 1990, on land not forested, or on land that had been degraded or unforested condition on December 31, 1989. The determination of density specifications for widely-spaced will be determined by the CCX Forestry Committee.

CCX aggregators must maintain a detailed database documenting planting dates and establishing that landowners with significant direct greenhouse gas emissions must be CCX Members in order to earn Carbon Financial Instruments for widely spaced tree planting projects. CCX aggregators must provide contractual evidence with each individual landowner regarding the permanence of maintaining the tree plantings into the future.

9.8.5.2 Quantification

The coefficients in Appendix Table 9.2B shall be applied for widely spaced tree planting Projects, including urban and suburban tree planting programs, undertaken in the U.S. and Canada. The CCX Forestry Committee may recommend modifications to the Tables provided in Appendix 9.2.

9.8.6 Combined Forestation and Forest Conservation Projects (2006)

9.8.6.1 General Provisions

Offsets will be issued to forest conservation portions of eligible Combined Forestation and Forest Conservation Projects (provided the two activities occur on contiguous sites unless approved otherwise by the CCX Offsets Committee) in an amount reflecting recent deforestation rates in the state in which the Project occurs. Qualifying locations are in specified states of Brazil and in other locations as may be approved by the CCX Offsets Committee. The Avoided Deforestation Rate (ADR) will be calculated on the basis of the actual annual deforestation rate during recent multi-year time periods in the state in which the Project is implemented. Exchange Offsets shall be issued on the basis of a 10% discount of the quantity of avoided carbon loss due to deforestation as calculated on the basis of definitions provided herein.

The baseline and annual carbon sequestration benefits of all Combined Forestation and Forest Conservation Projects must be quantified through use of CCX-approved recognized direct quantification methods. The Project Registration Filing and all Project Reports must be verified by a CCX-approved Verifier.

9.8.6.2 Quantification

Exchange Offsets will be issued on the basis of the annual avoided carbon loss (expressed in carbon dioxide equivalence) on eligible sites during the Phase I and Phase II Market Periods. Exchange Offsets for forest conservation can be issued in an amount up to (but shall not exceed) the quantity of Exchange Offsets issued in the same year to the Forestation component of a Combined Forestation and Forest Conservation Project.

Table 9.2 lists the states of Brazil in which Combined Forestation and Forest Conservation Projects are pre-qualified to register as XFO Projects in CCX, as well as the Avoided Deforestation Rate to be applied in quantifying avoided carbon loss and XFO Offset issuance.

Table 9.2 States in Brazil in Which Combined Forestation and Forest Conservation Projects are Pre-Qualified as Eligible to Register as XFO Projects in CCX, Annual Avoided Deforestation Rates to be Applied in Quantifying Avoided Carbon Loss and XFO Offset Issuance¹⁴

State	Annual Avoided Deforestation Rate (ADR) (% of forest included in the CCX-registered Project Carbon Stock baseline)
Alagoas	0.70*
Bahia	0.70*
Ceará	0.70*
Espirito Santo	1.09
Goiás	1.82
Mata Grosso do Sul	1.91
Minas Gerais	1.46
Paraíba	0.70*
Pernambuco	0.70*
Piauí	0.70*
Paraná	0.93
Rio de Janeiro	2.63
Rio Grande do Sul	1.08
Santa Catarina	0.73
Sergipe	0.70*
São Paulo	0.72

* represents an initial default value to be modified upon acquisition of additional information.

Annual avoided carbon loss will be defined as the mathematical expression listed below.

Annual avoided carbon loss = maximum possible offset issuance¹⁵

= 0.90 x Annual deforestation rate x adjusted baseline (adjusted for earlier-year offset issuance)

$$\text{Year 1} = B \times \text{ADR}$$

$$\text{Year 2} = B \times \text{ADR} (1 - \text{ADR})$$

$$\text{Year 3} = B \times \text{ADR} (1 - \text{ADR} - \text{ADR}^2)$$

$$\text{Year 4} = B \times \text{ADR} \times (1 - \text{ADR} - \text{ADR}^2 - \text{ADR}^3)$$

¹⁴ The data in Table 9-2 are based on information provided by: “Avaliação e Ações Prioritárias para a Conservação da Biodiversidade da Mata Atlântica e Campos Sulinos,” a publication of the Brazilian Environment Ministry with participation of Conservation International of Brazil, SOS Mata Atlântica, Institute of Ecological Research, Biodiversity Foundation, the Secretary of the Environment for the State of Sao Paulo and the State Forestry Institute of Minas Gerais.

¹⁵ Subject to the constraint that annual avoided deforestation Offsets cannot exceed the forestation Offsets component of a combined Project.

Where “B” is the baseline Carbon Stock multiplied by 0.90. The baseline carbon is the quantity of living biomass carbon on-site at the end of 2002, expressed in carbon dioxide equivalent. The multiplication by 0.90 reflects a 10% discount applied to the quantification of the baseline Carbon Stock. ADR is the value shown in column 2 of Table 9.2.

The annual modification of the B x ADR value reflects that annual downward adjustment in quantity of carbon that would have been exposed to deforestation in the “without Project” scenario.

9.9 Exchange Soil Offsets (XSOs) (U.S. and Canada) (2007)

Projects involving specified agricultural soil carbon sequestration activities in designated states, counties, provinces and parishes in the U.S. and Canada shall be eligible to earn XSOs subject to the provisions of this section.

9.9.1 Conservation Tillage (2007)

Projects involving specified agricultural soil carbon sequestration activities in designated states, counties, provinces and parishes in the U.S. and Canada shall be eligible to earn CCX Exchange Soil Offsets (XSOs) as per the rates provided in Appendix 9.3A. Eligible U.S. counties and states are provided in Appendix 9.3B.

Eligible conservation tillage practices vary by region and are broadly outlined by zones in the sections below. Practices and implements not specified below may be considered by CCX on case-by-case basis. CCX eligible practices generally follow the Natural Resources Conservation Service (NRCS) guidelines for conservation tillage¹⁶. While ridge till is included under the definition of conservation tillage provided by NRCS, it will not be eligible for Exchange Soil Offsets. As a general rule the tillage practice must leave at least two thirds of the soil surface undisturbed with at least two thirds of the residue remaining on the field surface.

9.9.2 Grassland Planting (2007)

¹⁶ For CCX purposes Conservation Tillage is as defined in the Natural Resources Conservation Service National Handbook of Conservation Practices. These definitions are: No-till/Strip-till - Managing the amount, orientation, and distribution of crop and other plant residue on the surface year-round while growing crops in narrow slots or tilled or residue-free strips in soil previously untilled by full width inversion implement.

Projects involving specified agricultural soil carbon sequestration activities in designated states, counties, provinces and parishes in the U.S. and Canada shall be eligible to earn CCX Exchange Soil Offsets (XSOs) at the specified rates provided for regions listed in Appendix 9.3C. XSOs will be issued to land managers who commit to maintain increases in soil carbon stocks realized as a result of permanent grass cover plantings that were undertaken on or after January 1, 1999. Such grass cover must be maintained through 2010 on the acres specified upon project registration.

An Owner of an Exchange Soil Offset Project may be issued additional XSOs if the Owner presents evidence that actual increases in soil carbon exceed the rates stipulated above, provided such evidence is deemed acceptable by the CCX Offsets Committee.

9.9.3 Rangeland Management (2007)

Exchange Soil Offsets may be issued to land owners who commit to increase Carbon Stocks realized on managed rangelands in approved geographic areas. Eligible projects include:

- a) Non-degraded rangeland managed to increase carbon sequestration through grazing land management that employs sustainable stocking rates, rotational grazing and seasonal use in eligible locations.
- b) Restoration of previously degraded rangeland through adoption of sustainable stocking rates, rotational grazing and seasonal use grazing practices initiated on or after January 1, 1999.

Exchange Soil Offsets will be earned at a specified rate of metric tons CO₂ per acre per year in eligible geographic areas. Verification shall be conducted in accordance with provisions contained in Chapter 10 of the CCX Rulebook. Appendix 9.3D provides the protocol and standards for rangeland sequestration Exchange Soil Offsets¹⁷.

9.9.3.1 Eligible Project locations, Offset Issuance Rates

Eligible rangeland soil carbon management Offset Issuance rates are based on below-ground carbon sequestration rates established for designated Land Resource Regions. Additional Land Resource Regions may be added to the regions listed in Appendix 9.3D. Issuance rates may also reflect the status of the land (degraded or non-degraded) prior to inception of project.

Eligible geographic areas are defined according to USDA Land Resource Region (LRR). Rangeland projects are also bounded by average annual precipitation levels for the specific

¹⁷ Soil sequestration on Rangeland is acknowledged by CCX to be a complex and continually developing area. CCX may update protocols and/or expand eligible geographic areas as new studies and information become available.

region. Rangeland projects must take place in areas where long-term annual average precipitation is not less than 14” and not greater than 40”.

Rangeland Soil Carbon Management Offset Issuance rates are as follows (in metric tons CO₂/acre/year):

Northwestern Wheat and Range Region (LRR B)

Sequestering practices on non-degraded managed rangeland	Restoration of degraded rangeland
0.12	0.20

California Subtropical Fruit, Truck, and Specialty Crop Region¹⁸ (LRR C)

Sequestering practices on non-degraded managed rangeland	Restoration of degraded rangeland
0.16	0.16

Rocky Mountain Range and Forest Region (LRR E)

Sequestering practices on non-degraded managed rangeland	Restoration of degraded rangeland
0.12	0.28

Northern Great Plains Spring Wheat Region (LRR F)

Sequestering practices on non-degraded managed rangeland	Restoration of degraded rangeland
0.12	0.24

Western Great Plains Range and Irrigated Region (LRR G)

Sequestering practices on non-degraded managed rangeland	Restoration of degraded rangeland
0.27	0.40

Central Great Plains Winter Wheat and Range Region (LRR H)

Sequestering practices on non-degraded managed rangeland	Restoration of degraded rangeland
0.20	0.52

Provided the project owner is able to present documentation sufficient to allow independent verification that recognized grazing practices have taken place historically, qualifying lands and

¹⁸ In this region, a key feature of the landscape is the Oak tree layer interspersed within rangelands. Research has shown that the native Oak trees have a positive impact on nutrient cycling, productivity and carbon storage in the soil system. Projects must have left the tree layer intact in order to qualify for Offsets.

practices may be issued CCX Rangeland Soil Carbon Management Offsets for the years 2003 and later.

9.9.4 Additional Regions for Exchange Soil Offsets (2007)

The CCX Offsets Committee may approve other regions of the U.S. and Canada as eligible for generation of Exchange Soil Offsets.

9.9.5 Soil Carbon Reserve Pool (2007)

Each CCX XSO Project shall be required to place 20% of the Offsets it earns into a CCX Soil Carbon Reserve Pool. Such XSOs shall remain the property of the Project Owner(s) (pool participants in the case of aggregated Projects) and all XSOs that remain in the Soil Carbon Reserve Pool for Phase I shall be released to Project Owners at a time that allows the owner to participate in trading before the True-up for the calendar year 2006. Offsets held in Soil Carbon Reserve Pool for Phase II shall be released to Project Owners at a time that allows the owner to participate in trading before the True-up for the calendar year 2010. In the event that a Project Owner does not conform to the XSO performance requirements listed above, such event shall be promptly reported to CCX (such reporting shall occur through a Project's Aggregator if the Project is registered through a CCX Offset Aggregator). CCX will then cancel XSOs held in the Soil Carbon Reserve Pool in an amount equal to the quantity of XSOs previously issued to the Project.

Project Owners may be responsible for replenishing the Soil Carbon Reserve Pool by replacing the XSOs that are cancelled in instances of Project non-performance. Each previously issued XSO must be replaced with one CCX Exchange Allowance or Exchange Offset.

In the case of noncompliance with the terms and conditions for CCX Exchange Soil Offsets the owner of the noncompliant Project shall transfer to the Soil Carbon Reserve Pool (as specified below) a quantity of CCX Exchange Offsets and/or Exchange Allowances that is equal to the total quantity of XSOs that have been issued to the Project during the Phase I and Phase II Market Periods. The Owner of the non-performing Project shall be prohibited from further participation in CCX.

9.9.6 Verification

Unless specified otherwise, verification entities designated by CCX shall conduct in-field inspections of enrolled XSO Projects. Such inspections shall examine field conditions, documentation of Project start dates (when applicable) and other records as may be specified by CCX.

9.10 Exchange Emission Reductions (XERs) (2007)

Exchange Emission Reductions are CCX Exchange Offsets that are issued to owners of the rights to Greenhouse Gas mitigation produced by qualifying Projects undertaken in developing countries. XERs are eligible for Compliance in CCX.

Qualifying XER Projects will include:

- (a) fuel switching,
- (b) renewable energy generation from solar, wind, and biomass systems and,
- (c) heat recovery and energy efficiency projects that displace fossil fuel.

CCX Offsets Committee shall consider such projects on a case-by-case basis.

9.11 Exchange Early Action Credits (XEs) (2006)

Exchange Early Action Credits (XEs) will be issued to certain Projects undertaken from 1995 through 1998. To qualify, a Project must be:

- (1) off-system; or an Owned and Operated project;
- (2) originally undertaken or financed by CCX Members;
- (3) direct emission reductions or involve sequestration;
- (4) legally owned by the CCX Member;
- (5) measured and verified; and,
- (6) registered in the U.S. Department of Energy 1605(b) database, the U.S. Initiative on Joint Implementation program, or an equivalent registry system.

Unless specifically approved by the CCX Offset Committee, XEs can only be used for Compliance by the CCX Member that originally owned them. XEs are not transferable among Registry Account Holders, unless authorized by CCX.

Exchange Early Action Credits will be given to the following Project types that meet the eligibility criteria:

- (i) reforestation, afforestation and avoided deforestation;
- (ii) methane destruction in the U.S.; or,
- (iii) fuel switching and other energy related United States Initiative on Joint Implementation (USIJI) Projects.

Exchange Early Action Credits will be issued on the basis of mitigation tonnage realized by the qualifying Project during the years 1995 through 2010. Applicable verification requirements shall be the same as those required for comparable Offset Project types.

9.12 CCX Offset Issuance for Electricity Produced by Renewable Energy (8/12/2005)

9.12.1 General Provision

In reflection of CO₂ emissions displacement, CCX Offsets will be issued to legal owners of offsets produced by eligible renewable energy facilities on the basis of electricity produced by such facilities.

9.12.2 Eligible Entities

The entity types eligible to earn CCX Offsets from renewable energy facilities are defined as entities that undertake sales of electricity produced by renewable energy systems to entities that are not engaged in production and sale of electricity.¹⁹

9.12.3 Facilities Eligible to Produce Offsets (2008)

Offsets may be generated by eligible renewable energy facilities owned by an Eligible Entity and placed into service on or after January 1, 1999.

As provided in Section 4.10.1, eligible facility types shall be electricity generation systems associated with CCX recognized renewable energy sources, which are:

- Solar;
- Wind;
- renewable fuels, which, for CCX purposes are:
 - wood, wood waste and wood-derived fuels
 - agricultural residues and grasses
 - landfill, agricultural and coal mine methane,
 - ethanol (bioalcohol).

9.12.3.1 Facilities Using Renewable Fuels

Offsets produced by eligible facilities using renewable fuel along with, or in place of, non-renewable fuel shall determine the amount of eligible offsets based on emissions displaced. Displaced emissions are those that would have otherwise been emitted if the equivalent energy content of non-renewable fuel was used instead of renewable fuel. Therefore, displaced emissions are calculated by multiplying the annual heat input of the renewable fuel by the emission rate per unit of energy of the non-renewable fuel. (Calculation assumes all renewable fuels are considered CO₂ neutral).

¹⁹ As provided in Section 9.1, CCX will not accept registration of Offsets or Offset Projects that are owned (in full or partially) by an entity that is eligible to be a CCX Member but is not a Member. This prohibition also extends to entities that may have no direct ownership but have a beneficial interest in such Offset Project(s)

9.12.4 Required Energy Contract Conditions

CCX Offsets for electricity produced by eligible renewable energy facilities can be issued only if the owner of the facility conforms with all of the following requirements:

1. The entity that operates the facility producing the proposed offsets must establish in its power purchase agreement contracts that it retains all green attributes associated with the electric power generated.
2. The entity that operates the facility producing the proposed offsets must not sell its generated electricity as “green power” or allow other entities that may resell such electricity to make such claim.
3. If power production by the facility that produces the proposed offsets yields Renewable Energy Certificates (RECs), those RECS must be surrendered to and retired by CCX in order to allow issuance of Offsets.
4. The renewable energy facility producing the proposed offsets is not counted towards meeting obligations established by state or local renewable energy mandates.

The CCX Offsets Committee shall review all proposed renewable energy-based offsets. Such reviews will include an assessment of the four conditions cited above as well as any other circumstances that could result in double-counting of emission reductions associated with the proposed offsets. The entity proposing registration of renewable energy-based offsets shall provide information requested by the Offsets Committee as it undertakes such reviews.

9.12.5 Offset Issuance Rate (2007)

CCX Offsets will be issued at a rate of metric tons CO₂ per megawatt-hour generated by eligible renewable energy facilities as determined by region specific values of the U.S. EPA’s Emissions and Generation Resource Integrated Database (eGRID) tool.

9.13 CCX Offset Issuance for Destruction of Ozone Depleting Substances (2007)

9.13.1 General Provision

In reflection of the destruction of ozone depleting substances (ODS), CCX Offsets will be issued to CCX members who undertake the destruction of certain ODS.

9.13.2 Eligible Entities

Eligible entities are those that facilitate the destruction of selected ODS at a facility that meets all Clean Air Act Amendments (CAAA) and Resource Conservation and Recovery Act regulatory requirements. Entities and facilities that destroy imported ODS must demonstrate that the material was imported into the U.S. in accordance with CAAA requirements.

CCX eligibility requirements for issuing offset for ODS destruction as Exchange Fluorocarbon Destruction Offsets (XFDOs) are as follows:

- CFCs, halons, carbon tetrachloride, methyl chloroform, hydrobromofluorocarbons, and HCFC-141b destroyed on or after January 1, 2007 can be registered and traded on the CCX.

In order for a project to be deemed eligible, the project activity cannot be undertaken to come into compliance with existing or imminent legislation. As of July 2007, ODS destruction would exceed federal, state, and/or local requirements governing GHG emissions, therefore, any destruction project involving ODS that has been phased out of production will be considered eligible. However, because new regulations may be implemented in the future, CCX members must demonstrate that federal, state and/or local regulations do not require ODS destruction when implementing specific, individual projects.

9.13.5 Offset Issuance Rate

Offsets shall be issued on the basis of the global warming potential of the ODS destroyed less 25%. Appendix 9.4 provides the protocol to be employed in quantifying ODS destruction for CCX XFDO Projects.

APPENDICES
TO
CHAPTER 9

Appendix 9.1A Protocol for Measuring and Verifying Greenhouse Gas Reductions from Landfills (1/21/2004)

INTRODUCTION

The purpose of this protocol is to address the measurement and verification of methane emissions reductions from the combustion of landfill gas (LFG) for the Chicago Climate Exchange (CCX).

Topics covered in this document include the following:

- Overview of requirements and overall approach for crediting methane reductions from landfills as emission offsets;
- Protocol for measuring, recording, and verifying methane recovery rates based on LFG flow and methane measurements;
- Use of measured data to calculate methane emission reductions at non-regulated sites;
- An alternative method for calculating methane emission reductions at LFG-to-energy facilities;
- Protocol to distinguish methane recovery resulting from early system installation vs. methane recovery from systems installed to meet regulatory requirements; and

Topics not included in this document include the following:

- Accounting for (carbon dioxide) emission reductions that may result from displacement of other fuels used in power production;
- Protocol for offsets for expanded LFG recovery from regulated sites other than from accelerated recovery (i.e., before required by regulation) from new cells;
- Accounting for effects of oxidation when calculating methane emissions reduction; and
- Protocol for offsets from other measures to reduce methane emissions through enhanced recovery or oxidation, including: 1) Geomembranes; 2) Bio-covers; and 3) Bioreactors.
- Third party verification requirements. Verification shall be conducted in accordance with the provisions contained in Chapter 10 of the CCX Rulebook and as prescribed by the CCX Offsets Committee.

Requirements and Overall Approach for Crediting Methane Reductions

For CCX purposes landfills are treated as providers of emission Offsets. CCX eligibility requirements for methane reductions from landfills are provided in Chapter 9 of the CCX

Rulebook. That Chapter also addresses Offset issuance rates for methane capture and combustion systems.

Landfill methane collection and combustion systems in the U.S. may be registered with CCX and may earn XMOs only for mitigation occurring during the time periods for which the landfill was not required to control LFG emissions (which is most commonly undertaken through methane collection and combustion systems) in accordance with U.S. regulations. The most commonly applicable regulations for U.S. landfills are the rules governing control of New Source Performance Standards (NSPS) rules (40 CFR Subpart WWW), which define if, when and how a gas collection and control system (GCCS) is required and how much non methane organic compounds (NMOC) must be controlled. The NSPS rules apply to landfills with design capacities greater than 2.5 million megagrams (2.75 million tons) that began receiving waste or commenced construction, reconstruction, or modification on or after May 30, 1991. These landfills are known as “new sources.” Landfills above the 2.5 million megagram design capacity threshold that operated between November 8, 1987 and May 30, 1991, or have capacity available for future waste deposition, are considered “existing sources” and are regulated under the Emissions Guidelines (EG) rule. The EG rule has the same requirements as the NSPS rule for control of LFG emissions. These rules require a landfill to control emissions of non-methane organic compounds (NMOCs), a class of air pollutants present in LFG, when the estimated NMOC emissions exceed 50 megagrams or 55 tons per year. A GCCS must be installed to control NMOC emissions within 30 months of the time the landfill reports that its NMOC emissions exceed the 50 megagram threshold.

The NSPS rule also defines how quickly the GCCS needs to be expanded to incorporate recently deposited waste. The landfill must install wells in new waste cells and extract and control the NMOCs present in the LFG within 5 years of the time waste is first placed in the cell if the cell is still active, or within 2 years of the time waste is first placed in the cell if the cell is closed or at final grade.

While the NSPS rule provides clear definitions of the timing of required GCCS installations and expansions into new cells, there is no clear definition of what constitutes an NSPS-compliant system. The rule only specifies that the GCCS must be able to handle maximum expected flows from the entire landfill, and to minimize off-site subsurface migration or surface emissions. Additional extraction wells must be installed in areas of the landfill where monitored methane concentrations near the landfill surface exceed 500 parts per million (ppm) over a specified period of time. However, there does not appear to be a correlation between the number of 500 ppm exceedances and the ability of the GCCS to recover generated LFG.²⁰

Accordingly, this protocol includes methods to distinguish methane emissions reduction resulting from early system installations (i.e., prior to the date required by NSPS), either in the case of new system installations or in the case of expansion of the system into new refuse cells. However, this protocol does not include methods for determining methane emissions reductions

²⁰See Pierce, J.L. and Stege, A., 2002. Measurement and characterization of landfill gas surface emissions at landfills with soil covers. WasteCon, October 2002.

resulting from improvements to GCCSs beyond what is required by NSPS or other regulations, nor does it include methods for estimating methane emissions reductions from the installation of geo-membranes, biocovers, or bioreactors. The lack of those procedures in this protocol does not preclude later consideration of such methods.

The overall approach to quantifying methane emissions reductions described in this report is to rely on measured quantities of methane collected and destroyed through the operation of a GCCS. Direct measurement by continuous monitoring of methane recovery is the most desirable method. Periodic measurement of methane concentrations in LFG, coupled with continuous monitoring of LFG flows is considered acceptable. Details on acceptable methods for recording rates of methane emissions reduction from both non-regulated and regulated sites are provided in the remainder of this protocol.

PROTOCOL FOR RECORDING METHANE EMISSIONS REDUCTIONS

Rates of methane capture and destruction at a landfill are a function of the following measurable quantities:

- The rate of landfill gas (LFG) flow to the control device (flare station, power plant, or other facility that combusts collected LFG);
- The methane content of the recovered LFG; and
- The methane destruction efficiency in the control device.

Since methane is the combustion fuel for the control device and is reduced (from about 20 to 55 percent by volume of the LFG) to ppm levels as a result of combustion, the destruction efficiency will be very near 100 percent in all cases (typically about 99.9%) and destruction rates can be assumed to be 100%. Methane recovery rates are therefore considered to be equivalent to methane emissions reductions.

Standard protocols for measuring the flow rate and methane content of recovered LFG are described below. An alternative method for measuring methane combustion rates at energy recovery facilities is provided at the end of this section. Also provided is a discussion of methods for calculating methane emissions reductions at non-regulated sites.

LFG Flow Rate Measurements

LFG flow rates are to be measured upstream of the control device by means of an installed flow metering device. The LFG flow rate at the control device is not equivalent to the sum of LFG flows measured at individual wells (due to losses and/or air infiltration along the collection piping and the cumulative errors inherent in multiple flow rate measurements); measurement of LFG flows from individual wells is not an acceptable quantification method. The protocol for measuring LFG flow using a flow meter is described below.

Flow Meter Requirements

Instrument Description

The following description of the types of flow meters and recommended flow meter installation points has been taken from the Solid Waste Association of North America's manual of practice for landfill gas operations and maintenance.²¹

The most common types of flow meters measure flow by sensing differential pressure. Examples include the orifice plate, pitot tube, venturi tube, and the averaging pitot tube (e.g., Annubar™). These flow meters measure flow using a standard mathematical formula without the need to modify the result based on proprietary device-specific information. The Annubar™ relies on proprietary information supplied by the manufacturer, such as a correction coefficient, chart, or flow computer to determine the flow. The flow meter may be read using a pressure gauge, or it may require a differential pressure transmitter which sends a signal to the flow computer or flow readout device. Instantaneous readings are typically recorded on a chart recorder.

Other types of flow meters such as hot wire anemometers produce an electronic signal based on the cooling effect on a filament caused by the gas flow. These devices are sensitive to the LFG flow rate, the moisture content, and the gas composition, and require re-calibration to yield accurate measurements when the gas composition changes. However, they are widely used within the LFG industry and are acceptable if calibrated to site conditions.

The flow meter should be installed along the header pipe at a location that provides a straight section of pipe sufficient to establish laminar gas flow, as turbulent flow resulting from bends, obstructions, or constrictions in the pipe can cause interference with flow measurements which rely on differential pressure. The most desirable location for the flow meter is downstream of the blower and upstream of the control device because the LFG is drier and under slight pressure instead of vacuum. The flow meter may also be installed upstream of the blower and downstream of the moisture separator.

Performance Standards

The following information regarding flow meter performance must be maintained and may be required by CCX to be included in Project Reports:

- Manufacturer specifications of flow meter accuracy should be +/- 5% of reading;
- Proof of initial calibration;
- Capability to record flow every 15 minutes; and
- Means to correct for temperature and pressure.

²¹ Solid Waste Association of North America, 1997. Landfill gas operation and maintenance – manual of practice.

Instrument Maintenance and Periodic Check of Flow Meter Accuracy

Installed flow meters should be inspected, cleaned, and checked for accuracy using a portable instrument such as a pitot tube to measure the flow velocities along a transverse of the header pipe. The velocity measurements are then used to calculate a flow rate, which is typically accurate to within 10 percent in larger pipes (greater than 4 inch diameter). The inspection, cleaning, and flow verification should be done at least quarterly. Alternately, annual calibration of the flow meter may be performed in lieu of the quarterly flow field check, provided that the following conditions are met:

- Calibrations are performed in accordance with manufacturer's specifications;
- Calibrations are performed by the manufacturer, or using manufacturer-approved methodologies; and
- All records of calibration reports and methodologies are documented and made available for review during the verification process.

Recordkeeping

The following records of LFG flows to the control device are to be kept in order to verify methane emissions reductions:

- Type of flow meter;
- Date and location of flow meter installation;
- Dates and results of flow meter calibration;
- Copies of charts or diskettes on which flow rates were recorded;
- Monthly tabulations of number of hours control device was shut down (no Offsets will be issued by CCX for periods during which the control device is not operated);
- Monthly tabulations of unadjusted total daily LFG flow to the control device (in actual cubic feet per day);
- Copies of field data used for flow measurement calibration;
- Monthly tabulations of daily LFG flow rate standardization calculations and results (in standard cubic feet per day);
- Information on the portable instrument and procedures used to check the installed flow meter accuracy, including field measurements and flow calculations; and
- Records of third-party verification of flow measurements and procedures.

The above-listed records need to be kept readily accessible and on-site for at least 2 years after the date that annual methane emissions reductions for the site have been recorded at the CCX and may be required by CCX to be included in Project Reports.

Methane Concentration Measurements

Measurement of the methane concentration of LFG is almost exclusively performed using an infrared gas analyzer (for example, the GEM-500 and GEM-2000 manufactured by LandTec, Inc.). Methane concentration measurements should be taken at approximately the same location as the flow meter. Measurements can be taken directly by connecting the sampling tube to a sampling port, or they can be taken from an LFG sample collected in a Tedlar bag or Summa canister or any other EPA-approved sampling method.

Instrument Requirements

Performance Standards

The following performance standards are recommended for current measurements for the calculation basis of Exchange Methane Offsets:

- Precision: Methane measurements are to be to the nearest 0.1 percent.
- Accuracy: Methane measurement accuracy decreases with increasing methane concentration but should be within +/- 10 percent of reading, as specified by the manufacturer.

Alternate instruments, including gas chromatographs or thermal conductivity detectors must meet similar standards.

Instrument Calibration Procedures

Hand-held gas analyzing instruments shall be calibrated against a gas sample with a known methane concentration prior to each day of use. A calibration gas with a methane concentration close to the concentration expected in the field (i.e., 40 to 50% methane) is optimal. Instructions in the instrument manual regarding details on the calibration procedures, including instrument adjustments and factory recommended calibration intervals shall be utilized. Records of all field and factory calibrations shall be kept at the facility.

Where permanently installed gas analyzers are in use, all calibration procedures recommended by the equipment manufacturer shall be properly adhered to. At a minimum, the analyzer shall be calibrated according to the manufacturer's recommended frequency. Records of all calibrations shall be kept at the facility.

Frequency of Recording

Although continuous monitoring of the methane concentration of recovered LFG would be optimal, it is not practical given the instruments available to the LFG industry currently. Unlike LFG flow rates, methane concentrations are not likely to vary dramatically over short time periods. The minimum frequency of measurement is at least monthly for Exchange Methane Offsets. “Grandfathered” Early Action Credits may go back to 1995 and data may not be archived for all sites. Where methane content measurement data is available, the average concentration measured for the year should be the concentration used to determine total methane destruction. Where data is not available the average landfill gas methane concentration of 45% will be used.

Recordkeeping

The following records of measured methane concentrations are to be kept in order to verify methane emissions reductions:

- Type of instrument.
- Dates and results of instrument calibration.
- Dates and results of methane measurement.
- Monthly tabulations of measured methane concentrations.
- Records of third-party verification of methane measurements and procedures.

The above-listed records need to be kept readily accessible and on-site for at least 2 years after the date that annual emissions reductions for the site have been registered with CCX and may be required by CCX to be included in Project Reports.

Calculating Total Daily, Monthly, and Annual Methane Flows

Tabulated records of total daily LFG flows (in standard cubic feet per day) need to be matched against methane concentrations measured during the corresponding time period to determine daily methane recovery rates, using equation 1:

Equation 1:

$$[\text{CH}_4 \text{ recovered (standard ft}^3\text{/day)}] = [\text{LFG recovered (standard ft}^3\text{/day)}] \times [\% \text{CH}_4]$$

The methane value used in the calculation should be the measurement that is the closest available in time to the date of the flow measurement, and in no case be more than 4 days distant from the date of the flow measurement. Daily methane flows should be tabulated and summed on a

monthly basis. Total annual methane recovery from the landfill is to be tabulated using the monthly summaries of methane recovery.

In order to estimate the amount of methane combusted in metric tons per year (Mg/yr), the annual methane recovery rate in cubic feet per year needs to be converted to weight using Equation 2:

Equation 2:

$$\text{CH}_4 \text{ combusted (Mg/yr)} = [\text{CH}_4 \text{ recovery (ft}^3\text{/yr)}] \times [16.04 \text{ (molecular weight of CH}_4\text{)}] \times [1\text{Mg}/10^6 \text{ g}]^* [1\text{mol}/24.04\text{L @ STP}] \times [28.32\text{L}/1\text{cf}]$$

Alternative Method for Calculating Methane Combustion Rates

Energy recovery facilities that use LFG as a fuel to generate electricity typically have detailed records of electrical generation rates in kilowatt-hours (kWhr) that can be used to calculate methane combustion rates. Information on the heat rate of the combustion unit in Btus per kilowatt hour (Btu/kWhr) can be used to calculate Btus of methane combusted. Typically, the high heating value of methane (1,012 Btus per cubic foot) is used to convert to a methane flow rate. The calculation can be summarized as provided in Equation 3:

Equation 3:

$$\text{Methane recovery (ft}^3\text{)} = [\text{kWhr of electricity produced from the LFG fuel}] \times [\text{heat rate in Btu/kWhr}] / [1012 \text{ Btu/ft}^3 \text{ (HHV of methane)}]$$

To estimate annual methane combustion rates, use the amount of electricity generated over a one year period in the equation above. The heat rate used in the calculation should be from the most recent source test for the combustion device. If no source test information is available, the heat rate per the manufacturer's specifications should be used.

This alternative method for calculating methane combustion rates at energy recovery facilities is preferred over the standard method applicable to other facilities (i.e., flares) because it does not rely on monthly methane concentration measurements and is therefore more accurate.

Performance Standards

The following information regarding the measurement of methane combustion at energy recovery facilities must be maintained and may be required by CCX to be included in Project Reports:

- Type, make, and model number of combustion unit(s);

- Number of combustion units that exclusively use LFG as fuel;
- Heat rate of combustion device(s) per manufacturer's specifications;
- Copy of a summary table from the most recent source test showing the measured heat rate of combustion device(s);
- Summary tables showing kWhr of electricity produced from LFG per month over the annual period;
- Type of electrical metering device; and
- Accuracy, precision, and calibration information on the metering device per manufacturer.

PROTOCOL FOR DETERMINING ELIGIBLE METHANE EMISSIONS REDUCTIONS FROM REGULATED (NSPS) SITES

Methane emissions reductions from landfills required to collect and destroy LFG NMOC emissions due to NSPS or other regulations (including enforcement, e.g., consent order) are not eligible to earn CCX Offsets unless the emission reductions occur prior to the date that NSPS or other requirements apply.

Methods for Determining Eligibility of Methane Reductions Prior to NSPS Regulation

All methane recovered from a landfill prior to the date that NSPS or other regulation requires the GCCS to be operational is potentially eligible to earn CCX Offsets. Methane emissions reductions are no longer eligible starting on the date of required system start-up, except for methane recovery from new cells (see below for NSPS applicability). The NSPS-required system start-up date is 30 months after the landfill first reports that its NMOC emissions are over 50 megagrams per year. Since the NSPS rule requires regular (at least once every 5 years) reporting of current and projected NMOC emissions to the EPA, the required system start-up date is well-defined.

The protocol for establishing emissions reductions due to early system operation at NSPS sites is the same as for non-regulated sites. The same data measurement, verification, recordkeeping, and reporting procedures are to be followed, with the following additional requirements:

- Records of the system start-up date need to be kept on-site for at least 2 years after the final submittal of methane emissions reduction reports to CCX. Copies of start-up date records must be maintained and may be required by CCX to be included in Project reports.
- NSPS reports providing NMOC emission rate estimates, including Tier 1 and Tier 2 reports, need to be kept on site for at least 2 years after the final submittal of methane emissions reduction reports to CCX. Copies of the results of the Tier 1 and/or Tier 2 NMOC emission rate estimates and the projected date when system

start-up will be required by NSPS should be maintained and may be required by CCX to be included in Project reports. reductions to CCX.

Methods for Determining Reductions in Methane Emissions Due to Accelerated Wellfield Installation in New Refuse Cells

All methane recovered from active waste cells that have refuse in place for less than 5 years, and all methane recovered from inactive cells that have refuse in place for less than 2 years, is potentially eligible to be counted as methane emissions reductions. The protocol for determining whether the 5 or 2-year age requirement is met and for measuring methane recovery from the new cells is described below.

Protocol for Establishing Age of Refuse Cells

The following recordkeeping, reporting, and data verification procedures should be followed to establish that the 5 or 2-year age limit requirements are met:

- A plan-view site drawing showing the following items must be kept on-site for at least 2 years after the final submittal of the methane emissions reduction report to CCX may require that such documents be included in Project Reports: A delineation of the refuse cell boundaries;
 - A delineation of the refuse cell boundaries;
 - The locations of extraction wells installed in the cell;
 - The locations of collection system piping connecting the cell's extraction wells to the rest of the GCCS; and
 - The location where flow and methane measurements are taken.
- Records of showing the date that refuse was first placed in the cell must be kept on-site for at least 2 years after the final submittal of the methane emissions reduction report to the CCX and CCX may require inclusion of such records in CCX Project Reports.

Methods for Measuring Accelerated Methane Recovery from New Cells

Methods for measuring methane recovery from new refuse cells meeting the 5 and 2-year age limit include methods which rely on direct measurements alone and methods which rely on a combination of direct measurements and indirect calculations. Both approaches require that the collection system is designed to allow LFG collected from the new refuse cells to remain separate from LFG collected from other cells, at least up to the point where the LFG flows and methane content can be measured. This requirement makes necessary a separate gas conveyance line (header piping) from the new cells.

Methods relying solely on direct measurement of methane flows require the installation of a flow meter and an LFG sampling port at some point along the header pipe collecting LFG from just the new cell(s). LFG flows and methane contents are to be measured at this location using the same procedure as described previously for measurement of methane recovery from the entire landfill for eligible sites. Recordkeeping, reporting, and verification of the measured methane recovery rates and conversion of methane flows to tons of CO₂-equivalent emissions reductions are also the same as described previously.

If installation of a fixed flow meter along the header pipe collecting LFG from the new cells is not practical, periodic measurements are acceptable if the following protocol is followed:

- Establish baseline methane recovery rates from the entire (NSPS) system prior to expanding the system to collect LFG from the new cells. The baseline methane recovery rate should be in standard cubic feet per minute (scfm) and be the average value from one month of measurements taken using the measuring procedures described previously for measuring methane recovery from eligible sites. The baseline recovery rates should be representative of normal operations and not be measured when there are problems with the wellfield.
- Shortly after wells installed in the new cells are operational, conduct new measurements of average methane recovery from the entire site (in scfm), based on one month of measurements taken using the measurement procedures described previously. The difference between the new methane recovery rates and the baseline methane recovery rates equals the initial rate of incremental methane emissions reductions.
- Ongoing methane emissions reduction quantification is to be based on average methane recovery rates (in scfm) as measured along the header pipe collecting LFG exclusively from the new cells. The measurement of methane recovery from the new cells should be conducted using the following procedures:
 1. Use a portable flow measuring device such as a pitot tube that meets the standards described in a previous section, “Flow Meter Requirements.”
 2. Use an infrared gas analyzer (such as a GEM-500) or alternative instrumentation that meets the standards described in a previous section, “Methane Concentration Measurements.”
 3. Take measurements of LFG flow and methane concentrations each week, starting one week after the initial rate of methane emissions reductions is established. Adjust measured LFG flow rates to scfm.
 4. Calculate an average daily methane recovery rate from the new cells. Calculate the percentage of sitewide methane recovery derived from the new cells.

Ongoing emissions reduction quantification would be based on continuous flow monitoring (and weekly methane concentration measurements) for the entire system and weekly LFG flow and

methane concentration measurements from the expansion system only. If fluctuations in total site methane recovery are indicated, compare the most recent measured methane recovery rate from the new cells with an estimated methane recovery rate from the new cells calculated from the total site methane recovery rate and the most recently measured percentage of methane recovery from the new cells. Use the lower of the two methane recovery values.

Recordkeeping, Reporting, and Verification Requirements

Recordkeeping, reporting, and data verification requirements described above for measuring methane recovery from eligible sites and for confirming that the 5 and 2-year refuse age requirements are met are applicable to NSPS or similarly affected landfills that recover additional methane as a result of accelerated installation of wells in new cells

As indicated above, additional calculation steps will be required to calculate daily methane recovery from average methane recovery rates (in scfm) at landfills that use indirect methods to calculate methane recovery from accelerated installation of wells in new cells.

Appendix 9.1B Protocol For Quantifying Greenhouse Gas Reductions From Agricultural Methane Capture (2007)

Eligibility

Projects eligible for anaerobic digester offsets must have prior (baseline) manure management practices^{22,23} where manure is handled as a liquid and with significant methane emitting potential, including:

1. Liquid/slurry storage
2. Pit storage below animal confinements (for periods exceeding one month)
3. Uncovered anaerobic lagoons

Eligible projects with additional baseline manure management systems other than those listed above may include only that portion of the manure handled by eligible systems in any baseline emission and offset credit calculations.

Although the use of non-manure feedstocks may result in additional emission reductions, such use should be treated as a separate project activity and is not included in the specific calculation of agricultural methane offsets for anaerobic manure digester projects.

Baseline calculation

The emissions baseline is the amount of methane that would be emitted to the atmosphere during the crediting period in the absence of the anaerobic digester project. For each year during the crediting period, baseline emissions for all anaerobic digesters are calculated as specified in paragraph (a) and paragraph (b) below, and the lower of the two values will be used:

- (c) Actual monitored amount of methane captured and destroyed by the project activity using existing CCX monitoring protocols and a GWP for methane of 21). The default methane combustion efficiency for flared biogas from anaerobic digesters is 90%. Higher efficiencies may be used if supported by manufacturer's specifications or other acceptable data. The default methane combustion efficiency for biogas utilized by electricity gensets is 100%.
- (d) The methane emission calculated ex ante based on the amount of the animal manure that would decay anaerobically in the absence of the project activity, using the most

²² IPCC 2000, Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories (May 2000)

²³ Table 10.18. Definitions of Manure Management Systems. 2006 IPCC Guidelines for National Greenhouse Gas Inventories.

recent country-specific IPCC tier 2 approach (for a description of the proposed calculation methods for projects in the U.S., see Appendix B).

Exclusion of nitrous oxide emissions from baseline calculations

Eligible projects, as defined above, utilize liquid manure management systems for baseline determination. Direct nitrous oxide emissions for these liquid manure management systems is expected to be relatively small based on IPCC and US National Inventory accounting methods and default emission factors; in most cases contributing significantly less than 5% of the total baseline GHG emissions. Therefore potential nitrous oxide emissions are excluded from baseline calculations. Projects that may reduce direct or indirect nitrous oxide emissions resulting in additional emission reductions would need to account for such reductions as a separate project activity.

Agriculture Methane Emission Destruction

This protocol provides the methods to be employed in quantifying methane combustion by agricultural methane Projects. The Project Verifier must document (among other items):

- (4) the Project Owner's clear ownership rights to Greenhouse Gas emission reductions associated with sites included in the Project;
- (5) eligibility of the site to earn CCX XMOs; and,
- (6) records of methane content and total gas flows or total electricity generation and engine manufacturer's efficiency rating (if applicable).

XMO Project Registration, Verification and Project Reports

Registration of each CCX XMO Project must be accompanied by a Project eligibility statement prepared by a CCX-approved Verifier. The Project Registration Filing must include a signed attestation that the entity registering as the CCX Project Owner holds full legal title to the Greenhouse Gas mitigation rights registered as CCX Exchange Offsets that are associated with the facilities included in the registered Project. The filings must contain an attestation by a CCX-approved Verifier as to the quantity of mitigation achieved and Exchange Offset issuance that is prepared in conformance with the rules provided herein, and with the verification protocols prescribed by the Exchange.

Protocol for Quantifying Greenhouse Gas Reductions from Anaerobic Manure Digesters

Introduction

The purpose of this protocol is to address the measurement and verification of methane emissions reductions from the combustion of biogas for the Chicago Climate Exchange (CCX).

Topics covered in this document:

- Overall approach for crediting methane reductions from anaerobic digestion of animal manure as emission offsets;
- Protocol for measuring, recording, and verifying anaerobic digester methane recovery rates based on biogas flow and methane measurements; and,
- Protocol for verifying ex ante calculation of methane generation.

Topics not included:

- Accounting for (carbon dioxide) emissions reductions that may result from displacement of other fuels used in power production; and

Requirements and Overall Approach for Crediting Methane Reductions

For CCX purposes, anaerobic digesters are treated as providers of Exchange Methane Offsets. CCX eligibility requirements for methane reductions from anaerobic digesters include the following:

- A company must demonstrate clear ownership rights of the emission reductions from the destruction of methane in order to register the offsets with CCX.
- Projects eligible to earn offsets during the years 2003 through 2006 are those placed into service on or after January 1, 1999.
- Except as may be provided by CCX, procedures outlined in this protocol must be followed to quantify methane emission reductions.
- Eligible animal manure biogas methane collection and combustion systems will be issued Offsets for methane collected and destroyed in accordance with this protocol. Such issuance shall occur at a rate of 21 metric tons CO₂ per metric ton of methane.

The overall approach to quantifying methane emissions reductions described in this report is to rely on the lesser of measured or calculated quantities of methane collected through the operation

of an anaerobic digester and destroyed by combustion in a flare or energy recovery facility. Details on acceptable methods for recording rates of methane emissions reduction from combustion of biogas produced from anaerobic digestion of animal manures are provided.

Although there are no regulations currently requiring the control of biogas emissions from the treatment of animal manures using anaerobic digestion or other methods, the USEPA's National Resource Conservation Service has published a guidance document for the operation of three categories of anaerobic digesters, including: (1) covered anaerobic lagoons; (2) complete mix digesters; and (3) plug flow digesters. The guidance document contains practice standards that should be followed at anaerobic digester facilities seeking to earn offsets through methane emissions reductions. The standards are included as Appendix F of a handbook on the use of biogas technologies for managing livestock manure, which is available on the web at <http://www.epa.gov/outreach/agstar/library/handbook/appendixf.pdf>.

Protocol for Quantifying Methane Emissions Reductions

Rates of methane capture and destruction at a biogas facility are a function of the following measurable quantities:

- The rate of biogas flow to the control device (flare station, power plant, or other facility that combusts collected biogas);
- The methane content of the recovered biogas; and
- The methane destruction efficiency in the control device.

Standard protocols for measuring the flow rate and methane content of recovered biogas are described below. An alternative method for measuring methane combustion rates at energy recovery facilities also is provided.

Biogas Flow Rate Measurements

Biogas flow rates are to be measured upstream of the control device by means of an installed flow meter device. The protocol for measuring biogas flow using a flow meter is described below.

Flow Meter Requirements

The following description of the types of flow meters and recommended flow meter installation points has been taken from the Solid Waste Association of North America's manual of practice for landfill gas operations and maintenance.²⁴

The most common types of flow meters measure flow by sensing differential pressure. Examples include the orifice plate, pitot tube, venturi tube, and the averaging pitot tube (e.g., Annubar[™]). These flow meters measure flow using a standard mathematical formula without the need to modify the result based on proprietary device-specific information. The Annubar[™] relies on proprietary information supplied by the manufacturer, such as a correction coefficient, chart, or flow computer to determine the flow. The flow meter may be read using a pressure gauge, or it may require a differential pressure transmitter which sends a signal to the flow computer or flow readout device. Instantaneous readings are typically recorded on a chart recorder.

Other types of flow meters such as hot wire anemometers produce an electronic signal based on the cooling effect on a filament caused by the gas flow. These devices are sensitive to the biogas flow rate, the moisture content, and the gas composition, and require re-calibration to yield accurate measurements when the gas composition changes. However, they are widely used within the biogas industry and are acceptable if calibrated to site conditions.

The flow meter should be installed along the header pipe at a location that provides a straight section of pipe sufficient to establish laminar gas flow, as turbulent flow resulting from bends, obstructions, or constrictions in the pipe can cause interference with flow measurements which rely on differential pressure. The most desirable location for the flow meter is downstream of the blower and upstream of the control device because the biogas is drier and under slight pressure instead of vacuum.

The following information regarding flow meter performance must be maintained and may be required by CCX to be included in Project Reports:

- Accuracy, precision per manufacturer;
- Proof of initial calibration;
- Means to correct for temperature and pressure.

Installed flow meters should be inspected, cleaned, and checked for accuracy using a portable instrument such as a pitot tube to measure the flow velocities along a transverse of the header pipe. The velocity measurements are then used to calculate a flow rate, which is typically accurate to within 2 percent in larger pipes (greater than 4 inch diameter). The inspection, cleaning, and flow verification should be done at least quarterly.

²⁴ Solid Waste Association of North America, 1997. Landfill gas operation and maintenance – manual of practice.

Recordkeeping

The following records of biogas flows to the control device are to be kept in order to verify methane emissions reductions:

- Type of flow meter;
- Date and location of flow meter installation;
- Dates and results of flow meter calibration;
- Copies of charts or diskettes on which flow rates were recorded;
- Monthly tabulations of number of hours control device was shut down (no offsets will be issued by CCX for periods during which the control device is not operated);
- Copies of field data used for flow measurement standardization, including barometric pressure, biogas temperature and pressure measurements, and biogas characteristics (percent methane, oxygen, water);
- Monthly tabulations of hourly biogas flow rate standardization calculations and results (in standard cubic feet per hour);
- Information on the portable instrument and procedures used to check the installed flow meter accuracy, including field measurements and flow calculations; and
- Records of third-party verification of flow measurements and procedures.

The above-listed records need to be kept readily accessible and on-site for at least 2 years after the date that annual methane emissions reductions for the site have been recorded at the CCX and may be required by CCX to be included in Project Reports.

Third-Party Verification of Gas Flow Measurements and Procedures

At least once per year, biogas flow measurements, records, and procedures should be verified as acceptable per the CCX protocol by a CCX-approved Verifier.

Methane Concentration Measurements

Offset providers who wish to use default factors (provided below) for methane concentration are required to provide laboratory analysis of methane concentration at least once per year. Offset providers who wish to receive credit for values in excess of the established default values must provide hourly averaged methane concentration data using the protocols described below.

Default values for methane concentration:

- Entities able to provide laboratory analysis of methane concentration between 70.0% and 74.9% for biogas digesters will be assigned a default value of 70%.
- Entities able to provide laboratory analysis of methane concentration between 65.0% and 69.9% for biogas digesters will be assigned a default value of 65%.
- Entities able to provide laboratory analysis of methane concentration between 60.0% and 64.9% for biogas digesters will be assigned a default value of 60%.

Default values will be reevaluated on a yearly basis and will be adjusted according to the most current laboratory analysis.

The methane concentration of biogas is typically measured using instrumentation located inside the digester, as methane concentrations are an important parameter to be monitored during digester operations. Instruments collect samples from gases that accumulate near the roof of the digester and provide periodic or continuous biogas methane concentrations.

The following information regarding methane concentration measurement instrumentation must be submitted:

- Accuracy, precision per manufacturer;
- Proof of initial calibration;
- Records of periodic instrument calibration (according to the manufacturers instructions for calibration);
- Capability to record methane concentrations at least every 15 minutes for entities not using default values for methane content.

The gas analyzer instrument needs to be calibrated against a gas sample with a known methane concentration at least once per year. See instructions in the instrument manual for details on the calibration procedures, including instrument adjustments. A calibration gas with a methane concentration close to the concentration expected in the field (i.e., 60-70% methane) is optimal.

Recordkeeping

The following records of measured methane concentrations are to be kept in order to verify methane emissions reductions:

- Type of instrument.
- Dates and results of instrument calibration.
- Dates, times, and results of methane measurement.
- Records of laboratory analysis of methane concentration- at least once per year.

- For entities not using default methane concentration factors- monthly tabulations of unadjusted average methane concentration of recovered biogas during each hour of digester operation, based on the average methane concentration measured during four 15-minute periods.
- Records of third-party verification of methane measurements and procedures.

The above-listed records need to be kept readily accessible and on-site for at least 2 years after the date that annual emissions reductions offsets for the site have been recorded at the CCX.

Third-Party Verification of Methane Measurements and Procedures

At least once per year, methane concentration measurements, records, and procedures should be verified as acceptable per the CCX protocol by a CCX-approved Verifier.

Use of Measured Data to Calculate Methane Emissions Reductions from Anaerobic Digesters

Methods for calculating the amount of methane recovered from anaerobic digesters and combusted are described below.

Methane concentrations should be measured at a minimum of once per year. Default factors will be applied to all offset providers who do not provide methane concentrations on an hourly basis as described below. Tabulated records of average hourly biogas flows (in standard cubic feet per hour) need to be matched against methane concentrations measured during the corresponding time period to determine hourly methane recovery rates, using the following equation:

$$[\text{CH}_4 \text{ recovered (standard ft}^3\text{/hour)}] = [\text{average biogas recovery rate (standard ft}^3\text{/hour)}] \times [\text{average hourly \%CH}_4].$$

Calculated hourly methane flows should be tabulated and summed on a daily and monthly basis. Total annual methane recovery from the digester is to be tabulated using the monthly summaries of methane recovery.

In order to estimate the amount of methane combusted in metric tons per year (Mg/yr), the annual methane recovery rate in cubic feet per year needs to be converted to weight using the following formula:

$$\text{CH}_4 \text{ combusted (Mg/yr)} = [\text{CH}_4 \text{ recovery (ft}^3\text{/yr)}] \times [16 \text{ (molecular weight of CH}_4)] \times [1\text{Mg}/10^6 \text{ g}]^* [1\text{mol}/24.04\text{L @ STP}] \times [28.32\text{L}/1\text{cf}]$$

Third-Party Verification of Methane Combustion Rate Calculations

For offset providers who desire to use actual hourly methane concentrations all calculations of hourly, daily, monthly, and annual methane recovery rates, and metric tons of methane combusted, need to be verified as acceptable per the CCX protocol by a CCX-approved Verifier prior to submitting records of annual amounts of methane combusted.

Alternative Method for Calculating Methane Combustion Rates

Energy recovery facilities that use biogas as a fuel to generate electricity typically have detailed records of electrical generation rates in kilowatt-hours (kWhr) that can be used to calculate methane combustion rates. Information on the heat rate of the combustion unit in Btus per kilowatt hour (Btu/kWhr) can be used to calculate Btus of methane combusted. Typically, the high heating value of methane (1,012 Btus per cubic foot) is used to convert to a methane flow rate. The calculation can be summarized as follows:

Methane recovery (ft³) = [kWhr of electricity produced from the biogas fuel] x [heat rate in Btu/kWhr] / [1012 Btu/ft³ (HHV of methane)]

For estimating annual methane combustion rates, use the amount of electricity generated over a one-year period in the equation above. The heat rate used in the calculation should be from the most recent source test for the combustion device. If no source test information is available, the heat rate per the manufacturer's specifications should be used.

The following information regarding the measurement of methane combustion at energy recovery facilities must be submitted:

- Type, make, and model number of combustion unit(s);
- Number of combustion units that exclusively use biogas as fuel;
- Heat rate of combustion device(s) per manufacturer's specifications;
- Copy of a summary table from the most recent source test showing the measured heat rate of combustion device(s);
- Summary tables showing kWhr of electricity produced from biogas per month over the annual period;
- Type of electrical metering device; and

- Accuracy, precision, and calibration information on the metering device per manufacturer.

Prior to submitting methane recovery rates to be recorded as metric tons of methane combusted, all calculations of annual methane recovery rates need to be verified as acceptable per the CCX protocol by a CCX-approved Verifier.

Ex Ante Calculations of Baseline Methane Emissions for U.S. Manure Digester Projects

The following procedure for ex ante calculation of baseline methane emissions from manure digester projects in the U.S. follows the IPCC Tier 2 approach and emission factors used in the most recent U.S. Greenhouse Gas Inventory Report²⁷

The procedure includes the following general steps for each reporting period (annual reporting is recommended to account for seasonal variability in animal populations and baseline emissions):

1. Characterize the average livestock populations included in the anaerobic digester project for the reporting period;
2. Characterize the baseline manure management system(s) for the project;
3. For each livestock population category and baseline manure management system, multiply the number of animals by the appropriate emission factor for that state (from Tables B.2 and B.3), by the appropriate solids separation correction factor, by the proportion of manure from those animals used in the digester, by the number of days in the period (Equation 1);
4. Sum the estimates for all population categories and baseline manure management systems (Equation 1);
5. Multiply the total estimate of methane emission by the appropriate methane GWP for the reporting period (Equation 2).

(Equation 1)
$$CH_{4Manure} = \sum_{T,S} N_{(T)} \cdot EF_{(T,S,St)} \cdot SSCF_{(S)} \cdot MS_{(T,S)} \cdot P_{days}$$

(Equation 2)
$$CO_2e_{Baseline} = \frac{CH_{4Manure} \cdot GWP_{Methane}}{1,000} ;$$

Where:

$$CH_4Manure = CH_4 \text{ emissions from manure management (kg } CH_4 \cdot \text{period}^{-1})$$

N(T)	=	Number of animals in livestock species/category T included in the project (head)
EF(T,S,St)	=	Methane emission factor for livestock category T, manure management system S, and state St ($\text{kg CH}_4 \cdot \text{head}^{-1} \cdot \text{day}^{-1}$); from Tables B.2 and B.3.
SSCF(S)	=	Solids separation correction factor for manure management system S (unitless fraction)
MS(T,S)	=	Fraction of livestock category T's manure handled using manure management system S (unitless fraction)
Pdays	=	number of days in the reporting period (days)
CO _{2e} Baseline	=	Baseline emissions ($\text{Mg CO}_2 \text{ equivalents} \cdot \text{period}^{-1}$)
GWP _{Methane}	=	Global warming potential of methane ($\text{kg CO}_{2e} \cdot \text{kg}^{-1} \text{ CH}_4$)
1,000	=	Mass conversion factor ($\text{kg CO}_{2e} \cdot \text{Mg}^{-1} \text{ CO}_{2e}$)

Livestock Categories

Livestock categories (T) included in this method are listed in Table B.1. For market swine (finishing operations), the use of a population-wide average animal weight is an acceptable conservative alternative.

Table B.1 – Livestock categories and waste characteristics included in baseline methane emission calculations and emission factor derivation¹

Livestock Category, T	Average TAM²	Total Kjeldhal N Excretion Rates, N_{ex}	Maximum Methane Generation Potential, B_o	Volatile Solids, VS
<i>Units</i>	<i>(kg)</i>	<i>(kg/day per 1,000 kg mass)</i>	<i>(m³ CH₄/kg VS)</i>	<i>(kg/day per 1,000 kg mass)</i>
Dairy Cattle				
Dairy Cows	604	0.44	0.24	(from Table B.4)
Dairy Heifer	476	0.31	0.17	(from Table B.4)
Beef Cattle				
Feedlot Steers	420	0.30	0.33	(from Table B.4)
Feedlot Heifers	420	0.30	0.33	(from Table B.4)
Swine				
Market < 60 lbs	16	0.60	0.48	8.8
Market 60-119 lbs	41	0.42	0.48	5.4
Market 120-179 lbs	68	0.42	0.48	5.4
Market >180 lbs	91	0.42	0.48	5.4
Breeding	198	0.24	0.48	2.6

¹Data From Table A-157, Appendix 3.9, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2004

²Typical Animal Mass

Emission Factors

State-specific methane emission factors (EF(T,S,St)) for each livestock category (T) and baseline manure management system (S) included in this method are listed in Tables B.2 and B.3. Emission factors were derived as in Equation 3 using typical animal mass (TAM) and maximum methane generation potential (Bo) data from Table A.1, and using state-specific data for volatile solids production rates (VS) and methane conversion factors (MCF) for the different baseline manure management systems from Tables B.4 and B.5.

$$EF_{(T,S,St)} = TAM_{(T)} \cdot \frac{VS_{(T,St)}}{1,000} \cdot B_{o(T)} \cdot 0.67 \cdot \frac{MCF_{(S,St)}}{100}$$

(Equation 3)

Where:

EF(T,S,St) = CH₄ emission factor for livestock category T, manure management system S and state St (kg CH₄ · head⁻¹ · day⁻¹); from Tables B.2 and B.3.

TAM(T) = Typical animal mass for livestock species/category T (kg · head⁻¹)

VS(T,St) = Volatile solids production rate for each livestock category and state (kg VS · day⁻¹ · 1,000 kg⁻¹ animal mass)

Bo(T) = Maximum CH₄ generation potential for livestock category T (m³ CH₄ · kg⁻¹ VS)

MCF(S,St) = Methane conversion factor for baseline manure management system S, and state St (%)

0.67 = CH₄ volume to mass conversion factor (kg CH₄ · m⁻³ CH₄)

1,000 = VS conversion factor (kg animal mass · 1000 kg⁻¹ animal mass)

100 = MCF percentage conversion factor

Solids Separation Correction Factor

For baseline liquid slurry storage or anaerobic lagoon manure management systems that separate manure solids prior to the input of liquid manure, a default solids separation correction factor (SSCF) of 0.8 must be used to calculate baseline emissions. Project specific correction factors may be used if supported by manufacturer's specifications or other acceptable data. For those systems that do not separate solids, or that utilize simple gravity separation of sand and other non-manure solids, the SSCF is equal to 1.

For projects which did not use solids separation in the baseline case, but subsequently utilize solids separation prior to the input of liquid manure to the digester, the separated solids must be handled in a manner that ensures negligible production of methane (e.g., aerobic composting, use as animal bedding, or daily spread), otherwise, the appropriate solids separation correction factor must be used to calculate baseline emissions.

Sample Baseline Emission Values

Tables B.6 and B.7 give annual baseline GHG emissions, as metric tons of CO_{2e} per head, for liquid slurry/pit storage and anaerobic lagoon manure management systems by livestock category (T) and state, assuming no solids separation and a global warming potential for methane of 21.

Clarification of definitions for baseline manure management systems

The CCX baseline calculation requires that a project baseline manure management practice be defined as "Liquid/Slurry", "Deep Pit", or "Anaerobic Lagoon." Higher methane conversion factors (MCF's) (Table B.5) result if a project is eligible to claim Anaerobic Lagoon status.

CCX has selected the following three most appropriate definitions and reference sources for the eligible practices that define the controlling factors as to which eligibility category may be used for baseline calculation purposes. These references include the IPCC 2000 good practice guidance document²⁵, the IPCC 2006 guidelines²⁶, and, for US projects, the US National GHG Inventory²⁷. Simplified definitions are as follows:

1. Liquid/Slurry:

Manure is stored as excreted or with some minimal addition of water to facilitate handling and is stored in either tanks or earthen ponds, usually for periods less than one year.

²⁵ IPCC 2000, Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories (May 2000).

²⁶ IPCC 2006 Guidelines for National Greenhouse Gas Inventories (Chp. 10: Livestock Emissions).

²⁷ US EPA (2007) Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2005.

2. **Pit Storage Below Animal Confinement:**
Collection and storage of manure usually with little or no added water typically below a slatted floor in an enclosed animal confinement facility. Typical storage periods range from 5 to 12 months, but must exceed one month.
3. **Anaerobic Lagoons:**
Uncovered anaerobic lagoons are designed and operated to combine waste stabilization and storage. Lagoon supernatant is usually used to remove manure from the associated confinement facilities to the lagoon. Anaerobic lagoons are designed with varying lengths of storage (up to a year or greater), depending on the climate region, the volatile solids loading rate, and other operational factors.

Manure management systems that utilize flush technologies to handle manure, or that combine scraped (or vacuumed) manure with more than minimal quantities of water in storage (for example, by mixing dairy parlor waste water with manure for handling or storage), and that have liquid manure storage systems with hydraulic retention times of greater than 90 days, may, for the purposes of the offset protocol, be categorized as “anaerobic lagoon” systems for baseline determination.

Table B.2 – Methane emission factors (EF(T,S,St)) for liquid slurry/pit storage baseline manure management systems (S) by livestock category (T) and State (St); (kg CH₄ · head⁻¹ · day⁻¹).

State	Dairy Cow	Dairy Heifer	Feedlot Steers	Feedlot Heifers	Market Swine <60 lbs.	Market Swine 60-119 lbs.	Market Swine 120-179 lbs.	Market Swine >180 lbs.	Breeding Swine
Alabama	0.317	0.142	0.143	0.138	0.017	0.027	0.045	0.061	0.064
Alaska	0.146	0.051	0.051	0.049	0.006	0.010	0.016	0.022	0.023
Arizona	0.562	0.196	0.195	0.189	0.024	0.038	0.063	0.084	0.088
Arkansas	0.300	0.148	0.132	0.128	0.016	0.026	0.043	0.057	0.060
California	0.342	0.139	0.139	0.134	0.017	0.027	0.045	0.060	0.062
Colorado	0.186	0.082	0.081	0.079	0.010	0.016	0.026	0.035	0.037
Connecticut	0.195	0.079	0.089	0.086	0.011	0.017	0.028	0.038	0.040
Delaware	0.243	0.099	0.110	0.107	0.013	0.021	0.035	0.047	0.049
Florida	0.429	0.193	0.193	0.188	0.024	0.037	0.062	0.082	0.086
Georgia	0.315	0.141	0.142	0.138	0.017	0.027	0.045	0.061	0.063
Hawaii	0.630	0.220	0.219	0.212	0.027	0.043	0.071	0.094	0.099
Idaho	0.245	0.086	0.085	0.082	0.011	0.017	0.027	0.037	0.038
Illinois	0.222	0.099	0.100	0.097	0.012	0.019	0.032	0.043	0.045
Indiana	0.215	0.096	0.097	0.094	0.012	0.019	0.031	0.041	0.043
Iowa	0.204	0.091	0.092	0.089	0.011	0.018	0.029	0.039	0.041
Kansas	0.268	0.118	0.117	0.113	0.014	0.023	0.038	0.050	0.053
Kentucky	0.250	0.112	0.113	0.109	0.014	0.022	0.036	0.048	0.050
Louisiana	0.383	0.189	0.168	0.163	0.021	0.033	0.054	0.073	0.076
Maine	0.159	0.065	0.072	0.070	0.009	0.014	0.023	0.031	0.032
Maryland	0.225	0.092	0.103	0.099	0.012	0.020	0.033	0.044	0.046
Massachusetts	0.189	0.077	0.086	0.083	0.011	0.017	0.027	0.037	0.038
Michigan	0.182	0.081	0.082	0.079	0.010	0.016	0.026	0.035	0.036
Minnesota	0.188	0.084	0.085	0.082	0.010	0.016	0.027	0.036	0.038
Mississippi	0.330	0.148	0.149	0.144	0.018	0.029	0.047	0.063	0.066
Missouri	0.251	0.112	0.113	0.110	0.014	0.022	0.036	0.048	0.050
Montana	0.177	0.078	0.077	0.075	0.010	0.015	0.025	0.033	0.035
Nebraska	0.224	0.099	0.098	0.094	0.012	0.019	0.032	0.042	0.044
Nevada	0.271	0.095	0.094	0.091	0.012	0.018	0.030	0.041	0.043
New Hampshire	0.172	0.070	0.078	0.075	0.010	0.015	0.025	0.033	0.035
New Jersey	0.216	0.088	0.098	0.095	0.012	0.019	0.031	0.042	0.044
New Mexico	0.344	0.120	0.120	0.116	0.015	0.023	0.038	0.052	0.054
New York	0.177	0.072	0.081	0.078	0.010	0.015	0.026	0.034	0.036
North Carolina	0.277	0.124	0.125	0.121	0.015	0.024	0.040	0.053	0.056
North Dakota	0.182	0.080	0.079	0.077	0.010	0.015	0.026	0.034	0.036
Ohio	0.205	0.092	0.092	0.089	0.011	0.018	0.029	0.039	0.041
Oklahoma	0.303	0.150	0.133	0.129	0.017	0.026	0.043	0.058	0.060
Oregon	0.241	0.084	0.084	0.081	0.010	0.016	0.027	0.036	0.038
Pennsylvania	0.206	0.084	0.094	0.091	0.011	0.018	0.030	0.040	0.042
Rhode Island	0.201	0.082	0.091	0.088	0.011	0.018	0.029	0.039	0.041
South Carolina	0.311	0.140	0.140	0.136	0.017	0.027	0.045	0.060	0.063
South Dakota	0.203	0.089	0.089	0.086	0.011	0.017	0.029	0.038	0.040
Tennessee	0.268	0.120	0.121	0.117	0.015	0.023	0.038	0.052	0.054
Texas	0.345	0.171	0.152	0.147	0.019	0.030	0.049	0.066	0.069
Utah	0.277	0.097	0.096	0.093	0.012	0.019	0.031	0.041	0.043
Vermont	0.165	0.067	0.075	0.073	0.009	0.014	0.024	0.032	0.033
Virginia	0.230	0.103	0.103	0.100	0.013	0.020	0.033	0.044	0.046
Washington	0.247	0.086	0.086	0.083	0.011	0.017	0.028	0.037	0.039
West Virginia	0.207	0.084	0.094	0.091	0.011	0.018	0.030	0.040	0.042
Wisconsin	0.185	0.083	0.083	0.081	0.010	0.016	0.026	0.035	0.037
Wyoming	0.179	0.079	0.078	0.075	0.010	0.015	0.025	0.034	0.035

Table B.3 – Methane emission factors (EF(T,S,St)) for anaerobic lagoon baseline manure management systems (S) by livestock category (T) and State (St); (kg CH₄ · head⁻¹ · day⁻¹).

State	Dairy Cow	Dairy Heifer	Feedlot Steers	Feedlot Heifers	Market Swine <60 lbs.	Market Swine 60-119 lbs.	Market Swine 120-179 lbs.	Market Swine >180 lbs.	Breeding Swine
Alabama	0.624	0.280	0.281	0.272	0.034	0.054	0.090	0.120	0.125
Alaska	0.510	0.178	0.177	0.171	0.022	0.034	0.057	0.076	0.080
Arizona	0.837	0.293	0.291	0.281	0.036	0.056	0.094	0.125	0.131
Arkansas	0.630	0.311	0.277	0.269	0.034	0.054	0.090	0.120	0.126
California	0.692	0.281	0.280	0.271	0.035	0.054	0.090	0.120	0.126
Colorado	0.560	0.246	0.244	0.236	0.030	0.047	0.079	0.105	0.110
Connecticut	0.567	0.231	0.258	0.249	0.031	0.049	0.082	0.110	0.115
Delaware	0.604	0.246	0.275	0.266	0.033	0.053	0.087	0.117	0.122
Florida	0.640	0.287	0.288	0.280	0.035	0.055	0.092	0.123	0.129
Georgia	0.622	0.279	0.280	0.272	0.034	0.054	0.089	0.119	0.125
Hawaii	0.814	0.285	0.283	0.273	0.035	0.055	0.091	0.122	0.128
Idaho	0.721	0.252	0.251	0.242	0.031	0.049	0.081	0.108	0.113
Illinois	0.591	0.264	0.266	0.258	0.032	0.051	0.084	0.113	0.118
Indiana	0.584	0.261	0.262	0.254	0.032	0.050	0.083	0.112	0.117
Iowa	0.576	0.257	0.259	0.251	0.032	0.050	0.082	0.110	0.115
Kansas	0.625	0.275	0.273	0.264	0.034	0.053	0.088	0.118	0.123
Kentucky	0.602	0.270	0.271	0.263	0.033	0.052	0.086	0.116	0.121
Louisiana	0.641	0.316	0.282	0.273	0.035	0.055	0.091	0.122	0.128
Maine	0.517	0.210	0.235	0.227	0.029	0.045	0.075	0.100	0.105
Maryland	0.589	0.240	0.268	0.259	0.033	0.051	0.085	0.114	0.119
Massachusetts	0.561	0.228	0.255	0.247	0.031	0.049	0.081	0.109	0.114
Michigan	0.551	0.246	0.248	0.240	0.030	0.047	0.079	0.105	0.110
Minnesota	0.561	0.251	0.252	0.245	0.031	0.048	0.080	0.107	0.112
Mississippi	0.626	0.281	0.282	0.273	0.034	0.054	0.090	0.120	0.126
Missouri	0.610	0.272	0.274	0.266	0.033	0.053	0.087	0.117	0.122
Montana	0.553	0.243	0.241	0.233	0.030	0.047	0.078	0.104	0.109
Nebraska	0.600	0.264	0.262	0.253	0.032	0.051	0.084	0.113	0.118
Nevada	0.744	0.260	0.259	0.250	0.032	0.050	0.083	0.111	0.117
New Hampshire	0.535	0.218	0.243	0.235	0.030	0.047	0.077	0.104	0.108
New Jersey	0.587	0.239	0.267	0.258	0.033	0.051	0.085	0.114	0.119
New Mexico	0.785	0.275	0.273	0.264	0.034	0.053	0.088	0.118	0.123
New York	0.544	0.221	0.247	0.239	0.030	0.047	0.079	0.105	0.110
North Carolina	0.614	0.275	0.276	0.268	0.034	0.053	0.088	0.118	0.124
North Dakota	0.561	0.247	0.245	0.237	0.030	0.048	0.079	0.106	0.111
Ohio	0.574	0.257	0.258	0.250	0.031	0.049	0.082	0.110	0.115
Oklahoma	0.632	0.312	0.278	0.269	0.034	0.054	0.090	0.120	0.126
Oregon	0.707	0.247	0.246	0.238	0.030	0.048	0.079	0.106	0.111
Pennsylvania	0.575	0.234	0.261	0.253	0.032	0.050	0.083	0.111	0.117
Rhode Island	0.575	0.234	0.261	0.253	0.032	0.050	0.083	0.111	0.117
South Carolina	0.624	0.280	0.281	0.272	0.034	0.054	0.090	0.120	0.125
South Dakota	0.584	0.257	0.255	0.246	0.032	0.050	0.082	0.110	0.115
Tennessee	0.610	0.274	0.275	0.267	0.034	0.053	0.088	0.117	0.123
Texas	0.639	0.316	0.281	0.272	0.035	0.055	0.091	0.122	0.127
Utah	0.751	0.263	0.261	0.252	0.032	0.051	0.084	0.112	0.118
Vermont	0.527	0.214	0.240	0.232	0.029	0.046	0.076	0.102	0.107
Virginia	0.592	0.266	0.267	0.259	0.033	0.051	0.085	0.114	0.119
Washington	0.717	0.251	0.249	0.241	0.031	0.048	0.080	0.107	0.112
West Virginia	0.570	0.232	0.259	0.251	0.032	0.050	0.082	0.110	0.116
Wisconsin	0.560	0.250	0.251	0.244	0.031	0.048	0.080	0.107	0.112
Wyoming	0.554	0.244	0.241	0.234	0.030	0.047	0.078	0.104	0.109

Table B.4 – Volatile solids production rates (VS(T,St)) by livestock category (T) and State (St)¹ used for derivation of methane emission factors (EF(T,S,St)); (kg VS · day⁻¹ · 1,000 kg⁻¹ animal mass).

State	Dairy Cow	Dairy Heifer	Feedlot Steers	Feedlot Heifers
Alabama	8.47	6.81	3.87	3.99
Alaska	10.87	6.81	3.82	3.95
Arizona	10.87	6.81	3.82	3.95
Arkansas	8.55	7.56	3.81	3.93
California	9.35	6.81	3.83	3.96
Colorado	8.64	6.81	3.81	3.94
Connecticut	8.41	6.13	3.87	4.00
Delaware	8.41	6.13	3.87	4.00
Florida	8.47	6.81	3.87	3.99
Georgia	8.47	6.81	3.87	3.99
Hawaii	10.87	6.81	3.82	3.95
Idaho	10.87	6.81	3.82	3.95
Illinois	8.51	6.81	3.88	4.00
Indiana	8.51	6.81	3.88	4.00
Iowa	8.51	6.81	3.88	4.00
Kansas	8.64	6.81	3.81	3.94
Kentucky	8.47	6.81	3.87	3.99
Louisiana	8.55	7.56	3.81	3.93
Maine	8.41	6.13	3.87	4.00
Maryland	8.41	6.13	3.87	4.00
Massachusetts	8.41	6.13	3.87	4.00
Michigan	8.51	6.81	3.88	4.00
Minnesota	8.51	6.81	3.88	4.00
Mississippi	8.47	6.81	3.87	3.99
Missouri	8.51	6.81	3.88	4.00
Montana	8.64	6.81	3.81	3.94
Nebraska	8.64	6.81	3.81	3.94
Nevada	10.87	6.81	3.82	3.95
New Hampshire	8.41	6.13	3.87	4.00
New Jersey	8.41	6.13	3.87	4.00
New Mexico	10.87	6.81	3.82	3.95
New York	8.41	6.13	3.87	4.00
North Carolina	8.47	6.81	3.87	3.99
North Dakota	8.64	6.81	3.81	3.94
Ohio	8.51	6.81	3.88	4.00
Oklahoma	8.55	7.56	3.81	3.93
Oregon	10.87	6.81	3.82	3.95
Pennsylvania	8.41	6.13	3.87	4.00
Rhode Island	8.41	6.13	3.87	4.00
South Carolina	8.47	6.81	3.87	3.99
South Dakota	8.64	6.81	3.81	3.94
Tennessee	8.47	6.81	3.87	3.99
Texas	8.55	7.56	3.81	3.93
Utah	10.87	6.81	3.82	3.95
Vermont	8.41	6.13	3.87	4.00
Virginia	8.47	6.81	3.87	3.99
Washington	10.87	6.81	3.82	3.95
West Virginia	8.41	6.13	3.87	4.00
Wisconsin	8.51	6.81	3.88	4.00
Wyoming	8.64	6.81	3.81	3.94

¹Data from Table A-158, Appendix 3.10, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2004

Table B.5 – Methane conversion factors ($MCF_{(S,St)}$) by baseline manure management system (S) and State (St)¹ used for derivation of methane emission factors ($EF_{(T,S,St)}$); (percent).

State	Liquid/Slurry and Deep Pit	Anaerobic Lagoon
Alabama	38.5	75.8
Alaska	13.8	48.3
Arizona	53.2	79.3
Arkansas	36.1	75.9
California	37.7	76.2
Colorado	22.2	66.7
Connecticut	23.9	69.4
Delaware	29.7	73.9
Florida	52.2	77.8
Georgia	38.3	75.6
Hawaii	59.7	77.1
Idaho	23.2	68.3
Illinois	26.9	71.5
Indiana	26.0	70.6
Iowa	24.7	69.7
Kansas	31.9	74.5
Kentucky	30.4	73.2
Louisiana	46.1	77.2
Maine	19.5	63.3
Maryland	27.6	72.1
Massachusetts	23.2	68.7
Michigan	22.0	66.7
Minnesota	22.8	67.9
Mississippi	40.1	76.1
Missouri	30.4	73.8
Montana	21.1	65.9
Nebraska	26.7	71.5
Nevada	25.7	70.5
New Hampshire	21.0	65.5
New Jersey	26.4	71.9
New Mexico	32.6	74.4
New York	21.7	66.6
North Carolina	33.7	74.6
North Dakota	21.7	66.9
Ohio	24.8	69.5
Oklahoma	36.5	76.1
Oregon	22.8	67.0
Pennsylvania	25.2	70.4
Rhode Island	24.6	70.4
South Carolina	37.8	75.8
South Dakota	24.2	69.6
Tennessee	32.6	74.2
Texas	41.6	77.0
Utah	26.2	71.1
Vermont	20.2	64.5
Virginia	27.9	72.0
Washington	23.4	67.9
West Virginia	25.3	69.8
Wisconsin	22.4	67.7
Wyoming	21.3	66.0

¹Data from Table A-165, Appendix 3.10, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2004

Table B.6 – Baseline annual GHG emissions for *liquid slurry/pit storage* manure management systems (S) by livestock category (T) and state, assuming $GWP_{Methane} = 21$ and no solids separation; (metric tons CO₂e per head per year).

State	Dairy Cow	Dairy Heifer	Feedlot Steers	Feedlot Heifers	Market Swine <60 lbs.	Market Swine 60-119 lbs.	Market Swine 120-179 lbs.	Market Swine >180 lbs.	Breeding Swine
Alabama	2.43	1.09	1.09	1.06	0.13	0.21	0.35	0.47	0.49
Alaska	1.12	0.39	0.39	0.38	0.05	0.08	0.12	0.17	0.18
Arizona	4.31	1.51	1.50	1.45	0.18	0.29	0.48	0.64	0.68
Arkansas	2.30	1.13	1.01	0.98	0.13	0.20	0.33	0.44	0.46
California	2.62	1.07	1.06	1.03	0.13	0.21	0.34	0.46	0.48
Colorado	1.43	0.63	0.62	0.60	0.08	0.12	0.20	0.27	0.28
Connecticut	1.50	0.61	0.68	0.66	0.08	0.13	0.22	0.29	0.30
Delaware	1.86	0.76	0.85	0.82	0.10	0.16	0.27	0.36	0.38
Florida	3.29	1.48	1.48	1.44	0.18	0.28	0.47	0.63	0.66
Georgia	2.42	1.08	1.09	1.06	0.13	0.21	0.35	0.46	0.49
Hawaii	4.83	1.69	1.68	1.62	0.21	0.33	0.54	0.72	0.76
Idaho	1.88	0.66	0.65	0.63	0.08	0.13	0.21	0.28	0.29
Illinois	1.70	0.76	0.77	0.74	0.09	0.15	0.24	0.33	0.34
Indiana	1.65	0.74	0.74	0.72	0.09	0.14	0.24	0.31	0.33
Iowa	1.56	0.70	0.70	0.68	0.09	0.13	0.22	0.30	0.31
Kansas	2.05	0.90	0.89	0.87	0.11	0.17	0.29	0.39	0.40
Kentucky	1.92	0.86	0.86	0.84	0.11	0.17	0.28	0.37	0.39
Louisiana	2.93	1.45	1.29	1.25	0.16	0.25	0.42	0.56	0.59
Maine	1.22	0.50	0.56	0.54	0.07	0.11	0.18	0.24	0.25
Maryland	1.73	0.70	0.79	0.76	0.10	0.15	0.25	0.33	0.35
Massachusetts	1.45	0.59	0.66	0.64	0.08	0.13	0.21	0.28	0.29
Michigan	1.39	0.62	0.63	0.61	0.08	0.12	0.20	0.27	0.28
Minnesota	1.44	0.65	0.65	0.63	0.08	0.12	0.21	0.28	0.29
Mississippi	2.53	1.13	1.14	1.10	0.14	0.22	0.36	0.49	0.51
Missouri	1.93	0.86	0.87	0.84	0.11	0.17	0.28	0.37	0.39
Montana	1.36	0.60	0.59	0.57	0.07	0.12	0.19	0.26	0.27
Nebraska	1.72	0.76	0.75	0.72	0.09	0.15	0.24	0.32	0.34
Nevada	2.08	0.73	0.72	0.70	0.09	0.14	0.23	0.31	0.33
New Hampshire	1.31	0.53	0.60	0.58	0.07	0.11	0.19	0.25	0.27
New Jersey	1.65	0.67	0.75	0.73	0.09	0.14	0.24	0.32	0.34
New Mexico	2.64	0.92	0.92	0.89	0.11	0.18	0.30	0.39	0.41
New York	1.36	0.55	0.62	0.60	0.08	0.12	0.20	0.26	0.28
North Carolina	2.12	0.95	0.96	0.93	0.12	0.18	0.31	0.41	0.43
North Dakota	1.40	0.61	0.61	0.59	0.08	0.12	0.20	0.26	0.28
Ohio	1.57	0.70	0.71	0.68	0.09	0.14	0.22	0.30	0.31
Oklahoma	2.32	1.15	1.02	0.99	0.13	0.20	0.33	0.44	0.46
Oregon	1.85	0.65	0.64	0.62	0.08	0.12	0.21	0.28	0.29
Pennsylvania	1.58	0.64	0.72	0.69	0.09	0.14	0.23	0.31	0.32
Rhode Island	1.54	0.63	0.70	0.68	0.09	0.13	0.22	0.30	0.31
South Carolina	2.38	1.07	1.07	1.04	0.13	0.21	0.34	0.46	0.48
South Dakota	1.56	0.68	0.68	0.66	0.08	0.13	0.22	0.29	0.31
Tennessee	2.06	0.92	0.93	0.90	0.11	0.18	0.30	0.39	0.41
Texas	2.65	1.31	1.16	1.13	0.14	0.23	0.38	0.50	0.53
Utah	2.12	0.74	0.74	0.71	0.09	0.14	0.24	0.32	0.33
Vermont	1.26	0.51	0.58	0.56	0.07	0.11	0.18	0.24	0.26
Virginia	1.76	0.79	0.79	0.77	0.10	0.15	0.25	0.34	0.35
Washington	1.89	0.66	0.66	0.64	0.08	0.13	0.21	0.28	0.30
West Virginia	1.58	0.64	0.72	0.70	0.09	0.14	0.23	0.31	0.32
Wisconsin	1.42	0.63	0.64	0.62	0.08	0.12	0.20	0.27	0.28
Wyoming	1.37	0.60	0.60	0.58	0.07	0.12	0.19	0.26	0.27

Table B.7 – Baseline annual GHG emissions for anaerobic lagoon manure management systems (S) by livestock category (T) and state, assuming GWP Methane = 21 and no solids separation; (metric tons CO_{2e} per head per year).

State	Dairy Cow	Dairy Heifer	Feedlot Steers	Feedlot Heifers	Market Swine <60 lbs.	Market Swine 60-119 lbs.	Market Swine 120-179 lbs.	Market Swine >180 lbs.	Breeding Swine
Alabama	4.78	2.15	2.15	2.09	0.26	0.41	0.69	0.92	0.96
Alaska	3.91	1.37	1.36	1.31	0.17	0.26	0.44	0.59	0.61
Arizona	6.42	2.24	2.23	2.16	0.28	0.43	0.72	0.96	1.01
Arkansas	4.83	2.38	2.12	2.06	0.26	0.41	0.69	0.92	0.96
California	5.30	2.16	2.15	2.08	0.26	0.42	0.69	0.92	0.97
Colorado	4.29	1.89	1.87	1.81	0.23	0.36	0.60	0.81	0.85
Connecticut	4.35	1.77	1.98	1.91	0.24	0.38	0.63	0.84	0.88
Delaware	4.63	1.88	2.10	2.04	0.26	0.40	0.67	0.90	0.94
Florida	4.91	2.20	2.21	2.14	0.27	0.42	0.70	0.94	0.99
Georgia	4.77	2.14	2.15	2.08	0.26	0.41	0.68	0.92	0.96
Hawaii	6.24	2.18	2.17	2.10	0.27	0.42	0.70	0.93	0.98
Idaho	5.53	1.93	1.92	1.86	0.24	0.37	0.62	0.83	0.87
Illinois	4.53	2.02	2.04	1.97	0.25	0.39	0.65	0.87	0.91
Indiana	4.47	2.00	2.01	1.95	0.25	0.39	0.64	0.86	0.90
Iowa	4.42	1.97	1.98	1.92	0.24	0.38	0.63	0.84	0.88
Kansas	4.79	2.11	2.09	2.02	0.26	0.41	0.67	0.90	0.95
Kentucky	4.62	2.07	2.08	2.02	0.25	0.40	0.66	0.89	0.93
Louisiana	4.91	2.43	2.16	2.09	0.27	0.42	0.70	0.94	0.98
Maine	3.96	1.61	1.80	1.74	0.22	0.35	0.57	0.77	0.80
Maryland	4.51	1.84	2.05	1.99	0.25	0.39	0.65	0.87	0.91
Massachusetts	4.30	1.75	1.96	1.89	0.24	0.37	0.62	0.83	0.87
Michigan	4.23	1.89	1.90	1.84	0.23	0.36	0.60	0.81	0.85
Minnesota	4.30	1.92	1.93	1.88	0.24	0.37	0.61	0.82	0.86
Mississippi	4.80	2.15	2.16	2.10	0.26	0.42	0.69	0.92	0.97
Missouri	4.68	2.09	2.10	2.04	0.26	0.40	0.67	0.89	0.94
Montana	4.24	1.86	1.85	1.79	0.23	0.36	0.60	0.80	0.84
Nebraska	4.60	2.02	2.01	1.94	0.25	0.39	0.65	0.87	0.91
Nevada	5.70	2.00	1.98	1.92	0.24	0.38	0.64	0.85	0.89
New Hampshire	4.10	1.67	1.86	1.80	0.23	0.36	0.59	0.79	0.83
New Jersey	4.50	1.83	2.05	1.98	0.25	0.39	0.65	0.87	0.91
New Mexico	6.02	2.11	2.09	2.02	0.26	0.41	0.67	0.90	0.94
New York	4.17	1.70	1.90	1.83	0.23	0.36	0.60	0.81	0.85
North Carolina	4.70	2.11	2.12	2.05	0.26	0.41	0.68	0.90	0.95
North Dakota	4.30	1.89	1.88	1.81	0.23	0.37	0.61	0.81	0.85
Ohio	4.40	1.97	1.98	1.92	0.24	0.38	0.63	0.84	0.88
Oklahoma	4.84	2.39	2.13	2.06	0.26	0.42	0.69	0.92	0.97
Oregon	5.42	1.90	1.88	1.82	0.23	0.37	0.61	0.81	0.85
Pennsylvania	4.41	1.79	2.00	1.94	0.24	0.38	0.64	0.85	0.89
Rhode Island	4.41	1.79	2.00	1.94	0.24	0.38	0.64	0.85	0.89
South Carolina	4.78	2.15	2.15	2.09	0.26	0.41	0.69	0.92	0.96
South Dakota	4.48	1.97	1.95	1.89	0.24	0.38	0.63	0.84	0.88
Tennessee	4.68	2.10	2.11	2.04	0.26	0.40	0.67	0.90	0.94
Texas	4.90	2.42	2.15	2.09	0.27	0.42	0.70	0.93	0.98
Utah	5.75	2.01	2.00	1.93	0.25	0.39	0.64	0.86	0.90
Vermont	4.04	1.64	1.84	1.78	0.22	0.35	0.58	0.78	0.82
Virginia	4.54	2.04	2.04	1.98	0.25	0.39	0.65	0.87	0.91
Washington	5.49	1.92	1.91	1.85	0.24	0.37	0.61	0.82	0.86
West Virginia	4.37	1.78	1.99	1.92	0.24	0.38	0.63	0.85	0.89
Wisconsin	4.29	1.92	1.93	1.87	0.23	0.37	0.61	0.82	0.86
Wyoming	4.25	1.87	1.85	1.79	0.23	0.36	0.60	0.80	0.84

Verification of *ex ante* baseline emissions calculation:

Baseline Practice:

The verifier shall confirm through records searches and site inspection the baseline practice at the facility as liquid/slurry, deep pit or anaerobic lagoon.

Flare Efficiency:

For projects wishing to demonstrate combustion efficiency for flared biogas greater than 90%, the verifier shall confirm and document evidence demonstrating the higher efficiency.

Calculation:

In order to verify the correctness of the calculation, the verifier shall confirm average livestock populations for the reporting period through a document search; confirm the use of the appropriate emission factor by state or country, solid separation factor, manure proportion and number of days in the period. Further the verifier shall confirm the appropriate use of the solid separation correction factor in the calculation.

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Appendix 9.1 C Protocol for Measuring, Recording, and Verifying Coal Mine Methane Capture and Use

I. Introduction

Methane, a potent greenhouse gas, is contained in coal seams throughout the United States (U.S.). Currently in the U.S., coal mines account for approximately 10 percent of all manmade methane emissions. Methane presents a safety hazard for operators of gassy mines because it is explosive at concentrations from 5 to 15 percent in air. Gassy underground coal mines are designed and operated in such a way that methane liberated during the extraction of coal is removed from the mine through powerful *ventilation* fans, which are part of a system that ensures safe working conditions in the mine. For particularly gassy mines, operators may employ additional methane *drainage* systems to supplement their ventilation systems in order to maintain a safe working environment.

Gas may be recovered and pumped to the surface in the process of removing gas via an underground drainage system, but utilization of recovered methane is not currently a typical operational practice at underground coal mines. Methane is most often vented to the atmosphere. Methane is the principle component of natural gas, and gas that is recovered from coal mines of sufficiently high methane concentrations can be used for its energy content. Because of this, any coal mine methane (CMM) captured by active mines or abandoned mines could be used in the same way as natural gas (e.g., through pipeline injection of high-quality gas or as fuel for electricity generation from mid-quality gas). Companies that engage in such project activities can prevent methane from being emitted to the atmosphere.

The purpose of this protocol is to address the measurement and verification of methane emission reductions resulting from the utilization of CMM and abandoned mine methane (AMM) gas for the Chicago Climate Exchange (CCX).

II. Definitions

Abandoned mine methane (AMM): Methane that is produced from coal mines designated as abandoned according to U. S. Mine Safety and Health Administration (MSHA) or equivalent non-U.S. mining regulatory agency rules.

Coalbed methane (CBM): Methane that resides within coal seams. For the purposes of this protocol, coalbed methane refers to methane produced from coal seams unrelated to mining activities.

Coal mine methane (CMM): As coal mining proceeds, methane contained in the coal and surrounding strata may be released. This methane is referred to as coal mine methane since its liberation resulted from mining activity. In some instances, methane that continues to be released from the coal-bearing strata once a mine is closed and sealed may also be referred to as coal

mine methane (or abandoned mine methane) because the liberated methane is associated with past coal mining activity.

Gob: A fractured rubble zone behind the mining face that is caused by the removal of the coal and the subsequent collapse of the mine roof and heaving of the mine floor.

Mine gas: The post-mine drainage gas that contains CMM but also contains various levels of other components, such as nitrogen, oxygen, carbon dioxide, hydrogen sulfide, and heavier hydrocarbons.

Mine Safety and Health Administration (MSHA): Federal enforcement agency responsible for the health and safety of U.S. miners.

Pre-mining drainage: Methane extraction from vertical surface wells (CBM) or horizontal underground boreholes in the mine prior to mining activities. This methane would have been emitted during mining activities had it not been previously drained. When CBM wells are mined around or through, the previously extracted methane is then considered CMM that has been captured and used.

Post-mining drainage: Methane extraction after completion of the mining process from vertical surface gob wells, underground inclined or horizontal boreholes, gas drainage galleries, or other gob gas capture techniques, including drainage of sealed areas in the mine (for safety reasons).

Ventilation air methane (VAM): CMM that is mixed with the ventilation air in the mine that is circulated in sufficient quantity to dilute the methane to low concentrations (typically below 1 percent) for safety reasons.

III. Applicability

This protocol applies to methane liberated as a result of coal mining activities (CMM) from either active or abandoned coal mines as defined by MSHA or equivalent non-U.S. mining regulatory agencies. Active coal mines include mine works that continue to be actively ventilated by the coal mine operator. This could also include MSHA designated “non-producing” or “idle” coal mines. Abandoned coal mines are declared “abandoned” from the date when ventilation activities cease to exist.

This protocol applies to methane recovered from active and abandoned coal mines using the following extraction techniques:

- Pre-mining drainage wells (from the surface or underground) associated with mining activities at active coal mines;
- Post-mining drainage wells (from the surface or underground) associated with mining activities including from sealed mine areas; and

- Ventilation air methane from ventilation fans.

IV. Eligibility

To be eligible, any methane-extraction technique used at active coal mines must be approved for use by MSHA or equivalent non-U.S. mining regulatory agency rules. CCX eligibility requirements for methane to be included for registration are as follows:

- Methane produced from pre-drainage wells will be limited to wells drilled after January 1, 1999.
- Methane produced from pre-drainage wells will only be eligible after the well is mined around or through.
- All methane produced from pre-drainage wells from within a -50 meter to +150 meter vertical range of the mined coal seam will become eligible when the well is mined around or through.
- Methane produced outside the established vertical range can become eligible if the candidate project(s) demonstrate sufficient analytical evidence, consistent with IPCC Tier 3 Methodology, which connects methane generated outside the established vertical range to the mined seam in question.
- All methane produced from abandoned coal mines will be eligible.

CCX requirements for crediting methane recovery from coal mines as *emission offsets* include the following:

Phase II registration & trading

○ **Pre-Mining Activities:**

- CMM collected from wells drilled after January 1, 1999, and mined around or through after January 1, 2007, can be registered and traded on CCX.

○ **Post-Mining Activities:**

- CMM from any wells drilled *after* January 1, 1999, and collected after January 1, 2003, can be registered and traded on the CCX.
- CMM from any well drilled *prior* to January 1, 1999 and collected after January 1, 2003, which is: 1) processed/refined through a low quality gas facility, constructed after January 1, 1999, or 2) utilized in a low quality combustion process (i.e. reciprocating engine, boiler, flare), constructed after January 1, 1999, can be registered and traded on the CCX.
- CMM from any well drilled *prior* to January 1, 1999 and collected after January 1, 2003, which is not 1) processed/refined through a low quality gas facility, constructed after January 1, 1999, or 2) utilized in a low quality combustion process (i.e. reciprocating engine, boiler, flare), constructed after January 1, 1999, cannot be registered and traded on the CCX.

V. Protocol for Measuring, Recording, and Verifying Methane Capture and Use

The purpose of this protocol is to establish a methodology to accurately determine the amount of methane captured and utilized and/or sold in a coal mine methane emission reduction project. The methane may be used at numerous locations within a project from compressors used to bring the gas from underground to the surface at individual well bores. It may also be used in intermediate compression sites that gather gas from several different sources such as wells or mines which then ship the gas to a sales point or various end use facilities such as boilers, power generators or simple flares. Wherever there is a change in flow volume related to usage or gas composition related to the blending of different gas streams there must be measurement devices to determine the quantity of methane from that point to the next downstream device. Because methane is the valued product the accounting of this product must meet commercial standards similar to those used in the natural gas industry.

The measuring and recording system should be setup such that there is a “master meter” from which various flow streams can be allocated. This will allow quality checking of the other meters on the system and also allow volumes to be calculated in the case of a measuring device being out of service or not functioning properly for a period of time. This master meter should have some type of continuous monitoring and data accumulation of the total gas volume and the methane concentration of the gas over given period of time. Spot sampling (as opposed to continuous monitoring) of the methane content from locations upstream of the master meter can be conducted for use in allocating the methane destroyed to the various end use devices both upstream and downstream of the master meter location.

CCX members shall employ the emission monitoring, reporting methods, and procedures described in this section. The prescribed emissions monitoring methods are based on the calculation tools contained in the World Resources Institute’s “*Corporate GHG Accounting and Reporting: Corporate Inventory Module*” and/or the United Nations Framework Convention on Climate Change consolidated methodology (ACM0008) developed for CMM projects.

Methane capture and utilization (or destruction) amounts are determined primarily by the measurement of gas flow rates, methane concentration, and combustion efficiencies of end-utilization technologies. Measurements of additional parameters, such as gas sales, electricity production, and gas composition, are also required. Because this methodology applies to CMM recovered from both drained mine gas and VAM from active mines, as well as AMM from abandoned mines, the measurement protocols applied may require different levels of rigor depending on the source of the gas and the number of end uses.

All natural gas measurements shall be performed within the protocols established by the American Gas Association (AGA), or similar international protocols, and documented in report number 3 (Orifice Metering of Natural Gas) and report number 8 (Compressibility Factors of Natural Gas), or equivalent formats. It is anticipated that the majority of equipment used to

measure natural gas flow will be orifice meters complete with electronic flow measurement computers (EFM), and on-line methanometers, which record methane concentrations in conjunction with the EFM. Other methods such as physical sampling and gas chromatograph analysis may also be used for determining methane concentration over time intervals of interest.

A. Carbon Offset Conversion Factors

The standard CCX carbon offset conversion factor of 18.25 shall be applied to all CMM projects, regardless of end utilization. This includes, but is not limited to the following types of CMM projects: gas sales to pipelines or local industry, electric and thermal power generation, gas boilers, liquefied or compressed gas, or gas flaring,

B. CMM Flow Rate Measurements

Equipment

The most common types of flow meters measure gas flow by sensing differential pressure. CCX recommends that gas flow through a pipe should be performed by AGA (or equivalent) methodologies using an orifice plate and recording temperature and pressure differential. These flow meters measure flow using a standard mathematical formula without the need to modify the result based on proprietary device-specific information. Most EFMs will have an instantaneous flow read out and will save the data in a non-volatile memory, or the flow meter may be read using the flow readout device on the flow computer.

The flow meter should be installed in accordance with AGA report number 3 along a straight section of pipe sufficient to establish laminar gas flow, because turbulent flow resulting from bends, obstructions, or constrictions in the pipe can cause interference with flow measurements (which rely on differential pressure across an orifice plate).

Because VAM flows through ductwork and not pressurized pipe, VAM flow measurement will require an alternative measurement method and different types of equipment. CCX will include VAM-specific guidelines in the future.

Performance Standard

The following information regarding flow-meter performance must be maintained and are required by CCX to be included in Project Reports:

- Manufacturer specifications of flow-meter accuracy should be +/-2% of reading;
- Proof of initial calibration;
- Capability to record flow every 15 minutes; and
- Means to correct for temperature and pressure.

Instrument Maintenance and Periodic Check of Flow Meter Accuracy

Installed flow meters should be inspected, cleaned, and checked quarterly for accuracy (or as prescribed by the instrument manufacturer). The flow accuracy should be checked using an

alternative, portable instrument (such as a pitot tube) to measure the flow velocities along a traverse of the header pipe. The velocity measurements are then used to calculate a flow rate, which is typically accurate to within 2 percent in larger pipes (greater than 4 inches in diameter).

Frequency of Recording

Gas-flow measurements of CMM must be recorded continuously. This is a standard operating procedure when using an EFM

Recordkeeping

The following records of CMM flowing to the end utilization/destruction are to be kept in order to verify methane emissions reductions:

- Name of CMM project;
- Type of flow meter;
- Date and location of flow meter installation;
- Dates and results of flow meter calibration;
- Copies of charts or diskettes on which flow rates were recorded;
- Monthly tabulations of unadjusted total daily gas flow to the control device (in actual cubic feet per day);
- Copies of field data used for flow measurement calibration;
- Monthly tabulations of daily mine gas flow rate standardization calculations and results (in standard cubic feet per day);
- Monthly tabulations of number of hours end utilization/destruction was shut down²⁸;
- Information on the portable instrument and procedures used to check the installed flow-meter accuracy, including field measurements and flow calculations; and
- Records of third-party verification of flow measurements and procedures.

The above-listed records need to be kept readily accessible and on-site (or with the local field office responsible for the site) for at least 2 years after the date that annual methane emissions reductions for the site have been recorded at the CCX. These records may be required in Project Reports by CCX.

C. Methane Concentration Measurements

Equipment

A methanometer or gas chromatograph is acceptable for measuring CMM. An online methanometer or gas chromatograph can be used in conjunction with an EFM to accurately calculate the methane volume of the CMM.

²⁸ No offsets will be issued by CCX for periods during which the methane utilization/destruction equipment is not operated and methane was vented to the atmosphere.

For smaller CMM projects where online methanometers may not be justified, methane concentration measurements can be taken directly by connecting the sampling tube to a sampling port in the pipeline and using a hand-held methanometer. Alternatively, the gas sample can be collected in a Tedlar bag or Summa canister or any other AGA- or EPA-approved sampling method and then sent to an approved lab for testing.

Downstream of compression equipment, collection systems can be installed that physically accumulate small samples of gas in a pressure canister every few minutes for a period of time (e.g. month). The resulting gas volume will represent the methane content of the gas for that time period. This gas can be analyzed with a gas chromatograph so that other components of the gas can be determined.

Because methane concentrations in VAM flows range from 0.1 – 1.0 percent, measurements of methane concentrations will require an alternative measurement method and different types of equipment. CCX will include VAM-specific guidelines in the future.

Performance Standards

The following performance standards are recommended for current measurements for the calculation basis of Exchange Methane Offsets:

- Precision: Methane measurements are to be to the nearest 0.1 percent (weight or volume).
- Accuracy: Methane measurement accuracy decreases with increasing methane concentration but should be within +/- 2.0 percent of reading for on-line equipment, and within +/- 5.0 percent for hand-held devices. Alternate instruments, including gas chromatographs or thermal conductivity detectors, must meet similar standards.

Instrument Calibration Procedures

For portable units, the gas analyzer instrument shall be calibrated against a gas sample with a known methane concentration prior to each day of use. Online gas chromatographs shall be calibrated according to AGA procedures or the manufacturer's calibration procedures, including instrument adjustments. A calibration gas with a methane concentration close to the concentration expected in the field (i.e., 40 to 90 percent methane) is optimal.

Frequency of Recording

If an online chromatograph is used, methane concentrations shall must be measured and recorded daily. Methane concentration measurements taken of CMM gas samples using a gas chromatograph or handheld meter shall be conducted daily for active mine CMM projects where the gas composition is subject to constant variation. If methane variation is demonstrated to be less than ± 2 percent, CCX will accept weekly methane concentration measurements. For AMM projects where the methane concentrations typically remain relatively stable, CCX will accept measurement intervals no greater than monthly.

Recordkeeping

The following records of measured methane concentrations are to be kept in order to verify the methane emissions reductions:

- Name of CMM project;
- Type of instrument;
- Dates and results of instrument calibration;
- Dates and results of methane measurement;
- Monthly tabulations of measured methane concentrations; and
- Records of third-party verification of methane measurements and procedures.

The above-listed records need to be kept readily accessible and on-site for at least 2 years after the date that annual emissions reductions for the site have been registered with CCX and may be required by CCX to be included in Project Reports.

D. Integrated Flow and Concentration Measurements

Although not required, CCX recommends the use of integrated flow and concentration meters for use with larger, long-term CMM offset projects. The integrated flow and concentration metering system is composed of three units: (1) a methane analyzer to determine the concentration of methane in the mine gas stream, (2) a flow meter that is temperature and pressure compensated to measure the flow rate of mine gas at standard conditions, and (3) a flow data processor to compute the mass flow rate of methane and to integrate the flow rate over time to yield a cumulative mass flow rate of methane between two points of time.

The integrated methane flow and concentration meters provide a cumulative measure of the quantity of methane that has passed through the meter, in units of metric tons. A flow metering system includes the capability to download the continuous methane flow measurements on computers or data storage devices such as CD-ROMs.

E. Measurement Locations

A master meter with continuous methane concentration data accumulation combined with volumetric flow should be placed upstream of the final end use devices or gas sales point. The methane content of the gas downstream of this meter will not change before it is used in any of the end use devices. The total gas volume and destruction efficiency of the end use device will therefore determine the volume of the methane destroyed. Sampling of the methane content of the gas upstream of the master meter will allow the back allocation of the methane destroyed to devices using the CMM prior to the master meter.

Flow Meters

If a CMM blower (suction pump) or other compression equipment is being powered by the CMM, there should be a flow meter upstream and downstream of the blower such that the

methane concentration can be recorded at one of those locations and the destruction of the methane documented. A fuel meter may be installed at the pump or compressor in lieu of the upstream full gas flow meters.

A single flow meter is acceptable for gas being sent to multiple-end uses providing they are of the same equipment type. For example, if the CMM pipeline is manifold to reach a set of multiple gas-fired electric gensets, only one flow meter is required. The methane content of the gas being measured by the flow meter must be known either upstream or downstream of that meter.

If the CMM is sent to various end uses, such as gas boilers, electric gensets, and flares, a separate flow meter should be installed upstream of each device with the methane content of the gas measured by the flow meter known. If CMM is being sold and used off-site, a flow meter should be installed at the exit or gas sales point.

Methane Concentration

A recovery project may draw from more than one coal mine or different areas of a coal mine with differing methane concentrations. A separate flow meter and methane concentration measurement can be taken from each CMM source before the gas is blended together for project management purposes, but this is not required for documenting methane destruction. The methane concentration and flow rate of any CMM must be known before it is combusted by on-site equipment, such as blowers or compressors, which are located upstream of the ultimate end-utilization technology. Methane concentrations must be taken again before the end-utilization equipment if a side-stream of gas is blended with the gas downstream of methane utilization by on site equipment

Example Locations

Figure 1 shows the appropriate locations for monitoring and measuring gas flow and methane concentrations as described above. The example uses three different type end-use technologies as well as recovering methane from two coal mines, one active and one abandoned.

Using Figure 1 as an example, it can be seen that the difference in volume between F1 and F2 multiplied by the fraction of methane in the gas downstream of pump station 1 will be the methane used at pump station 1. It can also be seen that the sum of the volume of methane at F2 and F4 should equal the methane at the master meter. Because the master meter has the most rigorous measurement and calibration standards it is considered to be the true volume of methane at that point. Using the following formulas an allocation factor can be determined.

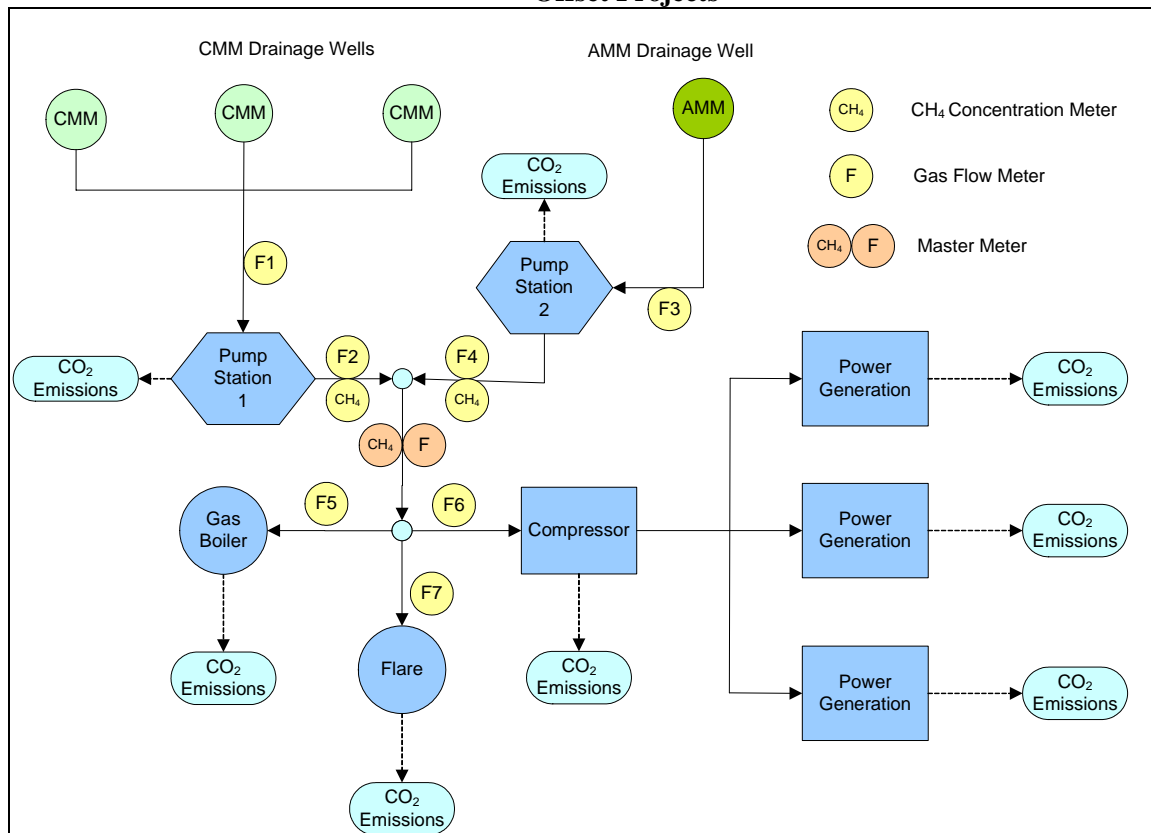
Allocation Factor = CH₄ volume at the master meter ÷ (F2 X %CH₄ + F4 X %CH₄)

This allocation factor multiplied by the methane volumes at the upstream measuring points will more accurately assign methane volumes to the upstream utilization devices. This is standard practice in oil and gas fields where well flow rates are measured only periodically. Allocation schemes also provide a quality check of the measurement devices throughout the system. A large

allocation factor indicates a problem either with the master meter or with meters elsewhere in the system.

The master meter can also be used to allocate volumes to downstream devices. For example in Figure 1 the meters F5, F6 and F7 should sum to the master meter. The ratio of the master meter to the sum of these meters will provide an allocation factor to or accurately apportion the methane to the various end uses shown.

Figure 1 – Location of Monitoring Equipment to be Used by CCX Member CMM/AMM Emission Offset Projects



Missing Data Contingency Plans

Typically, flow meters are extremely reliable and also the least expensive unit in the monitoring metering system. Since there may not be a convenient back-up flow measurement alternative of equal accuracy, it is recommended that a spare flow meter be kept in the mine inventory at all times. Replacement of the unit is quick and easy, requiring the temporary shutdown of the pipeline flow. Because the pipeline is shut down during replacement, there will be a negligible amount of unmeasured methane flow.

Alternative 1:

However, should a flow meter fail and a spare unit not be available, other flow meters (if located on the same CMM pipeline network) could be temporarily used to calculate the failed unit's gas flow. Using the master meter and other meters in system as shown in Figure 1 the methane flow at the failed location can be calculated until a replacement can be installed.

Alternative 2:

Energy recovery facilities that use CMM as a fuel to generate electricity should keep detailed records of electrical generation rates in kilowatt-hours (kW-hr) over time, so that they can be used to calculate methane combustion rates. Information on the heat rate of the combustion unit in BTUs/kW-hr can be used to calculate BTUs of combusted methane. Typically, the high heating value of methane (1,012 BTUs per cubic foot) is used to convert to a methane flow rate. The calculation can be summarized using the following equation²⁹:

$$\text{Methane recovery (ft}^3\text{)} = [\text{kW-hr of electricity produced from the CMM fuel}] \times [\text{heat rate in BTU/kW-hr}] / [1012 \text{ BTU/ft}^3 \text{ (HHV of methane)}]$$

The heat rate used in the calculation should be from the most recent source test for the combustion device. If no source test information is available, the heat rate per the manufacturer's specifications should be used.

Gas consumed by compression units used throughout the project can be calculated in a similar manner based on the performance specifications of the equipment and run-time. The following information regarding the measurement of methane combustion from methane-fueled equipment must be maintained and may be required by CCX to be included in the Project Reports:

- Type, make, and model number of combustion unit(s);
- Number of combustion units that exclusively use CMM as fuel;
- Heat rate of combustion device(s) per manufacturer's specifications;
- Copy of a summary table from the most recent source test showing the measured heat rate of combustion device(s);
- Summary tables showing kW-hr of electricity produced (or thermal energy) from CMM per month over the annual period;
- Type of electrical metering device; and
- Accuracy, precision, and calibration information on the metering device per manufacturer.

The above-listed records need to be kept readily accessible and on-site for at least 2 years after the date that annual methane emissions reductions for the site have been recorded at the CCX and may be required by CCX to be included in Project Reports.

²⁹ Assumes no other hydrocarbons present in gas stream. NMHCs need to be accounted for as addressed in Section J.

F. Electrical Output Measurements

It is a common practice for electrical generator manufacturers to provide watt meters on their units. These meters report the total quantity of electricity generated in units of kW-hr. The watt meters, usually provided as standard equipment of engine-electrical generator sets, have accuracies of no less than +/-1 percent. The manufacturers use solid-state watt meters that are calibrated at the factory and do not require recalibration during their normal life. However, if a watt meter fails, they are not considered repairable and are normally replaced. The generator manufacturers keep replacement meters in stock and can ship them immediately via express shipping services. Replacement of a failed meter is a simple operation that does not require special tools or skills and can be performed by mine staff.

The electrical output of each generator will be monitored each day. Any time that the electricity production is abnormal, with respect to the quantity of the gas that has been consumed during the same period, it should be reported to the manager responsible for the project. During any period when a watt meter is temporarily out of service, the electricity production can be calculated using the following equation that is based on the assumption that the thermal efficiency of the engine is constant over the period of the missing electrical data:

$$GEN_y = M_{ELEC-y} \times GEN_m / M_{ELEC-m}$$

where:

GEN_y	= electricity produced during the period of missing data
M_{ELEC-y}	= gas consumed by the engine during the period of missing data
GEN_m	= electricity produced by the engine during a past month
M_{ELEC-m}	= gas consumed by the engine during a past month

G. Gas Sales Measurements

Equipment

Gas flow meters (EFMs) and BTU analyzers (online chromatographs) are typically used as gas sales meters by the gas industry. Typically, these devices operate continuously throughout the life of a project. When BTU analyzers are used in lieu of methanometers, additional gas composition analyses should be periodically performed to determine the methane portion of the gas sales.

Often, mine gas can contain 1 to 2 percent non-methane hydrocarbons (NMHCs), which will affect the BTU recordings at the sales meter. NMHCs are not considered to be greenhouse gases; thus, their volume needs to be backed out of the gas sales to verify the amount of methane gas sold. Section J of this document addresses the measuring of NMHCs.

Performance Standards

Equipment must meet performance standards defined by the American Petroleum Institute, the AGA, or other gas industry regulation for interstate sales of natural gas for the calculation basis of Exchange Methane Offsets:

- Precision: Methane measurements are to be to the nearest 0.1 percent.
- Accuracy: Methane measurement accuracy decreases with increasing methane concentration but should be within +/- 2 percent of reading, as specified by the manufacturer. Alternate instruments, including gas chromatographs or thermal conductivity detectors, must meet similar standards.

Instrument Calibration Procedures

CCX members will follow the manufacturer's details on the calibration procedures, including instrument adjustments.

Frequency of Recording

Gas sales contracts generally require continuous measurement of gas flow and BTU concentrations.

Recordkeeping

The following records of measured methane concentrations are to be kept in order to verify methane emissions reductions:

- Name of CMM project,
- Type of instrument,
- Dates and results of instrument calibration,
- Dates and results of methane measurement,
- Monthly tabulations of measured methane concentrations, and
- Records of third-party verification of methane measurements and procedures.

The above-listed records need to be kept readily accessible and on-site for at least 2 years after the date that annual emissions reductions for the site have been registered with CCX and may be required by CCX to be included in Project Reports.

H. Flaring of CMM

The flaring of CMM requires monitoring and measurements different from those of end-utilization technologies. Because no electrical output or gas sales are recorded, flame detectors and run-time meters are necessary to validate the methane's destruction. The flares will be equipped with flame detectors and run-time meters that document the temperature conditions in the flare. During proper operation, the temperature of the enclosed flare will be between 750 and 1,000 °C.

Flame Detector

A simple and reliable flame detector for this application is a thermocouple. Thermocouples are manufactured by various companies, with typical accuracies of +/- 2 ° C, or less. Thermocouples have no moving parts and are expected to perform reliably for many years. They are calibrated at the factory and do not require recalibration or maintenance. If a thermocouple fails, a replacement can be obtained quickly. Numerous suppliers keep replacement thermocouples in stock and can ship them immediately through express shipping services.

Runtime Meters

A simple and reliable run-time meter offered by many enclosed flare manufacturers is typically a strip chart recorder. Open flares may need to have the equipment installed in the field. These types of recorders are manufactured by many companies and are low cost meters. A thermocouple connected to a data-recording device could serve the needs of both a flame detector and run-time meter. The data recorder records the thermocouple temperature, the time, and the date. Most models can record data from every 5 seconds to daily. CCX recommends that run-time is recorded every hour or less.

Flame Detector and Runtime Measurements

The flame detector and run-time recorder will provide a continuous verification that the flare temperature is between 750 and 1,000 ° C whenever gas is being sent to the flare. Once each day, the flare chart recorder should be monitored for proper operation and the temperature entered into the data sheet. Whenever the flame temperature is outside of the specifications provided by the flare manufacturer, the incident should be reported to the manager responsible for the project.

The flare temperature charts produced by the chart recorder should be collected monthly and labeled on the chart with the following information:

- Name of CMM project,
- Identification number of the flare,
- Initial time and date of the chart record
- Final time and date of the chart record,
- Name of the person collecting the chart, and
- Records of third-party verification of gas flow and methane measurements and procedures.

The above-listed records need to be kept readily accessible and on-site for at least 2 years after the date that annual methane emissions reductions for the site have been recorded at the CCX. The CCX may require these records to be included in Project Reports.

I. Thermal Destruction/Combustion of VAM

CCX will include VAM-specific guidelines regarding the destruction and/or combustion of methane in the future.

J. Annual Measurement of Non-Methane Hydrocarbon Content

Two sets of data must be documented in association with the measurement of the non-methane hydrocarbons in the mine gas. One set of data relates to the activities involved with collecting the gas sample, and the other set of data relates to the activities involved with conducting the analysis of the gas sample. These two data-collection activities have been separated, since the sampling activities may be conducted by the project developer staff and the analysis activities by a local laboratory. (The same procedure applies to CMM samples sent off-site for analysis). Samples of the sales gas and measurements of the non-methane hydrocarbon should be conducted quarterly³⁰ for the first year of the project, and annually thereafter. Should the NMHCs volume of the sales gas remain below 1 percent, no adjustment is required to the methane volumes. The sample collection sheet will contain the following information:

Project Sample Collection Sheet:

- Name of CMM project,
- Specific location where a sample is taken,
- Date and time a sample is collected,
- Quantity of samples collected,
- Method of transferring sample to container and type of container,
- Identification number of sample container, and
- Date the sample container was shipped to analytical laboratory.

The analytical report produced by the laboratory analyzing the gas sample must contain the information listed below for the “sample analysis report.” In addition, the analytical laboratory should submit a current year copy of their ISO 17025 certification.

Analytical Laboratory Report:

- Name of CMM project,
- Name and address of the analytical laboratory,
- Name of CMM project providing the sample,
- Identification number of sample container,
- Date and time sample arrived at the laboratory and analyzed,
- Type of instrument used to analyze the sample,
- Method used to perform the analysis, and
- Concentration of non-methane hydrocarbons in the sample.

³⁰ UNFCCC’s ACM0008 (Consolidated baseline methodology for CMM/CBM capture and use)

K. Data Variables and Monitoring Equipment Summary Tables

The data variables required for each project activity are listed in **Table 1**.

Table 1. Summary of Measured Data Variables

Data Variable	Units	Recording Frequency	Portion Monitored	Archiving	Archiving Period	Comments
Methane sent to flare	tCH ₄	Continuous	100%	Electronic	CP +2yr	Flow meters will record gas volumes, pressure, and temperature. Density of methane under normal conditions of temperature and pressure is 0.68kg/m ³
Flare/combustion efficiency, determined by (1) the operation hours	%	(1)Continuous	n/a	Electronic		(1) The flare operation shall be continuously monitored by continuous measurement of operation time of flare using a run-time meter connected to a flame detector or a flame continuous temperature controller.
CMM sent to power plant	tCH ₄	Continuous	100%	Electronic	CP +2yr	Flow meters will record gas volumes, pressure and temperature. Density of methane under normal conditions of temperature and pressure is 0.68kg/m ³
CMM sent to Boiler	tCH ₄	Continuous	100%	Electronic	CP +2yr	Flow meters will record gas volumes, pressure and temperature. Density of methane under normal conditions of temperature and pressure is 0.68kg/m ³
Mine gas sent to gas grid for end users	tCH ₄	Continuous	100%	Electronic	CP +2yr	Flow meters will record gas volumes, pressure, and temperature. Density of methane under normal conditions of temperature and pressure is 0.68kg/m ³ .
Concentration of methane in extracted gas	%	Hourly/Daily	100%		CP +2yr	Obtained from same location as flow measurements.
NMHC concentration in coal mine gas	%	Annually	100%		CP +2yr	If below 1% of emissions, no adjustment required.
Mine gas measured sent to use i.	tCH ₄	Continuous	100%	Electronic	CP +2yr	Obtained from same location as flow measurements.
Efficiency of methane destruction /oxidation through use of VAM unit.	%	Ex-ante or ex-post	100%	Electronic	CP +2yr	(1) The VAM oxidizer operation shall be continuously monitored by continuous measurement of operation time using a time meter connected to a temperature controller. (2) Periodic measurement of methane content of flare exhaust gas.
Electricity generation by project	MWh	Continuous	100%	Electronic	CP +2yr	Manufacturer provided meter
Heat generation by Project	GJ	Continuous	100%	Electronic	CP +2yr	Manufacturer provided meter

Table 2 shows a summary of monitoring equipment to be used by CCX Offset members for measuring CMM reductions.

Table 2. Summary of Monitoring Equipment

Data Variable Monitored	Monitoring Equipment
Methane sent to flare	Flow and Concentration Meters
Flare/combustion efficiency, determined by operation hours	Flame Detector and Runtime Meters

Methane sent to power plant	Flow and Concentration Meters
Methane sent to boiler	Flow and Concentration Meters
Methane sent to gas grid for end users	Flow and Concentration Meters
Concentration of methane in extracted gas	Flow and Concentration Meters
NMHC concentration in coal mine gas	Annual Measurement of Non-methane Hydrocarbon Content
Methane measured sent to use i.	Flow and Concentration Meters
Efficiency of methane destruction /oxidation of VAM	Temperature Detector and Runtime Meters
Post-mining CMM captured, and destroyed	Flow and Concentration Meters
Electricity generation by project	Electrical Output Meters

VI. Use of Measured Data and Factors to Calculate Emission Offsets

Tabulated records of total daily CMM flows in standard cubic feet per day (scfd) need to be matched against methane concentrations measured during the corresponding time period to determine daily methane recovery rates, using the following equation:

$$\text{CH}_4 \text{ recovered (scfd)} = \text{mine gas recovered (scfd)} \times \% \text{CH}_4$$

The methane value used in the calculation should be the measurement that is the closest available in time to the date of the flow measurement. Daily methane flows should be tabulated and summed on a monthly basis. Total annual methane recovery from the CMM project is to be tabulated using the monthly summaries of methane recovery.

In order to estimate the amount of methane combusted (or sold to the grid) in metric tons per year (Mg/yr), the annual methane recovery rate in cubic feet per year needs to be converted to weight using the following equation:

$$\text{CH}_4 \text{ combusted (Mg/yr)} = [\text{CH}_4 \text{ recovery (ft}^3\text{/yr)}] \times 16.04 \text{ (molecular weight of CH}_4\text{)} \times 1\text{Mg}/10^6 \text{ g}^* 1\text{mol}/24.04\text{L @ STP} \times 28.32\text{L}/1\text{cf} \times 98.75\% \text{ (destruction efficiency)}$$

VII. Third Party Verification Requirements

Verification of CMM projects shall be conducted in accordance with the provisions contained in Chapter 9 and 10 of the CCX Rulebook and as prescribed by the CCX Committee on Offsets.

VIII. Verification Checklist for Offset Members

- Confirm eligibility
 - Coal mine background information
 - Dates opened/closed
 - Historical methane recovery

- Annual amounts
- Well deployment dates
 - API permit #
 - Well completion reports
- Pre-drainage wells
 - Methane produced *within* the accepted zone of influence (-50 to +150 meters from mined coal seam)
 - If larger zone of influence can be demonstrated, include copies of studies showing analytical evidence that methane contained in coal seams or strata outside the accepted zone of influence contributes to emissions at the coal mine
- Measuring and monitoring protocol
 - List measured data and documentation to be verified by auditor
 - Sample of daily recordings
 - Company QA/QC procedures
 - Monthly summaries
 - Supplemental data such as lab analysis (CH₄ concentration) or equipment testing
- Calculating emission reductions
 - List and reference assumptions and conversion factors used
 - Sample calculations
 - Spreadsheet
 - QA/QC procedures
- Annual Report
 - Cumulative methane flow from monthly summaries
 - Cumulative gas or electricity sales
 - Proof that equipment performance standards are met
 - Gas composition analysis
 - Proof of equipment calibrations

Appendix 9.2Ai CCX Carbon Accumulation Tables for Afforestation Offset Projects Section 1: Classification of Afforestation Regions

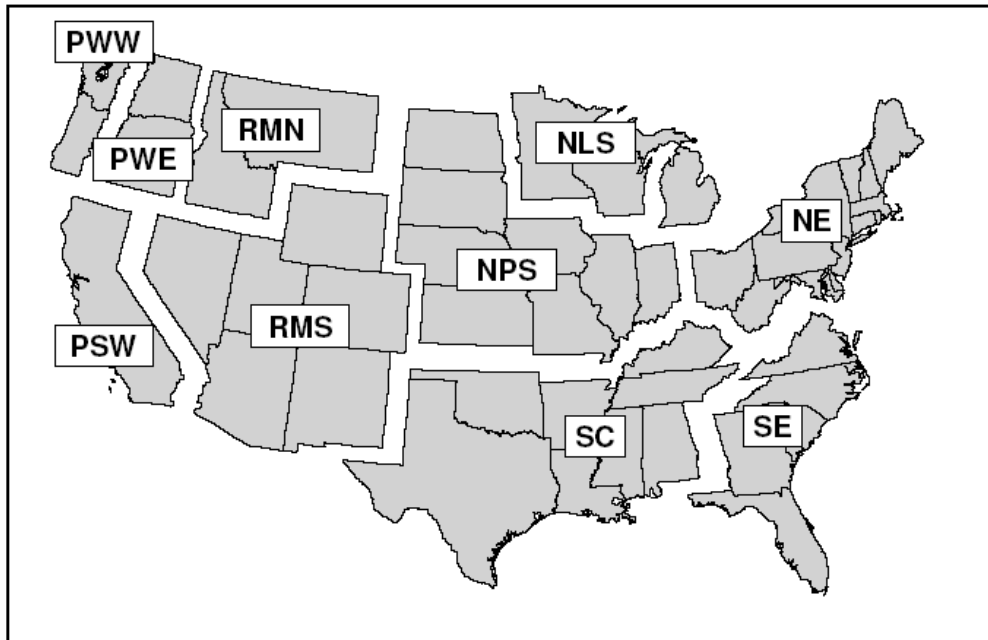


Figure 1.1—Definition of regions: Pacific Northwest, West (PWW); Pacific Northwest, East (PWE); Pacific Southwest (PSW); Rocky Mountain, North (RMN); Rocky Mountain, South (RMS); Northern Prairie States (NPS); Northern Lake States (NLS); Northeast (NE); South Central (SC); and Southeast (SE). Note that regions are merged for some tables, these combinations include: NLS and NPS as North Central; PWW, PWE, and PSW as Pacific Coast; RMN and RMS as Rocky Mountain; SC and SE as South; and RMN, RMS, PWE, and PSW as West (except where stated otherwise).

Section 2: Regional Estimates of Tree Annual Carbon Accumulation in Live trees and Soil Organic Carbon for Afforestation (Metric tons CO₂/ acre/ year age of tree)

<u>Region</u>	<u>Species</u>	1 through 5	6 through 10	11 through 15	16 through 20	21 through 25	26 through 30
Northeast	Aspen-birch	1.424	1.628	1.706	1.852	1.852	1.883
Northeast	Maple-beech-birch	1.571	2.199	2.702	2.638	2.481	2.449
Northeast	Oak-hickory	1.467	2.718	3.886	3.592	3.215	3.016
Northeast	Oak-pine	1.320	1.874	2.314	2.460	2.502	2.423
Northeast	Spruce-balsam fir	1.508	1.617	1.570	1.679	1.642	1.768
Northeast	white-red-jack pine	1.571	2.037	2.388	2.230	1.957	1.868
Northern Lake States	Aspen-birch	1.592	1.402	0.983	1.531	1.861	2.044
Northern Lake States	Elm-ash-cottonwood	0.921	1.098	1.024	1.483	1.661	1.802
Northern Lake States	Maple-beech-birch	1.131	1.240	1.140	1.788	2.239	2.379
Northern Lake States	Oak-hickory	1.466	1.429	1.266	1.752	2.082	2.160
Northern Lake States	Spruce-balsam fir	0.837	1.185	1.138	2.010	2.487	2.805
Northern Lake States	white-red-jack pine	0.146	0.679	1.036	2.260	3.297	3.396
Northern Prairie States	Elm-ash-cottonwood	0.859	0.826	0.669	0.909	1.014	1.359
Northern Prairie States	Maple-beech-birch	1.110	0.942	0.691	0.931	1.067	1.287
Northern Prairie States	Oak-hickory	1.425	1.251	1.016	1.256	1.413	1.476
Northern Prairie States	Oak-pine	1.089	1.063	0.984	1.419	1.801	1.916
Pacific Northwest, East	Douglas-fir	0.607	0.784	0.816	2.198	3.434	3.884
Pacific Northwest, East	Fir-spruce-mountain hemlock	0.691	0.581	0.397	0.868	1.235	1.742
Pacific Northwest, East	Lodgepole pine	0.419	0.628	0.754	1.361	1.884	1.905
Pacific Northwest, East	Ponderosa pine	0.712	0.691	0.586	0.910	1.162	1.177
Pacific Northwest, West	Alder-maple	1.739	2.272	2.638	5.193	7.572	6.932
Pacific Northwest, West	Douglas-fir	1.802	2.214	2.482	5.503	8.379	8.331
Pacific Northwest, West	Fir-spruce-mountain hemlock	0.712	0.890	0.994	2.277	3.456	4.079
Pacific Northwest, West	Hemlock-Sitka spruce	1.299	1.717	1.968	4.182	6.220	6.644

<u>Region</u>	<u>Species</u>	1 through 5	6 through 10	11 through 15	16 through 20	21 through 25	26 through 30
Pacific Southwest	Mixed conifer	0.901	0.738	0.502	0.722	0.858	0.962
Pacific Southwest	Fir-spruce-mountain hemlock	0.712	0.675	0.586	0.926	1.172	1.350
Pacific Southwest	Western oak	0.566	0.487	0.377	0.418	0.418	1.429
Rocky Mountain, North	Douglas-fir	0.587	0.544	0.439	1.120	1.749	2.167
Rocky Mountain, North	Fir-spruce-mountain hemlock	0.670	0.549	0.366	0.884	1.329	1.890
Rocky Mountain, North	Lodgepole pine	0.419	0.387	0.303	0.774	1.193	1.518
Rocky Mountain, North	Ponderosa pine	0.712	0.576	0.387	0.774	1.120	1.434
Rocky Mountain, South	Aspen-birch	0.670	0.622	0.471	0.774	0.994	1.261
Rocky Mountain, South	Douglas-fir	0.566	0.565	0.534	1.015	1.434	1.707
Rocky Mountain, South	Fir-spruce-mountain hemlock	0.398	0.366	0.293	0.638	0.942	1.214
Rocky Mountain, South	Lodgepole pine	0.461	0.387	0.283	0.466	0.607	0.774
Rocky Mountain, South	Ponderosa pine	0.377	0.340	0.251	0.481	0.680	0.885
Southeast	Loblolly-shortleaf pine	2.367	2.472	2.303	2.136	2.261	2.135
Southeast	Longleaf-slash pine	1.173	1.644	1.957	2.061	2.281	2.239
Southeast	Oak-gum-cypress	1.487	2.219	2.637	2.532	2.521	2.363
Southeast	Oak-hickory	1.739	2.262	2.430	2.136	2.178	2.041
Southeast	Oak-pine	1.571	2.157	2.440	2.220	2.083	1.968
South Central	Elm-ash-cottonwood	1.823	2.000	2.052	2.031	2.104	2.041
South Central	Loblolly-shortleaf pine	2.284	2.482	2.367	2.147	2.199	2.010
South Central	Oak-gum-cypress	1.152	1.948	2.534	2.419	2.345	2.104
South Central	Oak-hickory	2.053	2.252	2.220	2.073	2.042	1.958
South Central	Oak-pine	1.844	2.304	2.535	2.262	2.157	1.989

Appendix 9.2Aii CCX Carbon Accumulation Tables for Afforestation Offset Projects

<input type="checkbox"/>	Check documentation for legal evidence of entity's ownership of forest land.
<input type="checkbox"/>	Check documentation that forestation activity was done after January 1, 1990.
<input type="checkbox"/>	Check documentation to confirm existence of forests (e.g. Aerial Photograph, Receipt from Seed Purchase, Receipt from Planting)
<input type="checkbox"/>	Determine if records of easement or other evidence of intent to maintain enrolled land as forest are properly documented and signed.
<input type="checkbox"/>	Determine acreage, type of forest land and species included.
<input type="checkbox"/>	Determine that damage caused by pest, fire and weather is properly documented
<input type="checkbox"/>	Determine that any acquisitions or disposals after Jan 1, 2003 are properly documented. (e.g. Date of transfer of ownership.)
<input type="checkbox"/>	Determine if the entity is properly using the CCX approved quantification tables for carbon stocks. (Either using the tables provided in this protocol or direct measurements) a. Planting density b. Age class c. Species Class d. Geographic region
<input type="checkbox"/>	Determine if the net annual changes in carbon stocks in forest stocks are done in accordance to CCX rules (Refer: Rule book. Chapter 9. Section 9.8.2)
<input type="checkbox"/>	Verify that a signed contract with the Offset Aggregator is in the file.

**Appendix 9.2Aiii Sample letter of Intent to Maintain Forest Stocks beyond the CCX
Market Period for Afforestation Offsets**

**CHICAGO CLIMATE EXCHANGE
FORESTRY OFFSETS SECTOR**

STATEMENT OF INTENT
TO
MAINTAIN FOREST CARBON STOCK
BEYOND 2010

[COMPANY]
[ADDRESS]

TO: CHICAGO CLIMATE EXCHANGE

This Statement of Intent issued by _____ (“Enrolled Participant”), to Chicago Climate Exchange (“CCX”) confirms Participant’s intent to respect the Principle of Permanence regarding its forest carbon stock to maintain beyond December 31, 2010, excluding catastrophic events and land sales, the quantity of Carbon Stocks held by the Participant in its CCX-registered Afforestation Offset Project as defined in Chapter 9 of the CCX Rulebook including any amendments and/or interpretations thereto.

It is recognized by Participant and CCX that this is a non-binding Statement that reflects the Participant’s intent in regards to the issues described herein. The Participant acknowledges that the effectiveness of forest stocks in sequestering carbon dioxide depend on the forests stocks being maintained for a considerable time period. The Participant acknowledges that an objective of the Chicago Climate Exchange is the development of protocols to advance climate change mitigation objectives and that the Chicago Climate Exchange issues offsets for forest carbon stocks with the objective that the forest stocks sequester carbon for a considerable time period. The Participant acknowledges that they support the objectives of the Chicago Climate Exchange and the use of forest offset projects as a means of carbon sequestration.

DATED this ____ day of _____, [Year]

By: _____

Name: _____

Title: _____

Appendix 9.2B Methods for Quantifying Carbon Accumulation for Urban and Suburban Tree Planting Programs

Step 1: Determine the number and species of qualifying live trees standing at the end of 2002 (or upon Project registration) on lands included in the CCX-registered Project. Qualifying trees are those planted after December 31, 1989 on sites not forested at that time.

Annual carbon sequestration values are calculated **per one hundred trees**.

Step 2: Reference Table 9.3B to determine how many trees in the Project (rounded to the nearest hundred) correspond to the tree types listed below (species: H = Hardwood, C = Conifer) and growth rates (S = Slow, M = Moderate, F = Fast).

Do not include trees with diameters less than 1 inch at breast height.

Step 3: Apply the annual carbon accumulation values provided in Table 9.3C to determine annual metric tons of CO₂.

For the purpose of calculating Tree Age in order to use Table 9.3C, zero-year trees are 1 inch in diameter at Breast Height (total diameter at Breast Height of all trunks for multi-trunk trees).

To calculate Tree Age for trees with a diameter greater than 1 inch, use the following formula:

(Tree diameter (in inches) – 1) multiplied by 3. Round the result to the nearest whole number.

Retain all worksheets, calculations, field assessments and other information on tree counts.

Calculation Example: A city planted 10,000 two-inch diameter White Ash trees in 1996. Those trees were therefore age 3 in 1996, so they are age 10 during 2003. The city concludes that 90% of the trees survived through 2002 (9,000 remain alive).

The carbon sequestration calculation is as follows:

Tree type:	White Ash
Tree count:	9,000
Tree types, growth rate:	H, F
Carbon accumulated during 2003	$90 \times 2.25 = 202.5$ metric tons CO ₂ (round up to 203 metric tons).

Appendix Table 9.2B1 Tree Types and Growth Rates Applied to Urban and Suburban Tree Plantings³¹

Species	Type	Growth Rate	Species	Type	Growth Rate
Ailanthus, <i>Ailanthus altissima</i>	H	F	Maple, bigleaf, <i>Acer macrophyllum</i>	H	S
Alder, European, <i>Alnus glutinosa</i>	H	F	Maple, Norway, <i>Acer platanoides</i>	H	M
Ash, green, <i>Fraxinus pennsylvanica</i>	H	F	Maple, red, <i>Acer rubrum</i>	H	M
Ash, mountain, American, <i>Sorbus americana</i>	H	M	Maple, silver, <i>Acer saccharinum</i>	H	M
Ash, white, <i>Fraxinus americana</i>	H	F	Maple, sugar, <i>Acer saccharum</i>	H	S
Aspen, bigtooth, <i>Populus grandidentata</i>	H	M	Mulberry, red, <i>Morus rubra</i>	H	F
Aspen, quaking, <i>Populus tremuloides</i>	H	F	Oak, black, <i>Quercus rubra</i>	H	M
Baldcypress, <i>Taxodium distichum</i>	C	F	Oak, blue, <i>Quercus douglasii</i>	H	M
Basswood, American, <i>Tilia americana</i>	H	F	Oak, bur, <i>Quercus macrocarpa</i>	H	S
Beech, American, <i>Fagus grandifolia</i>	H	S	Oak, California black, <i>Quercus kelloggii</i>	H	S
Birch, paper (white), <i>Betula papyrifera</i>	H	M	Oak, California White, <i>Quercus lobata</i>	H	M
Birch, river, <i>Betula nigra</i>	H	M	Oak, canyon live, <i>Quercus chrysolepis</i>	H	S
Birch, yellow, <i>Betula alleghaniensis</i>	H	S	Oak, chestnut, <i>Quercus prinus</i>	H	S
Boxelder, <i>Acer negundo</i>	H	F	Oak, Chinkapin, <i>Quercus muehlenbergii</i>	H	M
Buckeye, Ohio, <i>Aesculus glabra</i>	H	S	Oak, Laurel, <i>Quercus laurifolia</i>	H	F
Catalpa, northern, <i>Catalpa speciosa</i>	H	F	Oak, live, <i>Quercus virginiana</i>	H	F
Cedar-red, eastern, <i>Juniperus virginiana</i>	C	M	Oak, northern red, <i>Quercus rubra</i>	H	F
Cedar-white, northern, <i>Thuja occidentalis</i>	C	M	Oak, overcup, <i>Quercus lyrata</i>	H	S
Cherry, black, <i>Prunus serotina</i>	H	F	Oak, pin, <i>Quercus palustris</i>	H	F
Cherry, pin, <i>Prunus pennsylvanica</i>	H	M	Oak, scarlet, <i>Quercus coccinea</i>	H	F
Cottonwood, eastern, <i>Populus deltoides</i>	H	M	Oak, swamp white, <i>Quercus bicolor</i>	H	M
Crabapple, <i>Malus spp.</i>	H	M	Oak, water, <i>Quercus nigra</i>	H	M
Cucumbertree, <i>Magnolia acuminata</i>	H	F	Oak, white, <i>Quercus alba</i>	H	S
Dogwood, flowering, <i>Cornus florida</i>	H	S	Oak, willow, <i>Quercus phellos</i>	H	M
Elm, American, <i>Ulmus Americana</i>	H	F	Pecan, <i>Carya illinoensis</i>	H	S
Elm, Chinese, <i>Ulmus parvifolia</i>	H	M	Pine, European black, <i>Pinus nigra</i>	C	S
Elm, rock, <i>Ulmus thomasii</i>	H	S	Pine, jack, <i>Pinus banksiana</i>	C	F
Elm, September, <i>Ulmus serotina</i>	H	F	Pine, loblolly, <i>Pinus taeda</i>	C	F
Elm, Siberian, <i>Ulmus pumila</i>	H	F	Pine, longleaf, <i>Pinus palustris</i>	C	F
Elm, slippery, <i>Ulmus rubra</i>	H	M	Pine, ponderosa, <i>Pinus ponderosa</i>	C	F
Fir, balsam, <i>Abies balsamea</i>	C	S	Pine, red, <i>Pinus resinosa</i>	C	F
Fir, Douglas, <i>Pseudotsuga menziesii</i>	C	F	Pine, Scotch, <i>Pinus sylvestris</i>	C	S
Ginkgo, <i>Ginkgo biloba</i>	H	S	Pine, shortleaf, <i>Pinus echinata</i>	C	F
Hackberry, <i>Celtis occidentalis</i>	H	F	Pine, slash, <i>Pinus elliotii</i>	C	F
Hawthorne, <i>Crataegus spp.</i>	H	M	Pine, Virginia, <i>Pinus virginiana</i>	C	M
Hemlock, eastern, <i>Tsuga canadensis</i>	C	M	Pine, white eastern, <i>Pinus strobus</i>	C	F

³¹ “Method for Calculating Carbon Sequestration by Trees in Urban and Suburban Settings,” in Energy Information Administration, U.S. Department of Energy, *Voluntary Reporting of Greenhouse Gases*, April 1998.

Species	Type	Growth Rate	Species	Type	Growth Rate
Hickory, bitternut, <i>Carya cordiformis</i>	H	S	Poplar, yellow, <i>Liriodendron tulipifera</i>	H	F
Hickory, mockernut, <i>Carya tomentosa</i>	H	M	Redbud, eastern, <i>Cercis canadensis</i>	H	M
Hickory, shagbark, <i>Carya ovata</i>	H	S	Sassafras, <i>Sassafras albidum</i>	H	M
Hickory, shellbark, <i>Carya laciniosa</i>	H	S	Spruce, black, <i>Picea mariana</i>	C	S
Hickory, pignut, <i>Carya glabra</i>	H	M	Spruce, blue, <i>Picea pungens</i>	C	M
Holly, American, <i>Ilex opaca</i>	H	S	Spruce, Norway, <i>Picea abies</i>	C	M
Honeylocust, <i>Gleditsia triacanthos</i>	H	F	Spruce, red, <i>Picea rubens</i>	C	S
Hophornbeam, eastern, <i>Ostrya virginiana</i>	H	S	Spruce, white, <i>Picea glauca</i>	C	M
Horsechestnut, common, <i>Aesculus hippocastanum</i>	H	F	Sugarberry, <i>Celtis laevigata</i>	H	F
Kentucky coffeetree, <i>Gymnocladus dioica</i>	C	F	Sweetgum, <i>Liquidambar styraciflua</i>	H	F
Linden, little-leaf, <i>Tilia cordata</i>	H	F	Sycamore, <i>Platanus occidentalis</i>	H	F
Locust, black, <i>Robinia pseudoacacia</i>	H	F	Tamarack, <i>Larix laricina</i>	C	F
London plane tree, <i>Platanus_X_acerifolia</i>	H	F	Walnut, black, <i>Juglans nigra</i>	H	F
Magnolia, southern, <i>Magnolia grandifolia</i>	H	M	Willow, black, <i>Salix nigra</i>	H	F

Type: H = Hardwood, C = Conifer Growth Rate: S = Slow, M = Moderate, F = Fast

Appendix 9.2B2 Annual CCX Carbon Accumulation Quantities for Urban and Suburban Tree Plantings (Metric tons CO₂) per One Hundred Trees by Tree Type and Age

Annual Sequestration Rates by Tree Type and Growth Rate (metric tons CO ₂ per one hundred trees)							
Tree Age*	Tree diameter (at 4.5 feet height)	Hardwood			Conifer		
		Slow	Moderate	Fast	Slow	Moderate	Fast
0	1 inch	0.15	0.22	0.31	0.08	0.12	0.16
1	1.33"	0.19	0.31	0.47	0.10	0.17	0.26
2	1.66"	0.23	0.41	0.63	0.13	0.23	0.36
3	2.0"	0.28	0.50	0.80	0.16	0.29	0.48
4	2.33"	0.33	0.61	0.99	0.19	0.36	0.61
5	2.66"	0.37	0.71	1.18	0.22	0.43	0.75
6	3.0"	0.43	0.83	1.38	0.26	0.51	0.89
7	3.33"	0.48	0.94	1.59	0.29	0.59	1.04
8	3.66"	0.54	1.06	1.81	0.33	0.68	1.19
9	4.0"	0.58	1.19	2.03	0.36	0.77	1.36
10	4.33"	0.64	1.31	2.25	0.41	0.86	1.54
11	4.66"	0.70	1.43	2.48	0.44	0.96	1.71
12	5.0"	0.76	1.57	2.72	0.49	1.06	1.90
13	5.33"	0.82	1.70	2.96	0.54	1.15	2.09
14	5.66"	0.87	1.84	3.21	0.57	1.26	2.28
15	6.0"	0.94	1.97	3.46	0.62	1.38	2.49
16	6.33"	1.00	2.11	3.72	0.66	1.48	2.70
17	6.66"	1.06	2.26	3.97	0.71	1.60	2.91
18	7.0"	1.13	2.40	4.23	0.77	1.71	3.14
19	7.33"	1.19	2.55	4.50	0.82	1.83	3.36
20	7.66"	1.26	2.70	4.78	0.86	1.95	3.59
21	8.0"	1.33	2.84	5.05	0.92	2.07	3.82
22	8.33"	1.40	3.01	5.33	0.97	2.20	4.07
23	8.66"	1.46	3.16	5.61	1.03	2.33	4.31
24	9.0"	1.53	3.31	5.90	1.07	2.46	4.56
25	9.33"	1.60	3.47	6.19	1.13	2.59	4.81
26	9.66"	1.67	3.64	6.48	1.19	2.73	5.07
27	10.0"	1.75	3.79	6.77	1.25	2.87	5.33
28	10.33"	1.82	3.95	7.08	1.31	3.01	5.59
29	10.66"	1.89	4.11	7.38	1.36	3.15	5.86

Appendix 9.2Ci CCX Approved Certification Schemes for Sustainable Forest Management³²

Country	Name	Schemes
Australia	<u>Australian Forestry Standard Limited</u>	<u>Australian Forest Certification Scheme</u>
Austria	<u>PEFC Austria</u>	<u>Austrian Forest Certification Scheme (2006)</u>
Belarus	<u>Belarusian Association of Forest Certification</u>	
Belgium	<u>WoodNet - Commission PEFC Belgique</u>	<u>Belgian Forest Certification Scheme</u>
Brazil	<u>National Institute of Metrology, Standardization and Industrial Quality</u>	<u>Cerflor - Brazilian Program of Forest Certification</u>
Canada	<u>CSA International;</u> <u>SFI, Inc.</u>	<u>CSA Sustainable Forest Management Program</u> <u>SFI – Sustainable Forestry Initiative</u>
Chile	<u>CertforChile Forest Certification Corporation</u>	<u>CertforChile</u>
Czech Republic	<u>PEFC Czech Republic</u>	<u>Czech Forest Certification Scheme (2006)</u>
Denmark	<u>PEFC Denmark</u>	<u>Danish Forest Certification Scheme</u>
Estonia	<u>Estonian Forest Certification Council</u>	<u>Estonian Forest Certification Scheme</u>
Finland	<u>Finnish Forest Certification Council</u>	<u>Finnish Forest Certification Scheme</u>
France	<u>PEFC France</u>	<u>French Forest Certification Scheme (2006)</u>
Gabon	<u>PAFC Gabon</u>	<u>PAFC Gabon Forest Certification Scheme</u>
Germany	<u>PEFC Germany e.V</u>	<u>Revised German Forest Certification Scheme (2005)</u>
Ireland	<u>PEFC Council of Ireland</u>	
Italy	<u>PEFC Italy</u>	<u>Italian Forest Certification Scheme</u>
Latvia	<u>PEFC Latvia Council</u>	<u>Latvian Forest Certification Scheme</u>
Lithuania	<u>PEFC Lietuva (PEFC Lithuania)</u>	<u>Lithuanian Forest Certification Scheme</u>
Luxembourg	<u>PEFC Luxembourg</u>	<u>Luxembourg Certification Scheme for Sustainable Forest Management</u>

³² http://www.pefc.org/internet/html/members_schemes/4_1120_59.htm

Malaysia	<u>Malaysian Timber Certification Council</u>	
Norway	<u>PEFC-Norway</u>	<u>Norwegian Living Forest Standard and Certification Scheme</u>
Poland	<u>PEFC Polska</u>	<u>Polish Forest Certification Scheme</u>
Portugal	<u>Portuguese Forestry Sector Council</u>	<u>Portuguese Forest Certification Scheme</u>
Russia	<u>Partnership on the Development of PEFC Forest Certification</u>	
Slovakia	<u>Slovak Forest Certification Association</u>	<u>Slovak Forest Certification Scheme</u>
Slovenia	<u>Institute of Forest Certification Slovenia</u>	<u>Slovenian Forest Certification Scheme</u>
Spain	<u>PEFC España</u>	<u>Spanish Forest Certification Scheme</u>
Sweden	<u>Swedish PEFC Co-operative</u>	<u>Swedish Forest Certification Scheme</u>
Switzerland	<u>PEFC Switzerland and HWK-Zertifizierungsstelle</u>	<u>Swiss Q-label certification scheme</u>
United Kingdom	<u>PEFC UK Ltd.</u>	<u>UK Scheme for Sustainable Forest Management</u>
	-	<u>PEFC UK certification scheme for sustainable forest management (revised 2006)</u>
United States	<u>Sustainable Forestry Inc.</u> <u>American Forest Foundation (AFF)</u>	<u>SFI - Sustainable Forestry Initiative</u> <u>American Tree Farm System</u>
International	<u>Forest Stewardship Council (FSC)</u>	<u>Forest Stewardship Council (FSC)</u>

Appendix 9.2Cii . Selected CCX factors for Average Disposition Patterns of Carbon as fractions of Roundwood by Region and Roundwood Category (assuming no bark on roundwood and excluding fuel wood)³³

<u>Region</u>	<u>Softwood Sawlog</u>	<u>Softwood Pulpwood</u>	<u>Hardwood Sawlog</u>	<u>Hardwood Pulpwood</u>
Northeast	0.318	0.09	0.316	0.261
North Central	0.346	0.092	0.297	0.304
Pacific Northwest (East)	0.337	0.337	0.265	0.265
Pacific Northwest (West)	0.409	0.076	0.477	0.477
Pacific Southwest	0.355	0.355	0.265	0.265
Rocky Mountain	0.367	0.367	0.265	0.265
Southeast	0.336	0.141	0.304	0.188
South Central	0.334	0.162	0.285	0.176

Appendix 9.2Ciii . Volume Multipliers for Converting Timber and Chip Units into Thousand Cubic Feet (MCF)³⁴

Unit	Factor
Bone Dry Tons	0.0713
Bone Dry Units	0.0825
Cords	0.075
Cubic Meters	0.0353
Cunits-Chips (CCF)	0.1
Cunits-Roundwood	0.1
Cunits-Whole tree chip	0.126
Green Tons	0.0315
MBF-Doyle	0.222
MBF-International 1/4"	0.146
MBF-Scribner ("C" or "Small")	0.165
MBF-Scribner ("Large" or "Long")	0.145
MCF-Thousand Cubic Feet	1
Oven Dried Tonnes	0.0758

³³ Source: Technical Guidelines for Voluntary Reporting of Greenhouse Gas Program. Part I Appendix Forestry. Table 1.6 Average disposition patterns of carbon as fraction in roundwood by region and roundwood category. Pages 36-48 March 2006

³⁴ American Forest & Paper Association, Sustainable Forestry Initiative Program Annual Progress Reporting Form.

Appendix 9.2Civ Basic Factors for Converting Merchantable Wood Yield to Carbon Yield by Species³⁵

		Specific Gravity	Lbs. per Dry cu. foot	Percent Carbon	Lbs C per Cubic foot
Region	Forest Type				
SE	Loblolly Pine	0.47	29.33	0.531	15.57
SE	Longleaf Pine	0.54	33.70	0.531	17.89
SE	Oak-Hickory (SI = 79)	0.61	38.06	0.479	18.23
NE	Pines	0.41	25.58	0.521	13.33
NE	Spruce-fir	0.37	23.09	0.521	12.03
NE	Oak-hickory (all)	0.61	38.06	0.498	18.96
NE	Maple-beech-birch	0.61	38.06	0.498	18.96
NC	Pines	0.41	25.58	0.521	13.33
NC	Spruce-fir	0.37	23.09	0.521	12.03
NC	Oak-hickory	0.61	38.06	0.498	18.96
NC	Maple-beech	0.58	36.19	0.498	18.02
NC	Aspen-birch	0.46	28.70	0.498	14.29
West	Douglas-fir	0.45	28.08	0.512	14.38
West	Ponderosa pine	0.38	23.71	0.512	12.14
West	Fir-spruce	0.35	21.84	0.512	11.18
West	Hemlock-Sitka sp.	0.43	26.83	0.512	13.74
West	Lodgepole pine	0.42	26.21	0.512	13.42
West	Redwoods	0.42	26.21	0.512	13.42
West	Hardwoods	0.38	23.71	0.496	11.76

³⁵ Birdsey 1996 (See also Appendices 2 & 3, Sampson and Hair 1996)

Appendix 9.2Di. CCX Forest Project Summary Form

<u>CCX Forest Project Summary Form</u>	
CCX Aggregator	
Project Name	
Geographic Region	
CCX Forest Offset Project Type	
Estimated Annual Metric Tons	
CCX Program Years	
Were Subaggregators Used on Project?	
Project Verifier	
Description of Consulting Services Utilized in Project Proposal Development	

Appendix 9.2Dii. CCX Forest Project Landowner Form

<u>CCX Forest Aggregator Reporting Form</u>	
Landowner Name	
Landowner Acreage	
Forest Age and Species	
Landowner Certification for Sustainable Management	
Legal Description of Land	
Landowner Management Activity	
Most Recent Inventory	
Documentation of Land Acquisition / Disposition	
Evidence of Ownership	
Most Recent Aggregator On-Site Visit	

Appendix 9.3A Exchange Soil Offset Eligible Practices and Offset Issuance Rates by Zone

Zone A:

States and counties included in Zone A are provided in Appendix 9.3B. Exchange Soil Offsets will be earned at a rate of 0.6 metric tons per acre per year to land managers who commit to continuous conservation tillage for years 2006 through 2010 on acres specified upon project registration. General eligibility criteria and practices for the region include, but are not limited to the following:

- (1) Continuous cotton, soybeans and pulse crops (i.e. beans, peas, lintels, etc.) are eligible only if there is a cover crop;
- (2) Eligible implements include but are not limited to: no-till drill, no-till and strip-till planters, rolling harrows, low disturbance liquid manure injectors, anhydrous ammonia applicator, manure knife applicator, sub-soil ripper with at least 24 inch shank spacing;
- (3) Ineligible implements include but are not limited to: field cultivators, tandem disk, offset disk, chisel plow, moldboard plow;
- (4) Histosol soils in Land Resource Region (LRR) T are not eligible;
- (5) In general if the implement would require that a leveling or smoothing activity follows, it would likely result in too much soil disturbance
- (6) Fallowed acres are not eligible in this region;
- (7) No Exchange Soil Offsets will be issued in years in which residue removal and/or burning occurs.

Zone B:

States and counties included in Zone B are provided in Appendix 9.3B. Exchange Soil Offsets will be earned at a rate of 0.4 metric tons per acre per year to land managers who commit to continuous conservation tillage for all of the years 2006 through 2010 on acres specified upon project registration. General eligibility criteria and practices for the region include but are not limited to the following:

- (1) For the North Dakota portion of Zone B, adherence to the cropping and implementation guidelines outlined below should at a minimum be reflective of management practices resulting in a Soil Tillage Intensity Rating (STIR) of 20 or less and a Soil Conditioning Index (SCI) of 0.3 or greater (USDA-NRCS North Dakota Conservation Practice Standard 329, September 2005);
- (2) Continuous soybeans or pulse crops (i.e. beans, peas, or lintels) are eligible only if there is a cover crop;
- (3) Irrigated acreage in Land Resource Region G of Zone B (counties within Land Resource Region G are indicated in Appendix 9.3B) is eligible for enrollment provided that the acreage began irrigation in crop years prior to April 17, 2007. Exchange Soil Offsets will be issued to eligible irrigated acres at a rate of 0.6 metric tons per acre per year;

- (4) Eligible implements include but are not limited to: no-till drill, no-till and strip-till planters, rolling harrows, low disturbance liquid manure injectors, anhydrous ammonia applicator, manure knife applicator, sub-soil ripper with at least 24 inch shank spacing;
- (5) Ineligible implements include but are not limited to: field cultivators, tandem disk, offset disk, chisel plow, moldboard plow;
- (6) In general if the implement would require that a leveling or smoothing activity follow, it would likely result in too much soil disturbance;
- (7) Fallowed acres are not eligible in this region;
- (8) No Exchange Soil Offsets will be issued in years in which residue removal and/or burning occurs.

Zone C:

States and counties included in Zone C are provided in Appendix 9.3B. Exchange Soil Offsets will be earned at a rate of 0.32 metric tons per acre per year to land managers who commit to continuous conservation tillage for all of the years 2006 through 2010 on acres specified upon project registration. General eligibility criteria and practices for the region include but are not limited to the following:

- (1) Continuous soybeans or pulse crops (i.e. beans, peas, or lintels) are eligible only if there is a cover crop;
- (2) Irrigated acreage in LRR G of Zone C (counties in LRR G are indicated in Appendix 9.3B) is eligible for enrollment provided that the acreage began irrigation in crop years prior to April 17, 2007. Exchange Soil Offsets will be issued to eligible irrigated acres at a rate of 0.6 metric tons per acre per year;
- (3) Eligible implements include but are not limited to: no-till drill, no-till and strip-till planters, rolling harrows, low disturbance liquid manure injectors, anhydrous ammonia applicator, manure knife applicator, sub-soil ripper with at least 24 inch shank spacing;
- (4) Ineligible implements include but are not limited to: field cultivators, tandem disk, offset disk, chisel plow, moldboard plow;
- (5) In general if the implement would require that a leveling or smoothing activity follow, it would likely result in too much soil disturbance;
- (6) Chemical fallowed acres in Major Land Resource Areas (MLRA) 52, 53A, and 54 (county listings provided in Appendix 9.3B) are eligible in this region but will not receive Exchange Soil Offsets for the years in which fallow takes place. Non-fallow years will receive Exchange Soil Offsets at a rate of 0.32 metric tons per acre per year;
- (7) No Exchange Soil Offsets will be issued in years in which residue removal and/or burning occurs

Zone D:

States and counties included in Zone D are provided in Appendix 9.3B. Exchange

Soil Offsets will be earned at a rate of 0.2 metric tons per acre per year to land managers who commit to continuous conservation tillage for all of the years 2006 through 2010 on acres specified upon project registration. General eligibility criteria and practices for the region include but are not limited to the following:

- (1) Irrigated acreage in LRRs H and G of Zone D (LRR H and LRR G counties indicated in Appendix 9.3B) is eligible for enrollment provided that the acreage began irrigation in crop years prior to April 17, 2007. Exchange Soil Offsets will be issued to eligible irrigated acres at a rate of 0.6 metric tons per acre per year;
- (2) Continuous cotton, soybeans or pulse crops (i.e. beans, peas, or lintels) are eligible only if there is a cover crop;
- (3) Eligible implements include but are not limited to: no-till drill, no-till and strip-till planters, rolling harrows, low disturbance liquid manure injectors, anhydrous ammonia applicator, manure knife applicator, sub-soil ripper with at least 24 inch shank spacing;
- (4) Ineligible implements include but are not limited to: field cultivators, tandem disk, offset disk, chisel plow, moldboard plow;
- (5) In general if the implement would require that a leveling or smoothing activity follow, it would likely result in too much soil disturbance;
- (6) Fallowed acres are not eligible in this region;
- (7) No Exchange Soil Offsets will be issued in years in which residue removal and/or burning occurs.

Zone E:

States and counties included in Zone E are provided in Appendix 9.3B. Exchange Soil Offsets will be earned at a rate of 0.4 metric tons per acre per year to land managers who commit to continuous conservation tillage for all of the years 2006 through 2010 on acres specified upon project registration. General eligibility criteria and practices for the region include but are not limited to the following:

- (1) Irrigated acreage in LRR H of Zone E (counties within LRR H are indicated in Appendix 9.3B) is eligible for enrollment provided that the acreage began irrigation in crop years prior to the date of this advisory. Exchange Soil Offsets will be issued to eligible irrigated acres at a rate of 0.6 metric tons per acre per year;
- (2) Continuous cotton, soybeans or pulse crops (i.e. beans, peas, or lintels) are eligible only if there is a cover crop;
- (3) Histosol soils in Land Resource Region T are not eligible;
- (4) Eligible implements include but are not limited to: no-till drill, no-till and strip-till planters, rolling harrows, low disturbance liquid manure injectors, anhydrous ammonia applicator, manure knife applicator, sub-soil ripper with at least 24 inch shank spacing;
- (5) Ineligible implements include but are not limited to: field cultivators, tandem disk, offset disk, chisel plow, moldboard plow;
- (6) In general if the implement would require that a leveling or smoothing activity follow, it would likely result in too much soil disturbance;

- (7) Fallowed acres are not eligible in this region;
- (8) No Exchange Soil Offsets will be issued in years in which residue removal and/or burning occurs.

Zone F:

States and counties included in Zone F are provided in Appendix 9.3B. Exchange Soil Offsets will be earned at a rate of 0.2 metric tons per acre per year to land managers who commit to continuous conservation tillage for all of the years 2006 through 2010 on acres specified upon project registration. General eligibility criteria and practices for the region include but are not limited to the following:

- (1) Continuous cotton, soybeans or pulse crops (i.e. beans, peas, or lintels) are eligible only if there is a cover crop;
- (2) Eligible implements include but are not limited to: no-till drill, no-till and strip-till planters, rolling harrows, low disturbance liquid manure injectors, anhydrous ammonia applicator, manure knife applicator, sub-soil ripper with at least 24 inch shank spacing;
- (3) Ineligible implements include but are not limited to: field cultivators, tandem disk, offset disk, chisel plow, moldboard plow;
- (4) In general if the implement would require that a leveling or smoothing activity follow, it would likely result in too much soil disturbance;
- (5) Fallowed acres are not eligible in this region;
- (6) No Exchange Soil Offsets will be issued in years in which residue removal and/or burning occurs.

Zone G:

States and counties included in Zone G are provided in Appendix 9.3B. Exchange Soil Offsets will be earned at a rate of 0.4 metric tons per acre per year to land managers who commit to continuous conservation tillage for all of the years 2006 through 2010 on acres specified upon project registration. General eligibility criteria and practices for the region include but are not limited to the following:

- (1) Continuous cotton, soybeans or pulse crops (i.e. beans, peas, or lintels) are eligible only if there is a cover crop;
- (2) Eligible implements include but are not limited to: no-till drill, no-till and strip-till planters, rolling harrows, low disturbance liquid manure injectors, anhydrous ammonia applicator, manure knife applicator, sub-soil ripper with at least 24 inch shank spacing;
- (3) Ineligible implements include but are not limited to: field cultivators, tandem disk, offset disk, chisel plow, moldboard plow;
- (4) In general if the implement would require that a leveling or smoothing activity follow, it would likely result in too much soil disturbance;
- (5) Fallowed acres are not eligible in this region;

- (6) No Exchange Soil Offsets will be issued in years in which residue removal and/or burning occurs.

Zone H:

Canadian provinces included in Zone H are Manitoba, Saskatchewan and Alberta. Rural municipalities having black and gray soils are eligible to earn Exchange Soil Offsets at a rate of 0.4 metric tons per acre per year to land managers who commit to continuous zero or no-tillage for all of the years 2006 through 2010 on acres specified upon project registration. Rural municipalities having brown and dark brown soils are eligible to earn Exchange Soil Offsets at a rate of 0.2 metric tons per acre per year to land managers who commit to continuous zero or no-tillage for all of the years 2006 through 2010 on acres specified upon project registration. General eligibility criteria and practices for the region include but are not limited to the following:

- (1) Seeding must take place via direct seeding into standing stubble using a narrow opener, with not more than 1/3 of the seedbed disturbed. For example, a three inch opener on a nine inch row spacing, or a four inch opener on a 12 inch row spacing;
- (2) Chemical fallowed acres in Canada are eligible in this region but will not receive Exchange Soil Offsets for the years in which fallow takes place;
- (3) Tillage fallow is not permitted;
- (4) Exchange Soil Offsets will not be issued to enrolled acreage in the years in which a flax crop is grown;
- (5) Secondary fertilizer application is permitted during crop growth provided it is applied with a narrow opener or via broadcast or surface banding methods;
- (6) Deep banding is permitted provided that the implement does not result in heavy soil disturbance including leveling or smoothing the soil after application. For example, a maximum of a 1.5 inch knife on nine inch spacing, or a two inch opener on 12 in spacing is acceptable;
- (7) Liquid manure injectors are permitted provided that the implement does not result in heavy soil disturbance including leveling or smoothing the soil after application;
- (8) For years in which residue burning and/or removal occurs no credit will be issued on the affected acreage. This includes chaff removal, straw removal/bailing.
- (9) Cultivation of any kind is prohibited;
- (10) Heavy harrowing including a Phoenix harrow is not permitted.

Appendix 9.3B Counties that Qualify for Exchange Soil Offsets for Conservation Tillage

Zone A Counties that Qualify for Exchange Soil Offsets for Conservation Tillage

Entire State	Arkansas	Florida
Alabama	Arkansas	Baker
Delaware	Ashley	Bay
Georgia	Bradley	Bradford
Illinois	Calhoun	Calhoun
Indiana	Chicot	Clay
Iowa	Clark	Columbia
Kentucky	Clay	Dixie
Maryland	Cleveland	Duval
Mississippi	Columbia	Escambia
North Carolina	Craighead	Franklin
South Carolina	Crittenden	Gadsden
Tennessee	Cross	Gilchrist
Virginia	Dallas	Gulf
West Virginia	Desha	Hamilton
	Drew	Holmes
	Grant	Jackson
	Greene	Jefferson
	Hempstead	Lafayette
	Howard	Leon
	Jackson	Levy
	Jefferson	Liberty
	Lafayette	Madison
	Lawrence	Nassau
	Lee	Okaloosa
	Lincoln	Santa Rosa
	Little River	Suwannee
	Lonoke	Taylor
	Miller	Union
	Mississippi	Wakulla
	Monroe	Walton
	Nevada	Washington
	Ouachita	
	Phillips	
	Poinsett	
	Prairie	
	Pulaski	
	Sevier	
	St. Francis	
	Union	
	Woodruff	

Zone A Counties that Qualify for Exchange Soil Offsets for Conservation Tillage

Kansas	Kansas	Louisiana
Allen	Riley	Ascension
Anderson	Saline	Assumption
Atchison	Sedgwick	Avoyelles
Bourbon	Shawnee	Beauregard
Brown	Wabaunsee	Bienville
Butler	Washington	Bossier
Chase	Wilson	Caddo
Chautauqua	Woodson	Caldwell
Cherokee	Wyandotte	Catahoula
Clay		Claiborne
Cloud		Concordia
Coffey		De Soto
Cowley		East Baton Rouge
Crawford		East Carroll
Dickinson		East Feliciana
Doniphan		Franklin
Douglas		Grant
Elk		Iberia
Ellsworth		Iberville
Franklin		Jackson
Geary		Jefferson
Greenwood		La Salle
Harvey		Lafayette
Jackson		Lincoln
Jefferson		Livingston
Johnson		Madison
Labette		Morehouse
Leavenworth		Natchitoches
Lincoln		Orleans
Linn		Ouachita
Lyon		Pointe Coupee
Marion		Rapides
Marshall		Red River
McPherson		Richland
Miami		Sabine
Montgomery		St. Charles
Morris		St. Helena
Nemaha		St. James
Neosho		St. John the Baptist
Osage		St. Landry
Ottawa		St. Martin
Pottawatomie		St. Mary
Republic		St. Tammany
Rice		Tangipahoa

Zone A Counties that Qualify for Exchange Soil Offsets for Conservation Tillage

Louisiana	Michigan	Minnesota
Tensas	Allegan	Big Stone
Union	Barry	Blue Earth
Vernon	Bay	Brown
Washington	Benzie	Carver
Webster	Berrien	Chippewa
West Baton Rouge	Branch	Cottonwood
West Carroll	Calhoun	Dakota
West Feliciana	Cass	Dodge
Winn	Clinton	Douglas
	Eaton	Faribault
	Genesee	Fillmore
	Gratiot	Freeborn
	Hillsdale	Goodhue
	Huron	Grant
	Ingham	Hennepin
	Ionia	Houston
	Isabella	Jackson
	Jackson	Kandiyohi
	Kalamazoo	Lac qui Parle
	Kent	Le Sueur
	Lapeer	Lincoln
	Lenawee	Lyon
	Livingston	Martin
	Macomb	McLeod
	Manistee	Meeker
	Mason	Mower
	Mecosta	Murray
	Midland	Nicollet
	Monroe	Nobles
	Montcalm	Olmsted
	Muskegon	Pipestone
	Newaygo	Pope
	Oakland	Redwood
	Oceana	Renville
	Ottawa	Rice
	Saginaw	Rock
	Sanilac	Scott
	Shiawassee	Sibley
	St. Clair	Steele
	St. Joseph	Stevens
	Tuscola	Swift
	Van Buren	Wabasha
	Washtenaw	Waseca
	Wayne	Watonwan
		Winona
		Wright
		Yellow Medicine

Zone A Counties that Qualify for Exchange Soil Offsets for Conservation Tillage

Missouri	Missouri	Nebraska
Adair	Monroe	Adams
Andrew	Montgomery	Antelope
Atchison	New Madrid	Boone
Audrain	Nodaway	Buffalo
Barton	Osage	Burt
Bates	Pemiscot	Butler
Boone	Perry	Cass
Buchanan	Pettis	Cedar
Butler	Pike	Clay
Caldwell	Platte	Colfax
Callaway	Putnam	Cuming
Cape Girardeau	Ralls	Custer
Carroll	Randolph	Dakota
Cass	Ray	Dawson
Chariton	Saline	Dixon
Clark	Schuyler	Dodge
Clay	Scotland	Douglas
Clinton	Scott	Fillmore
Cole	Shelby	Gage
Cooper	St. Charles	Greeley
Daviess	St. Louis	Hall
DeKalb	Stoddard	Hamilton
Dunklin	Sullivan	Howard
Gasconade	Vernon	Jefferson
Gentry	Warren	Johnson
Grundy	Worth	Kearney
Harrison		Lancaster
Henry		Madison
Holt		Merrick
Howard		Nance
Jackson		Nemaha
Jasper		Nuckolls
Johnson		Otoe
Knox		Pawnee
Lafayette		Phelps
Lewis		Pierce
Lincoln		Platte
Linn		Polk
Livingston		Richardson
Macon		Saline
Marion		Sarpy
Mercer		Saunders
Mississippi		Seward
Moniteau		Sherman

Zone A Counties that Qualify for Exchange Soil Offsets for Conservation Tillage

Nebraska	New Jersey	Ohio
Stanton Thayer Thurston Valley Washington Wayne York	Atlantic Burlington Camden Cape May Cumberland Gloucester Hunterdon Mercer Middlesex Monmouth Morris Ocean Salem Somerset	Adams Allen Ashland Athens Auglaize Belmont Brown Butler Carroll Champaign Clark Clermont Clinton Coshocton Crawford Darke Defiance Delaware Erie Fairfield Fayette Franklin Fulton Gallia Greene Guernsey Hamilton Hancock Hardin Harrison Henry Highland Hocking Holmes Huron Jackson Jefferson Knox Lawrence Licking Logan Lucas Madison Marion

Zone A Counties that Qualify for Exchange Soil Offsets for Conservation Tillage

Ohio	Oklahoma	Pennsylvania
Meigs	Bryan	Adams
Mercer	Choctaw	Allegheny
Miami	Craig	Armstrong
Monroe	Mayes	Beaver
Montgomery	Muskogee	Bedford
Morgan	Nowata	Berks
Morrow	Okfuskee	Blair
Muskingum	Okmulgee	Bucks
Noble	Osage	Butler
Ottawa	Ottawa	Cambria
Paulding	Rogers	Cameron
Perry	Tulsa	Carbon
Pickaway	Wagoner	Centre
Pike	Washington	Chester
Preble		Clarion
Putnam		Clearfield
Richland		Clinton
Ross		Columbia
Sandusky		Cumberland
Scioto		Dauphin
Seneca		Delaware
Shelby		Elk
Tuscarawas		Fayette
Union		Forest
Van Wert		Franklin
Vinton		Fulton
Warren		Greene
Washington		Huntingdon
Williams		Indiana
Wood		Jefferson
Wyandot		Juniata
		Lancaster
		Lebanon
		Lehigh
		Lycoming
		McKean
		Mifflin
		Montgomery
		Montour
		Northampton
		Northumberland
		Perry
		Philadelphia
		Potter

Zone A Counties that Qualify for Exchange Soil Offsets for Conservation Tillage

Pennsylvania	South Dakota	Texas
Schuylkill	Bon Homme	Anderson
Snyder	Brookings	Angelina
Somerset	Clark	Bowie
Union	Clay	Camp
Venango	Codington	Cass
Warren	Day	Cherokee
Washington	Deuel	Franklin
Westmoreland	Grant	Gregg
York	Hamlin	Harrison
	Hanson	Henderson
	Hutchinson	Houston
	Kingsbury	Jasper
	Lake	Marion
	Lincoln	Montgomery
	Marshall	Morris
	McCook	Nacogdoches
	Minnehaha	Newton
	Moody	Panola
	Roberts	Polk
	Turner	Rains
	Union	Red River
	Yankton	Rusk
		Sabine
		San Augustine
		San Jacinto
		Shelby
		Smith
		Titus
		Trinity
		Tyler
		Upshur
		Van Zandt
		Walker
		Wood

Zone A Counties that Qualify for Exchange Soil Offsets for Conservation Tillage

Wisconsin
Buffalo
Crawford
Grant
Iowa
La Crosse
Lafayette
Monroe
Pepin
Richland
Sauk
Trempealeau
Vernon

Zone B Counties that Qualify for Exchange Soil Offsets for Conservation Tillage

Michigan	Minnesota	Nebraska
Alcona	Aitkin	Arthur ²
Alger	Anoka	Banner ²
Alpena	Becker	Blaine ²
Antrim	Beltrami	Box Butte ²
Arenac	Benton	Boyd ²
Baraga	Carlton	Brown ²
Charlevoix	Cass	Cherry ²
Cheboygan	Chisago	Dawes ²
Chippewa	Clay	Garden ²
Clare	Clearwater	Garfield ²
Crawford	Cook	Grant ²
Delta	Crow Wing	Holt ²
Dickinson	Hubbard	Hooker ²
Emmet	Isanti	Keya Paha ²
Gladwin	Itasca	Kimball ²
Gogebic	Kanabec	Knox ²
Grand Traverse	Kittson	Logan ²
Houghton	Koochiching	Loup ²
Iosco	Lake	McPherson ²
Iron	Lake of the Woods	Morrill ²
Kalkaska	Mahnomen	Rock ²
Keweenaw	Marshall	Scotts Bluff ²
Lake	Mille Lacs	Sheridan ²
Luce	Morrison	Sioux ²
Mackinac	Norman	Thomas ²
Marquette	Otter Tail	Wheeler ²
Menominee	Pennington	
Missaukee	Pine	
Montmorency	Polk	
Ogemaw	Ramsey	
Ontonagon	Red Lake	
Osceola	Roseau	
Oscoda	Sherburne	
Otsego	St. Louis	
Presque Isle	Stearns	
Roscommon	Todd	
Schoolcraft	Traverse	
Wexford	Wadena	
	Washington	
	Wilkin	

² County is within LRR G or H

³ County is within MRLA 52, 53A or 54

Zone B Counties that Qualify for Exchange Soil Offsets for Conservation Tillage

North Dakota	North Dakota	South Dakota
Adams ³	Stark ³	Aurora
Barnes	Steele	Beadle
Benson	Stutsman	Bennett ²
Billings ²	Towner	Brown
Bottineau ²	Trail	Brule
Bowman ²	Walsh	Buffalo
Burke	Ward	Butte ²
Burleigh	Wells	Campbell
Cass	Williams ³	Charles Mix
Cavalier		Corson ³
Dickey		Custer ²
Divide ³		Davison ²
Dunn ³		Dewey ²
Eddy		Douglas
Emmons		Edmunds
Foster		Fall River ²
Golden Valley		Faulk
Grand Forks		Gregory ²
Grant ³		Haakon ²
Griggs		Hand
Hettinger ³		Harding ²
Kidder		Hughes
LaMoure		Hvde
Logan		Jackson ²
McHenry		Jerauld
McIntosh		Jones ²
McKenzie		Lawrence ²
McLean		Lyman ²
Mercer ³		McPherson
Morton ³		Meade ²
Mountrail		Mellette ²
Nelson		Miner
Oliver ³		Pennington ²
Pembina		Perkins ³
Pierce		Potter
Ramsev		Sanborn
Ransom		Shannon ²
Renville		Spink
Richland		Stanley ²
Rolette		Sully
Sargent		Todd ²
Sheridan		Tripp ²
Sioux ³		Walworth
Slope ²		Ziebach ³

² County is within LRR G or H

³ County is within MRLA 52, 53A or 54

Zone B Counties that Qualify for Exchange Soil Offsets for Conservation Tillage

Wisconsin	Wisconsin
Adams	Marathon
Ashland	Marinette
Barron	Marquette
Bayfield	Menominee
Brown	Milwaukee
Burnett	Oconto
Calumet	Oneida
Chippewa	Outagamie
Clark	Ozaukee
Columbia	Pierce
Dane	Polk
Dodge	Portage
Door	Price
Douglas	Racine
Dunn	Rock
Eau Claire	Rusk
Florence	Sawyer
Fond du Lac	Shawano
Forest	Sheboygan
Green	St. Croix
Green Lake	Taylor
Iron	Vilas
Jackson	Walworth
Jefferson	Washburn
Juneau	Washington
Kenosha	Waukesha
Kewaunee	Waupaca
Langlade	Waushara
Lincoln	Winnebago
Manitowoc	Wood

Zone C Counties that Qualify for Exchange Soil Offsets for Conservation Tillage

Montana	Wyoming
Big Horn ²	Campbell ²
Blaine ³	Converse ²
Carter ²	Crook ²
Cascade ³	Goshen ²
Chouteau ³	Johnson ²
Custer ²	Laramie ²
Daniels ³	Niobrara ²
Dawson ²	Platte ²
Fallon ²	Sheridan ²
Fergus ²	Weston ²
Garfield ²	
Glacier ³	
Golden Valley ²	
Hill ³	
Liberty ³	
McCone ³	
Musselshell ²	
Petroleum ²	
Phillips ³	
Pondera ³	
Powder River ²	
Prairie ²	
Richland ³	
Roosevelt ³	
Rosebud ²	
Sheridan ³	
Teton ³	
Toole ³	
Treasure ²	
Valley ³	
Wheatland ²	
Wibaux ³	
Yellowstone ²	

² County is within LRR G or H

³ County is within MRLA 52, 53A or 54

Zone D Counties that Qualify for Exchange Soil Offsets for Conservation Tillage

Colorado	Kansas	Nebraska
Adams ²	Cheyenne ²	Chase ²
Arapahoe ²	Clark ²	Cheyenne ²
Baca ²	Comanche ²	Deuel ²
Bent ²	Finney ²	Dundy ²
Cheyenne ²	Gove ²	Hitchcock ²
Crowley ²	Grant ²	Keith ²
Denver ²	Greeley ²	Lincoln ²
Elbert ²	Hamilton ²	Perkins ²
Kiowa ²	Haskell ²	
Kit Carson ²	Kearny ²	
Las Animas ²	Lane ²	
Lincoln ²	Logan ²	
Logan ²	Meade ²	
Morgan ²	Morton ²	
Otero ²	Rawlins ²	
Phillips ²	Scott ²	
Prowers ²	Seward ²	
Pueblo ²	Sheridan ²	
Sedgwick ²	Sherman ²	
Washington ²	Stanton ²	
Weld ²	Stevens ²	
Yuma ²	Thomas ²	
	Wallace ²	
	Wichita ²	

² County is within LRR G or H

Zone D Counties that Qualify for Exchange Soil Offsets for Conservation Tillage

New Mexico	Oklahoma	Texas
Chaves ²	Beaver ²	Andrews ²
Colfax ²	Beckham ²	Archer ²
Curry ²	Caddo ²	Armstrong ²
De Baca ²	Cimarron ²	Atascosa
Eddy ²	Comanche ²	Bailey ²
Guadalupe ²	Cotton ²	Bandera
Harding ²	Custer ²	Baylor ²
Lea ²	Dewey ²	Bee
Lincoln ²	Ellis ²	Bexar
Mora ²	Greer ²	Blanco
Quay ²	Harmon ²	Borden ²
Roosevelt ²	Harper ²	Briscoe ²
San Miguel ²	Jackson ²	Brooks
Santa Fe ²	Jefferson ²	Brown ²
Torrance ²	Kiowa ²	Callahan ²
Union ²	Roger Mills ²	Cameron
	Stephens ²	Carson ²
	Texas ²	Castro ²
	Tillman ²	Childress ²
	Washita ²	Clay ²
	Woods ²	Cochran ²
	Woodward ²	Coke ²
		Coleman ²
		Collingsworth ²
		Comal
		Concho ²
		Cottle ²
		Crockett
		Crosby ²
		Dallam ²
		Dawson ²
		Deaf Smith ²
		DeWitt
		Dickens ²
		Dimmit
		Donley ²
		Duval
		Ector ²
		Edwards
		Fisher ²
		Floyd ²
		Foard ²
		Frio
		Gaines ²
		Garza ²

² County is within LRR G or H

Zone D Counties that Qualify for Exchange Soil Offsets for Conservation Tillage

Texas	Texas
Gillespie	Mitchell ²
Glasscock	Montague ²
Goliad	Moore ²
Gray ²	Motley ²
Hale ²	Nolan ²
Hall ²	Ochiltree ²
Hansford ²	Oldham ²
Hardeman ²	Palo Pinto ²
Hartley ²	Parmer ²
Haskell ²	Potter ²
Hays	Randall ²
Hemphill ²	Reagan
Hidalgo	Real
Hockley ²	Roberts ²
Howard ²	Runnels ²
Hutchinson ²	San Saba
Irion	Schleicher
Jack ²	Scurry ²
Jim Hogg	Shackelford ²
Jim Wells	Sherman ²
Jones ²	Starr
Karnes	Stephens ²
Kendall	Sterling
Kenedy	Stonewall ²
Kent ²	Sutton
Kerr	Swisher ²
Kimble	Taylor ²
King ²	Terrell
Kinney	Terry ²
Kleberg	Throckmorton ²
Knox ²	Tom Green ²
La Salle	Travis
Lamb ²	Upton
Lipscomb ²	Uvalde
Live Oak	Val Verde
Llano	Webb
Lubbock ²	Wheeler ²
Lynn ²	Wichita ²
Martin ²	Wilbarger ²
Mason	Willacy
Maverick	Williamson
McCulloch	Wilson
McMullen	Yoakum ²
Medina	Young ²
Menard	Zapata
Midland ²	Zavala

² County is within LRR G or H

Zone E Counties that Qualify for Exchange Soil Offsets for Conservation Tillage

Kansas	Louisiana	Nebraska
Barber ²	Acadia	Franklin ²
Barton ²	Allen	Frontier ²
Decatur ²	Calcasieu	Furnas ²
Edwards ²	Cameron	Gosper ²
Ellis ²	Evangeline	Harlan ²
Ford ²	Jefferson Davis	Hayes ²
Graham ²	Lafourche	Red Willow ²
Gray ²	Plaquemines	Webster ²
Harper ²	St. Bernard	
Hodgeman ²	Terrebonne	
Jewell ²	Vermilion	
Kingman ²		
Kiowa ²		
Mitchell ²		
Ness ²		
Norton ²		
Osborne ²		
Pawnee ²		
Phillips ²		
Pratt ²		
Reno ²		
Rooks ²		
Rush ²		
Russell ²		
Smith ²		
Stafford ²		
Sumner ²		
Trego ²		

² County is within LRR G or H

Zone E Counties that Qualify for Exchange Soil Offsets for Conservation Tillage

Oklahoma	Texas	Texas
Alfalfa ²	Aransas	Hill
Blaine ²	Austin	Hood
Canadian ²	Bastrop	Hopkins
Carter	Bell	Hunt
Cleveland ²	Bosque	Jackson
Coal	Brazoria	Jefferson
Creek	Brazos	Johnson
Garfield ²	Burleson	Kaufman
Garvin	Burnet	Lamar
Grady	Caldwell	Lampasas
Grant ²	Calhoun	Lavaca
Johnston	Chambers	Lee
Kay ²	Collin	Leon
Kingfisher ²	Colorado	Liberty
Lincoln	Comanche	Limestone
Logan ²	Cooke	Madison
Love	Coryell	Matagorda
Major ²	Dallas	McLennan
Marshall	Delta	Milam
McClain ²	Denton	Mills
Murray	Eastland	Navarro
Noble ²	Ellis	Nueces
Oklahoma ²	Erath	Orange
Pawnee ²	Falls	Parker
Payne ²	Fannin	Refugio
Pontotoc	Fayette	Robertson
Pottawatomie	Fort Bend	Rockwall
Seminole	Freestone	San Patricio
	Galveston	Somervell
	Gonzales	Tarrant
	Grayson	Victoria
	Grimes	Waller
	Guadalupe	Washington
	Hamilton	Wharton
	Hardin	Wise
	Harris	

² County is within LRR G or H

Zone F Counties that Qualify for Exchange Soil Offsets for Conservation Tillage

Arkansas	Missouri	Oklahoma
Baxter	Barry	Adair
Benton	Benton	Atoka
Boone	Bollinger	Cherokee
Carroll	Camden	Delaware
Cleburne	Carter	Haskell
Conway	Cedar	Hughes
Crawford	Christian	Latimer
Faulkner	Crawford	Le Flore
Franklin	Dade	McCurtain
Fulton	Dallas	McIntosh
Garland	Dent	Pittsburg
Hot Spring	Douglas	Pushmataha
Independence	Franklin	Sequoyah
Izard	Greene	
Johnson	Hickory	
Logan	Howell	
Madison	Iron	
Marion	Jefferson	
Montgomery	Laclede	
Newton	Lawrence	
Perry	Madison	
Pike	Maries	
Polk	McDonald	
Pope	Miller	
Randolph	Morgan	
Saline	Newton	
Scott	Oregon	
Searcy	Ozark	
Sebastian	Phelps	
Sharp	Polk	
Stone	Pulaski	
Van Buren	Reynolds	
Washington	Ripley	
White	Shannon	
Yell	St. Clair	
	St. Francois	
	Ste. Genevieve	
	Stone	
	Taney	
	Texas	
	Washington	
	Wayne	
	Webster	
	Wright	

Zone G Counties that Qualify for Exchange Soil Offsets for Conservation Tillage

New York
Cayuga
Erie
Genesee
Livingston
Madison
Monroe
Montgomery
Niagara
Oneida
Onondaga
Ontario
Orleans
Oswego
Schenectady
Seneca
Wayne
Yates

Appendix 9.3C Exchange Soil Offset Permanent Grassland Planting Practices and Offset Issuance Rates by Zone

Grassland Zone A:

States and counties included in Zone A are provided in this Appendix. Canadian provinces of Manitoba, Saskatchewan, Alberta and British Columbia are included in Zone A.³⁶ Exchange Soil Offsets will be earned at a rate of 1.0 metric tons per acre per year to land managers who commit to maintain increases in soil carbon stocks realized as a result of grass cover plantings that were undertaken on or after January 1, 1999. Such grass cover must be maintained through 2010 on the acres specified upon project registration.

Grassland Zone B:

States and counties included in Zone B are provided in this Appendix. Exchange Soil Offsets will be earned at a rate of 0.4 metric tons per acre per year to land managers who commit to maintain increases in soil carbon stocks realized as a result of permanent (i.e. not harvested) grass cover plantings that were undertaken on or after January 1, 1999. Such grass cover must be maintained through 2010 on the acres specified upon project registration.

³⁶ For eligible regions within Canada, please contact CCX Staff.

Appendix 9.3C Counties that Qualify for Exchange Soil Offsets for Grassland Planting

Zone A Counties that Qualify for Exchange Soil Offsets for Grassland Planting

Entire State	Colorado	Colorado
Alabama	Adams	Logan
Arkansas	Alamosa	Mineral
Connecticut	Arapahoe	Morgan
Delaware	Archuleta	Otero
Florida	Baca	Ouray
Georgia	Bent	Park
Illinois	Boulder	Phillips
Indiana	Broomfield	Pitkin
Iowa	Chaffee	Prowers
Kansas	Cheyenne	Pueblo
Kentucky	Clear Creek	Rio Grande
Louisiana	Conejos	Routt
Maine	Costilla	Saguache
Maryland	Crowley	San Juan
Massachusetts	Custer	Sedgwick
Michigan	Denver	Summit
Minnesota	Douglas	Teller
Missouri	Eagle	Washington
Montana	El Paso	Weld
Nebraska	Elbert	Yuma
New Hampshire	Fremont	
New Jersey	Garfield	
New York	Gilpin	
North Carolina	Grand	
North Dakota	Gunnison	
Ohio	Hinsdale	
Pennsylvania	Huerfano	
Rhode Island	Jackson	
South Carolina	Jefferson	
South Dakota	Kiowa	
Tennessee	Kit Carson	
Vermont	Lake	
Virginia	Larimer	
West Virginia	Las Animas	
Wisconsin	Lincoln	

Zone A Counties that Qualify for Exchange Soil Offsets for Grassland Planting

Idaho	New Mexico	Oklahoma
Adams	Colfax	Adair
Benewah	Rio Arriba	Alfalfa
Boise	Taos	Atoka
Bonner		Beaver
Boundary		Bryan
Clearwater		Canadian
Custer		Carter
Idaho		Cherokee
Kootenai		Choctaw
Shoshone		Cimarron
Valley		Cleveland
		Coal
		Craig
		Creek
		Delaware
		Garfield
		Garvin
		Grady
		Grant
		Harper
		Haskell
		Hughes
		Jefferson
		Johnston
		Kay
		Kingfisher
		Latimer
		Le Flore
		Lincoln
		Logan
		Love

Zone A Counties that Qualify for Exchange Soil Offsets for Grassland Planting

Oklahoma	Oregon	Texas
Major	Benton	Anderson
Marshall	Clackamas	Angelina
Mayes	Clatsop	Aransas
McClain	Columbia	Austin
McCurtain	Coos	Bastrop
McIntosh	Curry	Bell
Murray	Douglas	Bosque
Muskogee	Grant	Bowie
Noble	Hood River	Brazoria
Nowata	Jackson	Brazos
Okfuskee	Josephine	Burleson
Oklahoma	Lane	Burnet
Okmulgee	Lincoln	Caldwell
Osage	Linn	Calhoun
Ottawa	Marion	Camp
Pawnee	Multnomah	Cass
Payne	Polk	Chambers
Pittsburg	Tillamook	Cherokee
Pontotoc	Union	Collin
Pottawatomie	Wallowa	Colorado
Pushmataha	Washington	Comanche
Rogers	Yamhill	Cooke
Seminole		Coryell
Sequoyah		Dallas
Stephens		Delta
Texas		Denton
Tulsa		Eastland
Wagoner		Ellis
Washington		Erath
Woods		Falls
Woodward		Fannin
		Fayette
		Fort Bend
		Franklin
		Freestone
		Galveston
		Gonzales
		Grayson
		Gregg
		Grimes

Zone A Counties that Qualify for Exchange Soil Offsets for Grassland Planting

Texas	Texas	Utah
Guadalupe	Newton	Cache
Hamilton	Nueces	Carbon
Hardin	Orange	Daggett
Harris	Panola	Duchesne
Harrison	Parker	Morgan
Henderson	Polk	Rich
Hill	Rains	Summit
Hood	Red River	Utah
Hopkins	Refugio	Wasatch
Houston	Robertson	
Hunt	Rockwall	
Jackson	Rusk	
Jasper	Sabine	
Jefferson	San Augustine	
Johnson	San Jacinto	
Kaufman	San Patricio	
Lamar	Shelby	
Lampasas	Smith	
Lavaca	Somervell	
Lee	Tarrant	
Leon	Titus	
Liberty	Trinity	
Limestone	Tyler	
Madison	Upshur	
Marion	Van Zandt	
Matagorda	Victoria	
McLennan	Walker	
Milam	Waller	
Mills	Washington	
Montgomery	Wharton	
Morris	Wise	
Nacogdoches	Wood	
Navarro		

Zone A Counties that Qualify for Exchange Soil Offsets for Grassland Planting

Washington	Wyoming
Clallam	Big Horn
Clark	Campbell
Cowlitz	Converse
Ferry	Crook
Grays Harbor	Goshen
Island	Hot Springs
Jefferson	Johnson
King	Laramie
Kitsap	Lincoln
Lewis	Niobrara
Mason	Park
Pacific	Platte
Pend Oreille	Sheridan
Pierce	Sublette
San Juan	Teton
Skagit	Uinta
Skamania	Weston
Snohomish	
Stevens	
Thurston	
Wahkiakum	
Whatcom	

Zone B Counties that Qualify for Exchange Soil Offsets for Grassland Planting

Entire State	Colorado	Idaho
Arizona California Nevada	Delta Dolores La Plata Mesa Moffat Montezuma Montrose Rio Blanco San Miguel	Ada Bannock Bear Lake Bingham Blaine Bonneville Butte Camas Canyon Caribou Cassia Clark Elmore Franklin Fremont Gem Gooding Jefferson Jerome Latah Lemhi Lewis Lincoln Madison Minidoka Nez Perce Oneida Owyhee Payette Power Teton Twin Falls Washington

Zone B Counties that Qualify for Exchange Soil Offsets for Grassland Planting

New Mexico	Oklahoma	Oregon
Bernalillo	Beckham	Baker
Catron	Blaine	Crook
Chaves	Caddo	Deschutes
Cibola	Comanche	Gilliam
Curry	Cotton	Harney
De Baca	Custer	Jefferson
Dona Ana	Dewey	Klamath
Eddy	Ellis	Lake
Grant	Greer	Malheur
Guadalupe	Harmon	Morrow
Harding	Jackson	Sherman
Hidalgo	Kiowa	Umatilla
Lea	Rogers Mills	Wasco
Lincoln	Tillman	Wheeler
Los Alamos	Washita	
Luna		
McKinley		
Mora		
Otero		
Quay		
Roosevelt		
San Juan		
San Miguel		
Sandoval		
Santa Fe		
Sierra		
Socorro		
Torrance		
Union		
Valencia		

Zone B Counties that Qualify for Exchange Soil Offsets for Grassland Planting

Texas	Texas	Texas
Andrews	Dallam	Hudspeth
Archer	Dawson	Hutchinson
Armstrong	Deaf Smith	Irion
Atascosa	DeWitt	Jack
Bailey	Dickens	Jeff Davis
Bandera	Dimmit	Jim Hogg
Baylor	Donley	Jim Wells
Bee	Duval	Jones
Bexar	Ector	Karnes
Blanco	Edwards	Kendall
Borden	El Paso	Kenedy
Brewster	Fisher	Kent
Briscoe	Floyd	Kerr
Brooks	Foard	Kimble
Brown	Frio	King
Callahan	Gaines	Kinney
Cameron	Garza	Kleberg
Carson	Gillespie	Knox
Castro	Glasscock	La Salle
Childress	Goliad	Lamb
Clay	Gray	Lipscomb
Cochran	Hale	Live Oak
Coke	Hall	Llano
Coleman	Hansford	Loving
Collingsworth	Hardeman	Lubbock
Comal	Hartley	Lynn
Concho	Haskell	Martin
Cottle	Hays	Mason
Crane	Hemphill	Maverick
Crockett	Hidalgo	McCulloch
Crosby	Hockley	McMullen
Culberson	Howard	Medina

Zone B Counties that Qualify for Exchange Soil Offsets for Grassland Planting

Texas	Texas	Utah
Menard	Sterling	Beaver
Midland	Stonewall	Box Elder
Mitchell	Sutton	Davis
Montague	Swisher	Emery
Moore	Taylor	Garfield
Motley	Terrell	Grand
Nolan	Terry	Iron
Ochiltree	Throckmorton	Juab
Oldham	Tom Green	Kane
Palo Pinto	Travis	Millard
Parmer	Upton	Piute
Pecos	Uvalde	Salt Lake
Potter	Val Verde	San Juan
Presidio	Ward	Sanpete
Randall	Webb	Sevier
Reagan	Wheeler	Tooele
Real	Wichita	Uintah
Reeves	Wilbarger	Washington
Roberts	Willacy	Wayne
Runnels	Williamson	Weber
San Saba	Wilson	
Schleicher	Winkler	
Scurry	Yoakum	
Shackelford	Young	
Sherman	Zapata	
Starr	Zavala	
Stephens		

Zone B Counties that Qualify for Exchange Soil Offsets for Grassland Planting

Washington	Wyoming
Adams	Albany
Asotin	Carbon
Benton	Fremont
Chelan	Natrona
Columbia	Sweetwater
Douglas	Washakie
Franklin	
Garfield	
Grant	
Kittitas	
Klickitat	
Lincoln	
Okanogan	
Spokane	
Walla Walla	
Whitman	
Yakima	

Appendix 9.3D Protocol for Verifying CCX Rangeland Soil Carbon Management Offset Projects and Eligible Counties

This appendix summarizes the eligibility and verification requirements for CCX Rangeland Soil Carbon Management Offset Projects eligible for registration in Chicago Climate Exchange.

Topics covered in this Appendix include:

- Overview of eligibility requirements and overall approach for generating Offsets from managed rangeland;
- Overview of a Protocol for verifying conforming projects;
- List of indicators for carbon-related management practices for rangeland.

Project Eligibility Requirements

Certain rangelands managed to enhance carbon storage in the soil are eligible for inclusion in the CCX Rangeland Soil Carbon Management Offsets program provided each of the following conditions are met (1-4):

1. The project takes place on rangeland, which is defined by the NRCS as:

“Land on which the historic plant community is principally native grasses, grasslike plants, forbs or shrubs suitable for grazing and browsing. In most cases, range supports native vegetation that is extensively managed through the control of livestock rather than by agronomy practices, such as fertilization, mowing, or irrigation. Rangeland also includes areas that have been seeded to introduced species (e.g., clover or crested wheatgrass) but are managed with the same methods as native range³⁷ .”

2. The project is in a geographic area for which data on soil sequestration rates for rangeland are available to CCX. A List of eligible counties defines these areas.
3. Project involves rangeland management practices that include use of **all** of the following tools through the adoption of a formal grazing plan:
 - a. Light or Moderate Stocking rates;
 - b. Sustainable Livestock Distribution which includes:
 - i. Rotational grazing
 - ii. Seasonal use.

The Natural Resources Conservation Service (NRCS) Field Office Technical Guides publish guidelines for managing the controlled harvest of vegetation with grazing animals. Stocking rates and livestock distribution criteria are defined according to County and State in the NRCS “Prescribed Grazing Specification” code. A formal grazing plan may be developed with the input of NRCS, BLM, USFS other non-profit agencies or private rangeland consulting firms. Regardless of the source of the grazing plan, it must at a minimum adhere to NRCS standards. A rancher that does not have a formal grazing plan may enroll in CCX with the agreement that he/she will complete a formal grazing plan prior to the next grazing season.

³⁷ In many cases, Rangeland refers to areas in the Western part of the U.S., while the general term “Grazing Lands” is used in regions East of the Mississippi. The use of the term Rangeland in this protocol is a land use designation and not a geographic designation. Land that fits the above definition of Rangeland *may* be eligible for CCX Rangeland Soil Offsets whether it is nominally referred to as Rangeland or Grazing Land provided that appropriate crediting rates can be established.

In most regions Rangeland that can be classified as degraded prior to inception of the project is eligible for different crediting rates. Degraded rangeland indicators specific to soil carbon storage are listed below and include soil surface loss or degradation and heavy stocking rates (exceeding carrying capacity of project land).

4. The project owner can demonstrate that its rangeland holdings outside of the Project are sustainably managed.

Documentation of Rangeland Management Practices

Conformance with the above eligibility requirements may be documented using the following methods (to be confirmed via site visit by CCX-approved verifier):

- Photographs of project site (e.g. aerial, remote sensing)
- Ranch records of stocking rates and grazing rotation patterns
- Records from agricultural extension agents or other agencies performing a monitoring function.

NRCS indicators of degraded rangeland related to below-ground carbon storage

The U.S. Natural Resources Conservation Service (NRCS) has established indicators of degraded rangeland that are published in *“Interpreting Indicators of Rangeland Health”* (U.S. Natural Resources Conservation Service, 2005). Eligibility to earn CCX Rangeland Soil Carbon Management Offsets based on restoration of degraded rangeland requires that the included rangelands must fall under the NRCS designation “Extreme” or “Moderate to Extreme” for indicators 1 and 2, and “Slight to Moderate, Moderate, Moderate to Extreme or Extreme” for indicator 3 to qualify as degraded. The applicable indicators are summarized below. A project site may qualify as degraded if any of the following indicators are present.

Indicator: Bare Ground

Indicator	Degree of Departure from Ecological Site Description and/or Ecological Reference Area(s)	
	Extreme	Moderate to Extreme
Bare Ground	Much higher than expected for the site. Bare areas are large and generally connected.	Moderate to much higher than expected for the site. Bare areas are large and occasionally connected.

Indicator: Soil Surface Loss or Degradation

Indicator	Degree of Departure from Ecological Site Description and/or Ecological Reference Area(s)	
	Extreme	Moderate to Extreme
Soil Surface Loss or Degradation	Soil surface horizon absent. Soil structure near surface is similar to, or more degraded, than that in subsurface horizons. No distinguishable difference in subsurface organic matter content.	Soil loss or degradation severe throughout site. Minimal differences in soil organic matter content and structure and subsurface layers.

Indicator: Annual Production

Indicator	Degree of Departure from Ecological Site Description and/or Ecological Reference Area(s)			
	Extreme	Moderate to Extreme	Moderate	Slight to Moderate
Annual Production	Less than 20% of potential production for the site based on recent weather.	20-40% of potential production for the site based on recent weather.	40-60% of potential production for the site based on recent weather.	60-80% of potential production for the site based on recent weather.

Protocol for Drought Stricken Rangeland Soil Offset Projects

It is generally agreed that severe or multi-year (ongoing) drought would cause loss of soil organic carbon (SOC) regardless of the practices that are being applied or the condition of the vegetation. Conversely, periods of above normal rainfall will likely result in increased soil carbon storage. Given the overriding influence of drought, its impact on plant growth and likely effect of carbon uptake, the CCX Rangeland Protocol contains the following rules on soil carbon in projects undergoing drought.

Agricultural Drought

For the purposes of the CCX Rangeland Protocol, drought occurs when soil water deficits limit vegetation production below a long term average.

Drought conditions in the United States are monitored and tracked on the NDMC website operated by the University of Nebraska at Lincoln. <http://www.drought.unl.edu/> The National Drought Map is updated weekly and drought conditions are reported on a county by county basis. Specifically, verifiers and aggregators may use the Drought Monitoring tool by county available at the following link:

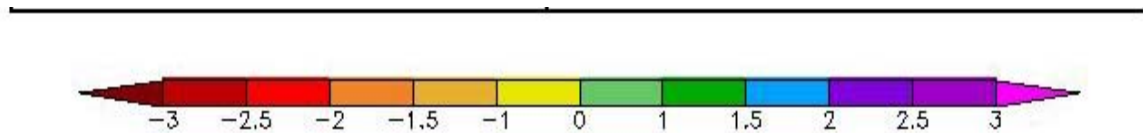
<http://drought.unl.edu/monitor/spi-dailygridded.html>

The drought severity classification table below shows the ranges for each indicator for each dryness level using the Standardized Precipitation Index (SPI). The SPI calculation for any location is based on the long-term precipitation record for a desired period. The SPI can be computed for different time scales, can provide early warning of drought and help assess drought severity, and is less complex than some other indicators.

SPI Values	
2.0+	extremely wet
1.5 to 1.99	very wet
1.0 to 1.49	moderately wet
-.99 to .99	near normal
-1.0 to -1.49	moderately dry
-1.5 to -1.99	severely dry
-2 and less	extremely dry

Drought Severity Classification http://www.drought.unl.edu/dm/classify.htm			
Category	Description	Possible Impacts	Standardized Precipitation Index (SPI)
D0	Abnormally Dry	Going into drought: short-term dryness slowing planting, growth of crops or pastures. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered	-0.5 to -0.7
D1	Moderate Drought	Some damage to crops, pastures; streams, reservoirs, or wells low, some water shortages developing or imminent; voluntary water-use restrictions requested	-0.8 to -1.2
D2	Severe Drought	Crop or pasture losses likely; water shortages common; water restrictions imposed	-1.3 to -1.5 (Light Orange on Color Scale)
D3	Extreme Drought	Major crop/pasture losses; widespread water shortages or restrictions	-1.6 to -1.9 (Dark Orange on Color Scale)
D4	Exceptional Drought	Exceptional and widespread crop/pasture losses; shortages of water in reservoirs, streams, and wells creating water emergencies	-2.0 or less (Dark Red, Red, Bright Red on Color Scale)

SPI color-coded Drought Scale,
National Drought Monitoring Center-Daily Gridded SPI
<http://drought.unl.edu/monitor/spi-dailygridded.html>



National Drought Mitigation Center

I. CCX Treatment of Rangeland under Drought Conditions

The following applies to Drought-related actions.

1. Rangelands enrolled must have drought management as a part of their overall formal grazing plan, preferably with defined management responses (e.g. utilization rates of < 50%) to drought triggers described by the drought classification index.
2. Project land that was classified as -1 to -3 or lower on the SPI Color-coded drought scale for at least three consecutive years beginning January 1, 1997 through December 31, 2002 may be enrolled as degraded rangeland (see above chart for descriptions).
3. During the CCX program, projects will continue to accrue credits at the specified rate according to LRR during years of drought (-1 to -3 or lower on the SPI Color-coded drought scale). At the end of CCX Phase II (2010), projects that are classified as being at drought levels of -1 to -3 or lower in any two or more consecutive years of the CCX program will have credits for those years deducted from the carbon reserve pool (20% per year in drought). Drought status will be determined by county or crop reporting district 12 month SPI from November- October via the following on-line tool: <http://drought.unl.edu/monitor/spi-dailygridded.html> <http://www.drought.unl.edu/monitor/archivedspi.htm>
4. If a project has credits deducted from the carbon reserve pool due to drought, and has ADDITIONAL non-compliance, the appropriate amount of CFI's will be deducted from the pool's 2010 offsets in order to again establish the full 20% carbon reserve.
5. Enrolled Project land credited under the non-degraded, improved management credit rates will not change status once enrolled in CCX, regardless of drought conditions.

LRR B - Counties that Qualify for Rangeland Soil Carbon Management Offsets

IDAHO	OREGON	WASHINGTON
Ada	Baker	Adams
Bannock	Crook	Asotin
Bear Lake	Deschutes	Benton
Bingham	Gilliam	Chelan
Blaine	Jefferson	Columbia
Bonneville	Morrow	Douglas
Butte	Sherman	Franklin
Camas	Umatilla	Garfield
Canyon	Wasco	Grant
Caribou	Wheeler	Kittitas
Cassia		Klickitat
Clark		Lincoln
Elmore		Okanogan
Fremont		Spokane
Gem		Walla Walla
Gooding		Whitman
Jefferson		Yakima
Jerome		
Latah		
Lemhi		
Lewis		
Lincoln		
Madison		
Minidoka		
Nez Perce		
Payette		
Power		
Teton		
Washington		

LRR C - Counties that Qualify for Rangeland Soil Carbon Management Offsets

CALIFORNIA		
Alameda	Marin	Santa Clara
Butte	Merced	Santa Cruz
Calaveras	Monterey	Solano
Colusa	Napa	Sonoma
Contra Costa	Orange	Stanislaus
Fresno	Sacramento	Sutter
Glenn	San Benito	Tehama
Kern	San Diego	Ventura
Kings	San Joaquin	Yolo
Lake	San Luis Obispo	Yuba
Los Angeles	San Mateo	
Madera	Santa Barbara	

LRR E - Counties that Qualify for Rangeland Soil Carbon Management Offsets

COLORADO	IDAHO	MONTANA
Alamosa	Adams	Beaverhead
Archuleta	Benewah	Broadwater
Boulder	Boise	Carbon
Broomfield	Bonner	Cascade
Chaffee	Boundary	Deer Lodge
Clear Creek	Clearwater	Flathead
Conejos	Custer	Gallatin
Costilla	Idaho	Glacier
Custer	Kootenai	Granite
Douglas	Shoshone	Jefferson
Eagle	Valley	Judith Basin
El Paso		Lake
Fremont		Lewis and Clark
Garfield		Lincoln
Gilpin		Madison
Grand		Meagher
Gunnison		Mineral
Hinsdale		Missoula
Huerfano		Park
Jackson		Powell
Jefferson		Ravalli
Lake		Sanders
Larimer		Silver Bow
Mineral		Stillwater
Ouray		Sweet Grass
Park		Teton
Pitkin		
Rio Grande		
Routt		
Saguache		
San Juan		
Summit		
Teller		

LRR E - Counties that Qualify for Rangeland Soil Carbon Management Offsets

NEW MEXICO	OREGON	UTAH
Colfax Rio Arriba Taos	Grant Union Wallowa	Cache Carbon Daggett Duchesne Morgan Rich Summit Utah Wasatch

LRR E - Counties that Qualify for Rangeland Soil Carbon Management Offsets

WASHINGTON	WYOMING
Ferry Pend Oreille Stevens	Big Horn Hot Springs Lincoln Park Sublette Teton Uinta

LRR F - Counties that Qualify for Rangeland Soil Carbon Management Offsets

MONTANA	NORTH DAKOTA		SOUTH DAKOTA
Blaine Chouteau Daniels Hill Liberty McCone Phillips Pondera Richland Roosevelt Sheridan Toole Valley Wibaux	Adams Barnes Benson Bottineau Burke Burleigh Cass Cavalier Dickey Divide Dunn Eddy Emmons Foster Golden Valley Grand Forks Grant Griggs Hettinger Kidder LaMoure Logan McHenry McIntosh McKenzie McLean Mercer Morton Mountrail Nelson Oliver Pembina Pierce	Ramsey Ransom Renville Richland Rolette Sargent Sheridan Sioux Stark Steele Stutsman Towner Traill Walsh Ward Wells Williams	Aurora Beadle Brown Brule Buffalo Campbell Charles Mix Corson Davison Douglas Edmunds Faulk Hand Hughes Hyde Jerauld McPherson Perkins Potter Sanborn Spink Sully Walworth Ziebach

LRR G - Counties that Qualify for Rangeland Soil Carbon Management Offsets

COLORADO	MONTANA	NEBRASKA
Adams	Big Horn	Arthur
Arapahoe	Carter	Banner
Bent	Custer	Blaine
Cheyenne	Dawson	Box Butte
Crowley	Fallon	Boyd
Denver	Fergus	Brown
Elbert	Garfield	Cherry
Kiowa	Golden Valley	Dawes
Kit Carson	Musselshell	Garden
Las Animas	Petroleum	Garfield
Lincoln	Powder River	Grant
Morgan	Prairie	Holt
Otero	Rosebud	Hooker
Prowers	Treasure	Keya Paha
Pueblo	Wheatland	Kimball
Washington	Yellowstone	Knox
Weld		Logan
		Loup
		McPherson
		Morrill
		Rock
		Scotts Bluff
		Sheridan
		Sioux
		Thomas
		Wheeler

LRR G - Counties that Qualify for Rangeland Soil Carbon Management Offsets

NEW MEXICO	NORTH DAKOTA	SOUTH DAKOTA	WYOMING
Chaves De Baca Guadalupe Lincoln Mora Quay San Miguel Santa Fe Torrance	Billings Bowman Slope	Bennett Butte Custer Dewey Fall River Gregory Haakon Harding Jackson Jones Lawrence Lyman Meade Mellette Pennington Shannon Stanley Todd Tripp	Campbell Converse Crook Goshen Johnson Laramie Niobrara Platte Sheridan Weston

LRR H - Counties that Qualify for Rangeland Soil Carbon Management Offsets

COLORADO	KANSAS	KANSAS
Baca	Barber	McPherson
Logan	Barton	Meade
Phillips	Butler	Mitchell
Sedgwick	Chase	Morris
Yuma	Cheyenne	Morton
	Clark	Ness
	Clay	Norton
	Cloud	Osage
	Comanche	Osborne
	Cowley	Ottawa
	Decatur	Pawnee
	Dickinson	Phillips
	Edwards	Pottawatomie
	Elk	Pratt
	Ellis	Rawlins
	Ellsworth	Reno
	Finney	Republic
	Ford	Rice
	Geary	Riley
	Gove	Rooks
	Graham	Rush
	Grant	Russell
	Gray	Saline
	Greeley	Scott
	Greenwood	Sedgwick
	Hamilton	Seward
	Harper	Sheridan
	Harvey	Sherman
	Haskell	Smith
	Hodgeman	Stafford
	Jewell	Stanton
	Kearny	Stevens
	Kingman	Sumner
	Kiowa	Thomas
	Lane	Trego
	Lincoln	Wabaunsee
	Logan	Wallace
	Marion	Washington
	Marshall	Wichita

LRR H - Counties that Qualify for Rangeland Soil Carbon Management Offsets

NEBRASKA	NEW MEXICO	OKLAHOMA
Adams Buffalo Butler Chase Cheyenne Clay Custer Dawson Deuel Dundy Fillmore Franklin Frontier Furnas Gosper Greeley Hall Hamilton Harlan Hayes Hitchcock Howard Jefferson Kearney Keith Lincoln Merrick Nuckolls Perkins Phelps Polk Red Willow Saline Seward Sherman Thayer Valley Webster York	Curry Harding Lea Roosevelt Union	Alfalfa Beaver Beckham Blaine Caddo Canadian Cimarron Cleveland Comanche Cotton Custer Dewey Ellis Garfield Grant Greer Harmon Harper Jackson Jefferson Kay Kingfisher Kiowa Logan Major McClain Noble Oklahoma Pawnee Payne Roger Mills Texas Tillman Washita Woods Woodward

LRR H - Counties that Qualify for Rangeland Soil Carbon Management Offsets

TEXAS	
Andrews	Hutchinson
Archer	Jack
Armstrong	Jones
Bailey	Kent
Baylor	King
Borden	Knox
Briscoe	Lamb
Brown	Lipscomb
Callahan	Lubbock
Carson	Lynn
Castro	Martin
Childress	Midland
Clay	Mitchell
Cochran	Montague
Coke	Moore
Coleman	Motley
Collingsworth	Nolan
Concho	Ochiltree
Cottle	Oldham
Crosby	Palo Pinto
Dallam	Parmer
Dawson	Potter
Deaf Smith	Randall
Dickens	Roberts
Donley	Runnels
Ector	Scurry
Fisher	Shackelford
Floyd	Sherman
Foard	Stephens
Gaines	Stonewall
Garza	Swisher
Gray	Taylor
Hale	Terry
Hall	Throckmorton
Hansford	Tom Green
Hardeman	Wheeler
Hartley	Wichita
Haskell	Wilbarger
Hemphill	Yoakum
Hockley	Young
Howard	

Appendix 9.4 CCX Ozone-Depleting Substances Destruction Project Guidelines

Introduction

Production of chlorofluorocarbons (CFCs), halons, and other ozone depleting substances (ODS) has been phased out in the U.S. and in all member countries under the Montreal Protocol; phaseout of hydrochlorofluorocarbons (HCFCs) is in progress. In addition to depleting stratospheric ozone, these chemicals have global warming potentials relative to CO₂ ranging between 500 and 10,000 when eventually emitted from equipment and storage stockpiles. While production of these chemicals has been or is being ended, there are no regulations or market incentives to ensure recovery and destruction of the chemicals contained in older appliances, commercial air conditioning and refrigeration equipment, insulation foam, fire fighting systems, storage cylinders, and other “banks”.

For the US in 2007, EPA estimates that accessible quantities of ODS contained in equipment represent over 1,400 million metric tons of CO₂ equivalent (MMTCO₂Eq). Accessible quantities of ODS that have been phased out of production in the U.S. account for approximately 330 MMTCO₂Eq. EPA estimates that by 2010, 13% of this amount will be emitted if not recovered and destroyed or converted. Subsection A presents historical and projected estimates for accessible quantities of ODS by ODS type for the years 2000 to 2030. Additional quantities of ODS (e.g., CFC-12, halon 1301) are contained in bulk storage (pressurized 30 pound cylinders, 250 gallon tanks, or large ISO tanks). Some stockpiled ODS could be made available for destruction, particularly if incentives were provided to the owners of such stockpiles.

This protocol summarizes procedures to measure and verify greenhouse gas emission reductions resulting from the destruction of ODS for the Chicago Climate Exchange (CCX).

Definitions

Montreal Protocol on Substances that Deplete the Ozone Layer (Montreal Protocol): An international treaty established in 1987, since amended, that stipulates phase out schedules for production and consumption of compounds that deplete ozone in the stratosphere.

U.S. Environmental Protection Agency (EPA): EPA is responsible for implementing regulations and programs under Title VI of the Clean Air Act Amendments of 1990 to meet U.S. commitments for protecting the ozone layer as agreed to under the Montreal Protocol. EPA also issues regulations and conducts enforcement activities for entities covered under the Resource Conservation and Recovery Act, including hazardous waste destruction facilities in the US.

Ozone-depleting substances (ODSs): Compounds including chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), halons, carbon tetrachloride, and methyl chloroform (see Subsection B for a complete list) that, once emitted to the atmosphere, significantly deplete the

stratospheric ozone layer that shields the planet from damaging UV-B radiation. The production and consumption of these compounds are controlled under the Montreal Protocol and CAAA regulations.

ODS Controlled Substance means a substance listed in Appendix B, whether existing alone or in a mixture. It excludes any controlled substance or mixture which is in a manufactured product other than a container used for the transportation or storage of that substance.

Production means the amount of ODS controlled substance produced minus the amount entirely used as feed stock in the manufacture of other chemicals. The amount recycled or reused is not to be considered as “production”.

Imports means the importation of ODS controlled substances as listed in Appendix B.

Clean Air Act Amendments (CAAA): Title VI, Stratospheric Ozone Protection, of the CAAA authorizes EPA to manage the phaseout of ODS. Among regulations established by EPA are requirements for safe handling and disposal of ODS and prohibitions on intentional venting or release of ODS into the atmosphere, and requirements governing the import of recycled ODS. Title V of the CAAA authorizes EPA to issue Operating Permits that contain emission limits for the release of air pollutants, including hazardous air pollutants (HAPs), by hazardous waste destruction facilities.

Resource Conservation and Recovery Act (RCRA): Regulates compounds classified as hazardous waste as well as the facilities that handle these wastes through a permitting and enforcement program.

Maximum Achievable Control Technology (MACT): RCRA-permitted hazardous waste facilities that operate HWCs are also required by the MACT standard under the CAAA to obtain Title V Operating Permits as a hazardous air pollutant (HAP) emission source.

Hazardous Waste Combustors (HWCs): Commercial destruction facilities that destroy hazardous waste, including ODS, for outside sources.

Destruction Removal Efficiency (DRE): A measure of a destruction unit’s efficiency in destroying specified compounds.

Applicability

This protocol applies to ODS recovered from equipment or stockpiles and submitted for destruction to a facility that commercially destroys ODS for outside parties. In the U.S., commercial destruction facilities can be categorized as follows:

- Incinerators
 - Rotary kilns
 - Fixed hearth units
 - Liquid injection units
- Industrial furnaces

- Cement kilns
- Lightweight aggregate kilns
- Plasma technologies
 - Argon plasma arc units

Only ODS whose production has been completely phased out under Title VI of the CAAA (currently including all CFCs, halons, carbon tetrachloride, methyl chloroform, hydrobromofluorocarbons, and HCFC-141b) are eligible for destruction under this protocol. *For international stocks, the Montreal Protocol member country must have phased out the production and importation of the ODS (except for critical use exemptions as defined by the Montreal Protocol) as listed in Appendix B for it to be eligible for destruction under this protocol.* Destruction of the ODS must be in compliance with all applicable requirements under the CAAA and RCRA related to ODS safe handling and disposal and operation of destruction facilities described below. Similarly, only ODS that is imported into the U.S. is eligible for destruction under this protocol that is imported into the U.S. in accordance with applicable requirements under the CAAA.

Federal Regulations for ODS Destruction Facilities

Under the authority of the CAAA, the **stratospheric ozone protection regulations** (40 CFR Part 82, Subpart A) establish the following definitions relating to the destruction of controlled substances:³⁸

- “*Destruction* means the expiration of a controlled substance to the destruction efficiency actually achieved, unless considered completely destroyed as defined in this section. Such destruction does not result in a commercially useful end product and uses one of the following controlled processes approved by the Parties to the Protocol:
 - (1) Liquid injection incineration;
 - (2) Reactor cracking;
 - (3) Gaseous/fume oxidation;
 - (4) Rotary kiln incineration;
 - (5) Cement kiln;
 - (6) Radio frequency plasma; or
 - (7) Municipal waste incinerators only for the destruction of foams.”
- “*Completely destroy* means to cause the expiration of a controlled substance at a destruction efficiency of 98 percent or greater using one of the destruction technologies approved by the Parties.”

In other words, the stratospheric ozone protection regulations require the use of one of the technologies approved by the Parties to the Montreal Protocol when destroying a controlled substance. Additionally, if the substance is to be considered “completely destroyed” as defined in the regulations, it must be destroyed to a 98 percent destruction efficiency.

In addition to the stratospheric ozone protection regulations for ODS under the Clean Air Act, ODS that are classified as hazardous wastes are also regulated under **RCRA**. Therefore, facilities that operate hazardous waste storage tanks, manage hazardous waste containers, and operate

hazardous waste treatment units are required to have RCRA permits, which regulate what specific hazardous wastes the facilities are permitted to receive and store, and in what quantities.

According to 40 CFR Part 261, Subpart D, ODS (or ODS-containing waste) may be classified as hazardous wastes if they fall under one of the following waste categories:

- Wastes from non-specific sources (Code F);
- Commercial chemical products (Code U);
- Characteristic wastes (Code D); or
- Wastes from specific sources (Code K).

Carbon tetrachloride, methyl chloroform, and all CFCs and HCFCs may be classified as Code **F** hazardous wastes if they have been used as solvents prior to disposal. While carbon tetrachloride, methyl chloroform, methyl bromide, trichlorofluoromethane (CFC-11), and dichlorodifluoromethane (CFC-12) have designated **U** waste codes, this code is limited to container residues and products that were manufactured but never used. Therefore, refrigerants removed from equipment (which are not classified as hazardous wastes)³⁹ and used solvents (some of which do fall under waste Code F) *would not* fall under hazardous waste Code U; a controlled substance that was manufactured and never used *would* be considered a Code U waste if it was discarded or intended to be discarded. ODS-contaminated wastes which may be generated from specific sources, such as the production of carbon tetrachloride, may be classified under several **K** waste codes. However, because these waste codes apply mainly to wastes/residues from the production of various chemicals, they will not apply to controlled substances being sent for destruction. Carbon tetrachloride is designated under waste code **D019**; thus, if an extract from a representative sample of a solid waste contains a concentration of carbon tetrachloride equal to or greater than the regulatory threshold level of 0.5 mg/L, it is considered a hazardous waste. Additionally, used ODS contaminated with any of the other Code D chemicals are considered hazardous wastes if an extract contains any of the contaminants listed in 40 CFR 261.24 at a concentration equal to or greater than the specified values.

³⁸ According to 40 CFR 261.4(b)(12), refrigerants that meet the following definition are exempt from classification as hazardous wastes: “used chlorofluorocarbon refrigerants from totally enclosed heat transfer equipment, including mobile air conditioning systems, mobile refrigeration, and commercial and industrial air conditioning and refrigeration systems that use chlorofluorocarbons as the heat transfer fluid in a refrigeration cycle, provided the refrigerant is reclaimed for further use”. According to 56 FR 5913, this exemption includes CFC and HCFC refrigerants.

Table 1 summarizes the RCRA hazardous waste codes that may apply to controlled substances (i.e., not including ODS byproducts or ODS-containing wastes from chemical manufacture).

Table 1: RCRA Hazardous Waste Codes for Selected ODS

Chemical Name	Hazardous Waste Codes			
	U ^a	F	D	K
CFC-11 (Trichlorofluoromethane)	U121	F001, F002	-	-
CFC-12 (Dichlorodifluoromethane)	U075	F001	-	-
Other CFCs and HCFCs	-	F001	-	-
Carbon Tetrachloride	U211	F001	D019	-
Methyl Chloroform (1,1,1-trichloroethane)	U226	F001, F002	-	-
Methyl Bromide	U029	-	-	-

^a Code U only applies to the controlled substances listed above if they were manufactured and subsequently disposed of without ever being used.

RCRA-permitted hazardous waste facilities that operate hazardous waste combustors (HWCs) are also required by the **MACT** standard under the **CAAA** to obtain a Title V Operating Permit as a hazardous air pollutant (HAP) emission source. Title V Operating Permits contain emission limits for the release of air pollutants, including HAPs, from the combustion of hazardous wastes to ensure the protection of human and environmental health. Under the MACT standards, when hazardous wastes are to be destroyed by way of combustion, the combustion unit must adhere to a minimum 99.99 percent DRE and also meet the air emission limits listed in 40 CFR 63.1216 – 63.1221. The air emission limits relevant to ODS destruction include limits for dioxins and furans, PM, total chlorine (HCl and Cl₂), and CO. Additional operating limitations for HWCs, including maximum hazardous waste feed rates and ranges of hazardous waste composition (e.g., maximum feed rate of chlorine to the unit), are established on a unit-specific basis by the Title V Operating Permit writers based on a review of the unit design, waste characterization data, and performance test results.

At this time, all of the known commercial destruction facilities, with the exception of one plasma arc unit, are RCRA-permitted HWCs and, therefore, must meet all regulatory requirements under the CAAA and RCRA, including meeting a 99.99 percent DRE⁴⁰ when destroying hazardous

⁴⁰ According to the United Nations Environmental Programme Technology and Economic Assessment Panel (TEAP), DE is a more comprehensive measure of destruction than DRE as it includes emissions of undestroyed chemical from all points (e.g., stack gases, fly ash, scrubber, water, bottom ash), while DRE includes emissions of undestroyed chemical from the stack gas only. However, “because of the relatively volatile nature of ODS and because, with the exception of foams, they are generally introduced as relatively clean fluids, one would not expect a very significant difference between DRE and DE”. This information along with reviewed ODS destruction technologies and recommendations are available from the TEAP Report of the Task Force on Destruction Technologies (2002) available at <http://www.teap.org>.

waste. While the 99.99 percent DRE is not required for ODS that are not classified as hazardous wastes (e.g., halons and most CFCs and HCFCs), research has indicated that it is probable that all ODS will be destroyed to at least this DRE when sent to a permitted HWC.

Regulations Governing Import of Used/Recycled ODS

EPA requires that imports of ODS into the U.S. receive approval based on documentation specified in the Code of Federal Regulations at 82.13(g)(2) and 82.24(c)(3). Importers must submit to EPA a petition with the following information:

- Name and quantity of ODS
- Identity and addresses of importer and of all previous source facilities from which ODS was recovered
- Detailed description and date of previous use of ODS at each source facility including details of the equipment using the ODS
- Identity and address of entity that recovered ODS at source facility and of as of all persons whom ODS was transferred or sold after it was recovered
- Expected date of shipment and vessel transporting ODS
- Description of intended use and identity and address of U.S. purchaser
- Identity and addresses of U.S. and foreign reclamation facility
- An export license from country of export and, if recovered in another country, the export license from that country;
- Statement from reclamation facility that it will process ODS to specifications of 40 CFR 82
- Certification of accuracy

These petitioning requirements may be revised to allow companies to more easily import ODS specifically for destruction.

C. Federal Regulations on Venting of ODS

Demand for ODS to service existing equipment has remained steady since the production of halons and CFCs ended in 1994 and 1996, respectively, and this demand is likely to continue for equipment using HCFCs. U.S. policy has been to encourage the transition from the use of ODS to alternatives, to allow recycling to meet needs of critical users, and to ensure proper disposal to prevent unnecessary emissions. Section 608 of the CAAA prohibits the known venting of ODS while maintaining, servicing, repairing, and disposing of ODS containing equipment. There are no current federal, state, or local regulations in place that require equipment decommissioning and destruction of ODS. Therefore, destruction of ODS, that would otherwise be emitted, exceeds current venting regulations. If new regulations are issued in the future that require ODS destruction, CCX offset projects must demonstrate additional emission reductions beyond compliance.

Eligibility

To be eligible, any ODS destruction must be conducted at a facility that meets all CAAA and RCRA regulatory requirements. Facilities that destroy imported ODS must demonstrate that the material was imported into the U.S. in accordance with CAAA requirements.

CCX eligibility requirements for crediting ODS destruction as *Exchange Fluorocarbon Destruction Offsets (XFDOs)* are as follows:

- CFCs, halons, carbon tetrachloride, methyl chloroform, hydrobromofluorocarbons, and HCFC-141b destroyed after January 1, 2007 can be registered and traded on the CCX.

In order for a project to be deemed eligible, the project activity cannot be undertaken to come into compliance with existing or imminent legislation. Currently, ODS destruction would exceed federal, state, and/or local requirements in the U.S. governing GHG emissions, therefore, any destruction project involving ODS that has been phased out of production will be considered eligible. However, because new regulations may be implemented in the future, CCX members must demonstrate that federal, state and/or local regulations do not require ODS destruction when implementing specific, individual projects.

While not required for project eligibility, recommended best management practices should be followed to reduce potential losses and ODS emissions while collecting and transporting ODS for destruction. Subsection C presents additional information on these recommended best management practices.

Protocol for Measuring and Recording ODS Destruction

For measuring and recording ODS destruction, CCX offset members shall employ the measurement and recordkeeping procedures described in this section. ODS destruction amounts shall be determined by the amount of ODS input into the destruction unit, less that emitted through the stack gas, which is determined based on the unit's DRE. Exchange Offsets (XOs) will be determined based on the amount of ODS destroyed, assuming that in the absence of destruction, 100 percent of the ODS would have eventually been emitted. This approach for granting XOs for the total amount of ODS destroyed is based on the fact that current destruction practices are minimal, as the majority of surplus ODS in the market is currently being reclaimed and used in equipment (which leads to slow leakage or accidental release), rather than being destroyed. In addition, the extra costs required to destroy ODS, versus these other options, generally prevent owners from undertaking destruction projects. Exceptions to these are owners of ODS that may be too contaminated to reuse or owners motivated to prevent emissions altogether. Therefore, any ODS destruction activity can be considered "beyond common practice", and therefore additional.

Measurement

Because there is no cost-effective way to continuously measure ODS emissions from stack gases during destruction processes, the DRE should be used to estimate the amount of ODS that is not destroyed and therefore emitted from the stack gases.

Under the MACT standards, DREs achieved by destruction units are calculated based on measured feed rates and stack gas emissions rates occurring during performance tests conducted under controlled conditions using representative compounds. Facility operators and permitting agencies then determine that the HWCs are achieving the applicable DRE by determining that the units are being operated within the permitted range of operating parameters. This permitted range of parameters is developed based on the conditions under which performance tests for the HWC were conducted.

Therefore, the DRE recorded during the performance test should be assumed to apply when the actual supply of ODS is destroyed, provided that the unit was being operated within the permitted range of operating parameters (e.g., waste feed rate, combustion temperature).

Recordkeeping

The recordkeeping requirements for an ODS destruction project are based on the pre-existing recordkeeping and reporting requirements for ODS destruction facilities under the CAAA.

Under Title V of the CAAA, hazardous waste combustor facility operators are required to record information to document and maintain compliance with MACT standard Subpart EEE regulations. Specifically, HWCs are required, under 40 CFR 63.1209, to continuously monitor (1) total hydrocarbon or carbon monoxide emissions in exhaust gas using a continuous emission monitoring system (CMS) and (2) the waste feed rate. Under 40 CFR 63.1206 and 63.1207, HWCs must document compliance with emission limits (including DRE) and demonstrate performance of their CMS by conducting comprehensive performance tests every five years. Additionally, under 40 CFR 62.1211, facilities are required to maintain information on site to document and maintain compliance with MACT standard Subpart EEE regulations (including data recorded by CMS) and make operating records available for on-site inspection by the EPA.

Under Title VI of the CAAA, ODS destruction facilities must provide the following reports:

A report to EPA with the names and quantities of all ODS destroyed during each calendar year, as per 40 CFR 82.13(m). Subsection D presents an example of the reporting form facilities can use to report ODS destruction to EPA;

A one-time report to EPA, which must include the following information as per 40 CFR 82.13(j):

- the destruction unit's DRE;
- the methods used to record the volume destroyed;
- the methods used to record DRE; and

- the names of other relevant federal or state regulations that may apply to the destruction process.

A destruction verification document to the producer/importer from whom they purchased/received the ODS, which must include the following information as per 40 CFR 82.13(k):

- the identity and address of the person intending to destroy controlled substances;
- an indication of whether those controlled substances will be “completely destroyed” or less than completely destroyed, in which case they must provide the DRE;⁴¹
- the period of time over which the person intends to destroy the controlled substances; and
- the signature of the verifying person.

If any aspects of this verification change, a revised copy of the verification must be submitted to producer/importer. Subsection E presents an example destruction verification document..

Based on these pre-existing regulatory requirements, the following project-specific records are to be kept in order to verify ODS destruction:

- Name of ODS destruction project;
- Amounts and types of ODS and dates placed into destruction unit;
- Type of destruction technology used;
- Copies of destruction facility’s one-time report to EPA as required under 40 CFR 82.13(j);
- Copies of the destruction verification document as required under 40 CFR 82.13(k);
- Copies of the CMS data recorded by the destruction facility during the destruction of the ODS, as required under 40 CFR 63.1209 and 63.1211;
- Copies of the calculations done to determine the total amount of ODS destroyed;
- Gas chromatograph and mass spectrometer test results of material batched that determines the ODS components by mass weight/percentage as sampled at the destruction facility;
- For destruction of imported ODS, copy of approved petition to import the used ODS into the U.S.; and
- Records of third-party verification of emission monitoring and procedures.

The above-listed records need to be kept readily accessible and on-site (or with the local field office responsible for the site) for at least 2 years after the date that ODS emissions reductions for the project have been recorded at the CCX. These records may be required in Project Reports by CCX.

⁴¹ “Completely destroy,” as defined in 40 CFR 82.3, means “to cause the expiration of a controlled substance at a destruction efficiency of 98 percent or greater, using one of the destruction technologies approved by the Parties.”

Use of Measured Data and Factors to Calculate Emission Offsets

The following equation should be used to calculate the total amount of ODS destroyed, based on the amount fed into the destruction unit and the DRE:

$$\text{Amount Fed Into Destruction Unit} * \text{DRE} = \text{Amount Destroyed}$$

As the total amounts of ODS destroyed are considered ODS emissions savings, they can be converted to XOs using the direct global warming potential (GWP) of the ODS less 25%. Direct GWP values should be based on the most up-to-date estimates (see Subsection F for current values).

Eligible offset projects will be issued XOs on the basis of the entire mitigation tonnage realized less 25%. The vintage year assigned to the XOs will correspond to the year in which ODS destruction occurs. The entity that bears the entire costs of destroying the ODS will have clear and undisputed legal ownership of the XOs created by the offset project.

Third Party Verification Requirements

Verification of ODS destruction projects shall be conducted in accordance with the provisions contained in Chapter 9 and 10 of the CCX Rulebook and as prescribed by the CCX Committee on Offsets.

Verification Checklist for Offset Members

- Confirm eligibility
 - Confirm no pre-existing federal, state, or local regulations requiring destruction
 - Confirm material phase out
- Develop specific destruction plan
 - Arrange for ODS destruction with destruction facility
 - List measured data and documentation to be verified by auditor
- Calculate amounts destroyed/emission reductions
 - List and reference assumptions and conversion factors used
 - Prepare a spreadsheet to calculate amounts destroyed, emissions reductions and XOs
 - Perform QA/QC procedures
- Prepare overall report
 - Present cumulative emission savings
 - Compare CMS data from destruction to permitted levels to prove that DRE standard was met

Subsection A: Estimated ODS Accessible Banks in U.S. Equipment

Table A1: Total ODS Accessible Banks in U.S. Equipment, By ODS Type (Million Metric Tons)

Year	CFC-11	CFC-12	CFC-115	CFC Totals	Halon 1211	Halon 1301	Halon Totals	HCFC-22	HCFC-123	HCFC-124	HCFC-141b	HCFC-142b	HCFC Totals	Overall Totals
2000	0.0134	0.0844	0.0037	0.1015	0.0074	0.0154	0.0229	0.5167	0.0125	0.0004	0.0000	0.0002	0.5297	0.6541
2005	0.0094	0.0270	0.0020	0.0385	0.0016	0.0135	0.0151	0.5928	0.0195	0.0001	0.0000	0.0000	0.6123	0.6659
2010	0.0065	0.0136	0.0008	0.0210	0.0014	0.0050	0.0064	0.5490	0.0251	0.0000	0.0000	0.0000	0.5742	0.6016
2015	0.0018	0.0030	0.0001	0.0049	0.0017	0.0029	0.0045	0.3546	0.0298	0.0000	0.0000	0.0000	0.3845	0.3939
2020	0.0000	0.0000	0.0000	0.0000	0.0019	0.0015	0.0034	0.1623	0.0271	0.0000	0.0000	0.0000	0.1895	0.1929
2025	0.0000	0.0000	0.0000	0.0000	0.0022	0.0015	0.0037	0.0371	0.0207	0.0000	0.0000	0.0000	0.0578	0.0615
2030	0.0000	0.0000	0.0000	0.0000	0.0026	0.0016	0.0042	0.0117	0.0145	0.0000	0.0000	0.0000	0.0262	0.0304

^a The quantity of accessible ODS contained in U.S. banks is estimated from the *U.S. EPA Vintaging Model* (Version VM IO 3-1-07). These estimates include ODS in fire protection and refrigeration/AC equipment in any given year. It is assumed that the amount of ODS recoverable from this equipment is equal to the full equipment charge minus the average annual loss rate (from leakage and service events) times the charge size.

Table A2: Total ODS Accessible Banks in U.S. Equipment, By ODS Type (Direct GWP-Weighted Million Metric Tons [MMT CO₂ Eq])^{a,b}

Year	CFC-11	CFC-12	CFC-115	CFC Totals	Halon 1211	Halon 1301	Halon Totals	HCFC-22	HCFC-123	HCFC-124	HCFC-141b	HCFC-142b	HCFC Totals	Overall Totals
2000	63	905	27	995	14	108	122	920	1	0	0	0	921	2,038
2005	44	290	15	349	3	95	98	1,055	1	0	0	0	1,057	1,503
2010	31	146	6	182	3	35	38	977	2	0	0	0	979	1,199
2015	9	32	1	41	3	20	23	631	2	0	0	0	633	698
2020	0	0	0	0	4	11	14	289	2	0	0	0	291	305
2025	0	0	0	0	4	10	14	66	2	0	0	0	68	82
2030	0	0	0	0	5	11	16	21	1	0	0	0	22	38

^a Source: *U.S. EPA Vintaging Model* (Version VM IO 3-1-07).

^b The amount of ODS in Table A1 was converted into million metric tons of carbon dioxide equivalent [MMT CO₂ Eq] using direct global warming potentials (GWP) published in the *Special Report on Safeguarding the Ozone Layer and the Global Climate System: Issues Related to Hydrofluorocarbons and Perfluorocarbons* (IPCC/TEAP 2006).

Subsection B: Common Ozone Depleting Substances and their Direct GWPs⁴²

Class I	Direct GWP (100yr)	Class II	Direct GWP (100yr)
CFC-11 (Trichlorofluoromethane)	4,680	HCFC-22 (Monochlorodifluoromethane)	1,780
CFC-12 (Dichlorodifluoromethane)	10,720	HCFC-123 (Dichlorotrifluoroethane)	76
CFC-113 (1,1,2-Trichlorotrifluoroethane)	6,030	HCFC-124 (Monochlorotetrafluoroethane)	599
CFC-114 (Dichlorotetrafluoroethane)	9880	HCFC-141b (Dichlorofluoroethane)	713
CFC-115 (Monochloropentafluoroethane)	7250	HCFC-142b (Monochlorodifluoroethane)	2,270
Halon 1211 (Bromochlorodifluoromethane)	1,860	HCFC-225ca (Dichloropentafluoropropane)	120
Halon 1301 (Bromotrifluoromethane)	7,030	HCFC-225cb (Dichloropentafluoropropane)	586
Halon 2402 (Dibromotetrafluoroethane)	1,620		
Carbon Tetrachloride	1,380		
Methyl Chloroform (1,1,1-trichloroethane)	144		
Methyl Bromide	5		

Source: IPCC/TEAP. 2006. Special Report on Safeguarding the Ozone Layer and the Global Climate System: Issues Related to Hydrofluorocarbons and Perfluorocarbons. p. 162. Available online at: <http://www.ipcc.ch/pub/reports.html>

⁴² Compounds in bold have been phased out under Title VI of the CAAA and are, therefore, eligible for destruction under this protocol.

Subsection C: Recommended Best Management Practices

During the lifetime of ODS, a certain amount of emissions are inevitable. During storage, ODS stored in cylinders can be emitted if the cylinder fails or if the cylinder possesses a faulty valve; ODS stored in pressure vessels can leak due to the accidental failure of the relief valve (i.e., a valve installed to prevent tank explosion in case of a large pressure change). During transfers of ODS from one container/equipment to another container, emissions can occur from hose leaks and from any residual ODS remaining in the hoses when they are disconnected. Additionally, a residual amount of ODS (also known as a heel) can remain in the “empty” source container/equipment.

Best practices should be employed to reduce these emissions as much as possible while preparing, collecting, and transporting ODS for destruction. By minimizing emissions prior to destruction, one ensures that the maximum amount of offsets will be earned. The following list outlines several best management steps that should be considered:

- Maintain in proper condition and regularly inspect storage equipment;
- Conduct transfers using dry-break couplings where possible and evacuate hoses prior to disconnection;
- Evacuate heels from the container using a vacuum and combine them with the remainder of the ODS.

The following publications can be used as references for additional information on best management practices for reducing emissions:

ARI. 2006. Responsible Use Guide for Minimizing Fluorocarbon Emission in Manufacturing Facilities. Air-Conditioning and Refrigeration Institute. Available online at http://www.epa.gov/ozone/snap/refrigerants/ARI_ResponsibleUseGuide.pdf.

EPA. 2002. Voluntary Code of Practice for the Reduction of Emissions of HFC & PFC Fire Protection Agents. Developed and endorsed by the Fire Equipment Manufacturers’ Association (FEMA), the Fire Suppression Systems Association (FSSA), the National Association of Fire Equipment Distributors (NAFED), the Halon Alternatives Research Corporation, and the U.S. Environmental Protection Agency (EPA). March 2002. Available online at <http://www.epa.gov/ozone/snap/refrigerants/vcopdocument.pdf>.

Subsection D: Example Second-Party Destruction Annual Report

EPA U.S. Environmental Protection Agency STRATOSPHERIC OZONE PROTECTION PROGRAM		CLASS I CONTROLLED SUBSTANCE SECOND-PARTY DESTRUCTION ANNUAL REPORT (Sec 82.13)	
SECTION 1 COMPANY IDENTIFICATION			
1.1 Date of Submission		1.2 Year To Which This Report Applies	1.3 <input type="checkbox"/> Original Submittal <input type="checkbox"/> Re-submittal
1.4 Have you submitted a one-time destruction report to EPA (per Sec 82.13)?	<input type="checkbox"/> Yes <input type="checkbox"/> No	Date Submitted:	
1.5 Have you submitted a destruction verification to the producer or importer (per Sec 82.13)?	<input type="checkbox"/> Yes <input type="checkbox"/> No	Date Submitted:	
1.6 Company Information			
Company Name			
Street Address			
City	State	Zip Code	
1.7 Company Contact Identification			
Reporting Company Contact Person	Phone Number	Fax Number	
E-mail Address			
1.8 Signature of Reporting Company Representative			
<p><i>I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.</i></p>			
Name _____		Date _____	
Title _____			
Signature _____			

EPA U.S. Environmental Protection Agency STRATOSPHERIC OZONE PROTECTION PROGRAM		CLASS I CONTROLLED SUBSTANCE SECOND-PARTY DESTRUCTION ANNUAL REPORT (Sec 82.13)	
SECTION 2 DESTRUCTION SUMMARY			
2.1 Company Name			
2.2 Destruction Totals			
A		B	
Chemical Name		Second-Party Destruction of Class I Substance (kg)	
CFC-11			
CFC-12			
CFC-13			
CFC-111			
CFC-112			
CFC-113			
CFC-114			
CFC-115			
Other CFCs (please specify)			
HBFCs (please specify)			
Halons (please specify)			
Carbon Tetrachloride			
Methyl Chloroform			
CBM			

Subsection E: Example Destruction Verification Form

Company X Name and Address

Date

Customer Name and Address

Contract Number: 1234567

Company X has received [amount] of ODS including [type of ODS] for destruction.

In accordance with the contract, this material will be destroyed using our [name of destruction technology] unit.

The following information summarizes the planned destruction of the ODS:

Amount of ODS Destroyed:

ODS Type:

DRE:

Date for Destruction:

I certify, on behalf of Company X, that to the best of my knowledge, the above described will be destroyed in compliance with all applicable federal, state, and local laws, regulations, permits, and licenses.

Signature of Verifying Person, Date

Chapter 10 Environmental Audits and Offset Project Verification

10.0 Purpose

This Chapter provides the rules governing audits of CCX Member Emission Reports and Emission Baselines, verification of CCX Offset Projects and audit of Project Reports.

10.1 General Provisions

Emissions, Emission Baselines and Project verification reports will be subject to audit by the Provider of Regulatory Services designated by CCX. CCX Offset Projects are to be independently verified as per the provisions of Chapter 9 of this *Rulebook*. Project Reports shall be prepared and signed by a CCX-approved Verifier in accordance with the provisions of Chapter 9.

10.2 Rule Interpretation and Modifications (2007)

Unless provided otherwise by the Board, issues involving audits of emissions and Emission Baselines shall be addressed by the CCX Environmental Compliance Committee; and issues involving verification and audit of CCX Offset Projects shall be addressed by the CCX Offsets Committee, and the CCX Forestry Committee as applicable.

10.3 Emission Audits (2007)

The Provider of Regulatory Services designated by CCX shall conduct audits of each CCX Member's Emission Baseline and annual emission reports, as directed by the CCX Environmental Compliance Committee.

CCX Members shall cooperate fully with the Provider of Regulatory Services designated by CCX. All relevant data, underlying calculations, receipts or other evidence used to quantify emissions shall be provided promptly upon request of the Provider of Regulatory Services designated by CCX.

The scope of these emissions audits shall include (based on the sample selected):

- (1) the quality of data management and records of underlying data;
- (2) completeness and accuracy of calculations and baseline and annual emission reports;
- (3) proper inclusion and documentation of Jointly Owned Facilities and facility acquisitions and dispositions;
- (4) correct application of CCX rules for filling Baseline Period data gaps; and,
- (5) other data, methods and procedures deemed necessary to establish the accuracy of

baseline and annual emissions.

CCX requires all data to be reported in English. When source data is not in English, a Member, must, at its own expense, have an English-language version provided.

In the case of international facilities, other than Canada, Mexico and Brazil, a Member will, at its own expense, have its source data inspected, and have an English-language report on underlying data prepared by a CCX approved entity to provide such inspection services. The Member must make the CCX designated entity available to assist the CCX Provider of Regulatory Services in the audit of international facilities.

In cases where an audit of Emission Baselines identifies deficiencies, the Environmental Compliance Committee may direct a follow-up audit to be conducted for the purpose of evaluating proper correction of deficiencies.

The Provider of Regulatory Services designated by CCX shall report the findings of its audits to CCX to enable CCX to establish True-up for each Member. Should the CCX Environmental Compliance Committee determine that a Member is deficient in its application of CCX rules, it may direct the Member to take certain remedial action.

10.4 Offset Project Verification and Audits

10.4.1 Project Verification (2007)

CCX may approve qualified entities to be eligible to provide independent verification of CCX Exchange Offset Projects. Unless specifically provided otherwise, each request to issue CCX offsets for an approved project must be accompanied by a verification statement signed by a CCX-approved Verifier. The verification statement must attest to the CCX eligibility and existence of the registered Project, as well as the descriptive information required by CCX in a form and manner prescribed by the Exchange. The periodic Project Reports to be filed by Project Owners must be signed by a CCX-approved Verifier, which shall attest to the accuracy of the information provided in the Project Report. The Verifier must attest to the ongoing operation and maintenance of the Project, and to the quantity of emissions mitigation reported and all associated calculations. The costs of Project verification is to be paid by the Owner of a Project.¹

A CCX-designated entity shall conduct inspections of CCX soil carbon Projects and Small Forestation Projects. Owners of such Projects shall provide prompt access to the Project site and all associated documentation for inspection.

¹ Small Forestation Projects and soil carbon Projects shall be subject to verification procedures overseen by CCX.

10.4.2 Audit of Project Reports (2007)

The Provider of Regulatory Services designated by CCX shall conduct audits of Project Reports. Audits of Project Reports may include site visits or other steps needed to confirm the accuracy of the information contained in the Report.

CCX requires project related information to be reported in English. When source data is not in English, a Member, must, at its own expense, have an English-language version provided.

10.4.3 Qualifications of Verifiers

CCX will accept applications from entities wishing to be approved as Verifiers. Such entities must provide CCX with requested information which will include, but may not be limited to, the following:

- (1) evidence of professional licenses, direct experience, educational backgrounds and other indications of capability with the Project types for which the entity seeks to become a Verifier;
- (2) evidence of an established business history and absence of legal or other problems that may prevent the entity from reliably providing its services in a highly professional manner;
- (3) evidence of professional liability (or similar) insurance;
- (4) applicant's current financial statement;
- (5) acknowledgement that the entity must report to CCX any changes in the above items that may reduce the entity's ability to provide its services in a highly professional manner; and,
- (6) acknowledgement that verification of CCX Projects must be conducted in conformance with CCX rules, and that all Project Reports are subject to audit.

Chapter 11 Associate Members (2006)

11.0 Purpose

This Chapter provides the rules governing the CCX Associate Member category. Associate Members commit to fully offset Indirect and Direct Emissions (collectively “Emissions”) associated with their offices and business travel.

11.1 General Provisions (2007)

Associate Members are required to annually offset their Emissions through the acquisition and retirement of Carbon Financial Instruments.

Associate Members that meet the eligibility requirements to access the CCX Trading Platform may be approved by CCX to trade Carbon Financial Instruments directly through the CCX Trading Platform. Associate Members that do not meet the eligibility requirements to access the CCX Trading Platform must acquire Carbon Financial Instruments by means of Cash Transactions.

Associate Members are subject to the applicable provisions of this Rulebook.

11.2 Emissions

11.2.1 Included Emissions (2007)

Associate Members are required to report all U.S. Emissions. If an Associate Member’s primary business activities are domiciled outside the U.S., the Associate Member must include the Emissions from such primary location(s).

Associate Members are required to report Emissions resulting from:

- Electricity purchases for office facilities
- Heating fuel purchases for office facilities
- Business travel (airplanes, automobiles, trains)

Electricity produced using specified renewable energy sources can be reported as zero emission electricity by an Associate Member provided the Associate Member provides documented evidence that the electricity is produced solely for the Associate Member or is otherwise dedicated to the Associate Member. Electricity produced by the following Renewable Electricity Production Systems shall qualify under this provision:

- Solar
- Hydropower

- Wind
- Renewable Fuels, which, for purposes of CCX are:
 - wood, wood wastes and wood-derived fuels¹
 - agricultural residues and grasses
 - landfill and agricultural methane
 - ethanol (bioalcohol) and biodiesel

Documentary evidence that electricity is produced solely for the Associate Member or is otherwise dedicated to the Associate Member may consist of copies of power plant ownership documents, power purchase contracts, and, as specified by CCX, certain renewable energy certificates.

11.2.2 Optional Emissions Inclusion (2007)

Associate Members may elect to include Emissions in other non-U.S. locations.

Associate Members may elect to include Emissions resulting from:

- Daily employee commuting
- Employees' home energy usage
- Employees' personal automobile usage and air travel
- Materials consumption (e.g. paper and food)
- Events such as corporate retreats, annual meetings, etc.

Once an Associate Member has made an election to include optional Emissions, the Associate Member must include the optional Emissions in all subsequent program years.

11.3 Reporting Procedure

Each CCX Associate Member shall submit its annual Emissions report to the Exchange in a manner, format and time prescribed by the Exchange.

An Associate Member must, at a minimum, submit an Emissions report for the program year in which the membership was approved and for all subsequent program years.

11.3.1 Prior Program Years Reporting Election (2007)

At the time of membership approval, an Associate Member may make a one-time election to report its Emissions for program years prior to its membership approval. An Associate Member that elects to report its Emissions for prior program years must submit an annual Emissions report for each elected program year in a manner and time prescribed by the Exchange.

¹ CCX Members may elect to include N₂O and CH₄ emissions associated with fossil fuel and biomass combustion.

11.4 Emissions Audit (2007)

All relevant data, including, but not limited to, underlying calculations, receipts or other evidence used to quantify indirect emissions shall be provided promptly upon request by CCX or the Exchange's Provider of Regulatory Services. CCX requires all data to be reported in English. When source data is not in English, a Member, must, at its own expense, have an English-language version provided.

If an audit of Emissions identifies deficiencies, a follow-up audit may be conducted for the purpose of evaluating proper correction of deficiencies.

11.4.1 Phase I Emissions Audit Alternative (2007)

If an Associate Member is unable to provide the relevant supporting documentation as described in Section 11.4, the Associate Member or CCX, upon determination that the relevant supporting documentation is not adequate for an Emissions category, may elect to access a surcharge on the metric tons of CO₂ reported as Emissions.

The Environmental Compliance Committee will establish a surcharge for each Phase I program year. The surcharge, if applicable, will be assessed on an Associate Member for the current program year based on the greater level of indirect emissions reported for an applicable indirect emissions category by the Associate Member for the current program year or any prior program year.

This Section 11.4.1 will expire at the completion of the 2006 True-up.

11.4.2 Phase II Emissions Audit Requirement (2007)

A requirement of the Phase II program for all Associate Members is an annual audit of all Emission sources by CCX or the Exchange's Provider of Regulatory Services..

11.5 True-up

Subsequent to the end of each calendar year of the CCX program, each Associate Member must True-up its Emissions and Carbon Financial Instrument holdings in accordance with the manner prescribed by the Exchange. CCX will notify each Associate Member of the total quantity of Carbon Financial Instruments that must be acquired and Surrendered for True-up, and each Associate Member will then provide notice to the Exchange indicating which Carbon Financial Instruments Vintage(s) it chooses to Surrender. CFIs that are Surrendered are transferred to the Registry Account Holder's Registry Retirement Account.

Associate Members' Emissions will be rounded up to the nearest hundred metric ton

denomination for True-up purposes. Associate Members with Emissions less than one hundred metric tons must acquire and Surrender at least one CFI in each program year in which they elect or are required to participate.

11.6 Acquiring Carbon Financial Instruments

Associate Members must acquire CFIs to meet their requirements under Section 11.6 in accordance with the requirements of Sections 5.4 through 5.9.

11.7 CCX Registry Account

Associate Members are also Registry Account Holders and are subject to the requirements and privileges of Section 5.3.

Chapter 12 Other Participants (2006)

12.0 Purpose

This Chapter provides the rules governing parties that have registered with the Exchange as Liquidity Providers, Offset Providers and Offset Aggregators (collectively known as “Participant Members”) and Exchange Participants.

12.1 General Provisions

Participant Members and Exchange Participants are subject to the applicable provisions of this Rulebook.

12.2 Liquidity Providers

A Liquidity Provider is an entity or person who trades on the Exchange for reasons other than compliance with CCX Emission Reduction Schedule or indirect emissions offset. A Liquidity Provider may post bids and offers on the CCX Trading Platform subject to the limits established by the Exchange and holdings in the Liquidity Provider’s Registry Account.

A Liquidity Provider must at all times meet the requirements of an Eligible Commercial Entity and Eligible Commercial Participant as defined in paragraph 1a(11) and (12) of the U.S. Commodity Exchange Act and Rulebook Section 2.6.1.

12.3 Offset Providers and Offset Aggregators

Offset Providers must register Exchange Offsets with CCX in accordance with the provisions of Rulebook Chapter 9 and pay the applicable registration fees.

CCX may elect to grant an Offset Provider/Offset Aggregator access to the CCX Trading Platform for the sole purpose of selling its registered Exchange Offsets. An Offset Provider/Offset Aggregator that is granted access to the CCX Trading Platform to sell its registered Exchange Offsets will be subject to the applicable provisions of Rulebook Chapter 5 regarding Trading Platform access and execution.

12.4 Exchange Participants

Exchange Participants establish Registry Accounts for the purpose of purchasing and retiring Carbon Financial Instruments by means of a Cash Transaction in accordance with Rulebook Section 5.9. Exchange Participants are not eligible to sell Carbon Financial Instruments to any CCX Member or non-member party.

During the annual True-Up, CCX will retire all Carbon Financial Instruments in the Registry Accounts of Exchange Participants. All CFIs that are retired are transferred to the Registry

Account Holder's Registry Retirement Account.

Exchange Participants may engage in the purchase and sale of Super Reduction allowances in accordance with Rulebook Section 4.11.2.1.

Chicago Climate Exchange[®]

General Offset Program Provisions

The General Offset Program Provisions provide an overview of the Chicago Climate Exchange (CCX[®]) Offset Program, including project and member qualifications, program principles, rules and governance and CCX Offset Project procedures. The CCX Offset Program Verification Guidance Document and individual CCX Offset Program Protocols can be downloaded by visiting www.theccx.com. Requests for further information or comments may be directed to offsets@theccx.com.

CHICAGO CLIMATE EXCHANGE

General Offset Program Provisions

Updated as of 8/20/2009

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ACRONYMS, TERMS AND DEFINITIONS¹

ANSI	American National Standards Institute
CCX	Chicago Climate Exchange
GHG	Greenhouse Gas
IPCC	Intergovernmental Panel on Climate Change
WBCSD	World Business Council on Sustainable Development
WRI	World Resources Institute

Affected GHG Source, Sink or Reservoir: A GHG Source, Sink or Reservoir influenced by a project activity, through changes in market demand or supply for associated products or services, or through physical displacement. This concept is commonly referred to as leakage.

Authorized Trader: Either an employee or a contracted agent of a CCX Registry Account Holder that is authorized to receive access privileges to the CCX Trading Platform and CCX Registry as determined by the relevant Registry Account Holder.

Baseline Scenario: Hypothetical reference case that best represents the conditions most likely to occur in the absence of a proposed GHG project.

Carbon Financial Instrument: (also referenced herein as “CFI”) A CCX Exchange Allowance (“XA”), Exchange Offset (“XO”), or Exchange Early Action Credit (“XE”) which represents one-hundred metric tons of carbon dioxide and that is issued by CCX to the Registry accounts of CCX Members and are surrendered to the Exchange by Members to annually achieve compliance with the CCX Emission Reduction schedule.

Carbon Sequestration The removal of carbon dioxide from the atmosphere and retention in a terrestrial system (e.g. forests and soils) or in a geologic formation.

Carbon Stock A quantity of carbon stored in soils or biomass, expressed in metric tons carbon dioxide equivalent.

CCX Emission Reduction The quantitative schedule of direct emission reductions that each

¹ Please refer to individual CCX Offset Project Protocols for additional “Acronyms, Terms and Definitions”

Schedule:	CCX Member commits to undertake
CCX Market Period:	The time period during which CCX Registry Account Holders commit to the terms of the CCX Rulebook, as amended from time to time. (2006)
CCX Member:	(also referenced herein as “Members”) include corporations, municipalities and other Entities that emit GHGs from facilities located in countries and regions approved by CCX and commit to the CCX Emission Reduction Schedule for the Phase I and, or Phase II Programs. CCX Members are one of the four classes of CCX Registry Account Holders.
CCX Participant Member:	Offset Providers, Aggregators, Liquidity Providers and intermediaries that trade or transact on CCX but do not have an Emission Reduction Schedule.
CCX Registry Account Holder:	(Also referenced herein as “Registry Account Holder”) is a CCX Member, Associate Member, Participant Member or Exchange Participant.
CCX Registry Account:	A data file in the CCX Registry that provides a record of all holdings and Transfers of CCX Carbon Financial Instruments for each CCX Registry Account Holder.
CCX Registry:	(Also referenced herein as “Registry”) is an electronic database that will serve as the official holder of record and transfer mechanism for Allowances, Offsets and Exchange Early Action Credits owned by CCX Registry Account Holders.
CCX Trading Platform:	An electronic, internet-accessible system for posting and accepting bids to buy and offers to sell CCX Carbon Financial Instrument contracts.
Controlled Greenhouse Gas Source, Sink or Reservoir:	A GHG Source, Sink or Reservoir whose operation is under the direction and influence of the GHG Project Proponent through financial, policy, management or other instruments.
Eligible Commercial Entity:	An entity or person that meets the conditions established in paragraph 1(a)(11) of the U.S. Commodity Exchange Act.
Eligible Offset Projects:	Offset Projects that conform to CCX rules and thus can be registered with CCX, allowing the Project Owner to receive Offsets.
Exchange Allowance:	(also referenced herein as “Allowance”) A tradable Carbon Financial Instrument issued:

- 1) to each CCX Member in accordance with its Emission Baseline and Emission Reduction Schedules;
- 2) to a CCX Member that elects to include electricity purchases as a supplemental reduction objective if such Member reduces electricity purchases beyond the CCX Purchase Reduction Schedule; and,
- 3) to CCX Members in the commercial forestry sector that realize net increases in Carbon Stocks using the model-based accounting approach. (2006)

Exchange Offset:	(also referenced herein as “Offset”) A tradable commodity grouped into lots of 100 metric tons of carbon dioxide equivalent generated by qualifying mitigation GHG projects and registered with CCX by a CCX member.
GHG Project Proponent:	Individual or organization that has overall control and responsibility for a GHG project on the CCX. This could either be the entity that owns the GHG project or an Aggregator.
GHG Project:	Activity or activities that alter the conditions identified in the baseline scenario which cause GHG emission reductions or GHG removal enhancements
GHG Sink:	A physical unit or process that removes a GHG from the atmosphere.
GHG Source:	A physical unit or process that releases a GHG into the atmosphere ² .
Greenhouse Gas (GHG):	Gaseous constituent of the atmosphere, both natural and anthropogenic including carbon dioxide (CO ₂); methane (CH ₄); nitrous oxide (N ₂ O); hydrofluorocarbons (HFCs); perfluorocarbons (PFCs); sulphur hexafluoride (SF ₆) and Ozone Depleting Substances (ODS).
Metric Tons Carbon Dioxide Equivalent (Mt CO₂e):	The quantity of GHGs, expressed in carbon dioxide equivalence, equal to 2,205 pounds. Metric tons of non-CO ₂ GHGs are converted using the IPCC 100 year global warming potential conversion factors.

² As defined in ISO 14064-2: Specification with guidance at the project level for quantification, monitoring, and reporting of GHG emission reduction or removal enhancements

Offset Aggregator:	A Participant Member that serves as an administrative representative, on behalf of Project Owners, of multiple CCX-qualifying Exchange Offset Projects..
Offset Project Protocol:	CCX standardized rules for implementing Offset Projects and issuing Offsets.
Offset Project:	CCX-registered project that is issued Offsets in reflection of the amount by which the project reduces, sequesters, or avoids GHG emissions according to CCX Offset Project Protocols and CCX General Offset Program Guidelines. Also referred to as a “Project”.
Offset Provider:	May be a Project implementer or a CCX-registered Aggregator, that registers CCX-eligible Projects with the Exchange and can sell Offsets.
Pooled Projects:	The multiple Projects that are represented in CCX by a single Aggregator.
Project Category:	A grouping of functionally similar Projects. The following are examples of CCX Project categories: Methane Projects; Forestry Projects, Soil Carbon Projects.
Project Owner:	The entity that is the legal owner of Offsets produced by a CCX-eligible registered Project. A Project Owner may represent one or more ultimate owners of Offsets produced by one or more Projects.
Provider of Regulatory Services:	An entity designated by the Exchange to: audit Emission Baselines, annual True-up and Offset Project verifications; provide market oversight and compliance procedures; and utilize market surveillance technologies to monitor trading activity and prevent fraud and manipulation.
Related GHG Source, Sink or Reservoir:	A GHG Source, Sink or Reservoir that has material or energy flows into, out of, or within the project.
Validation:	CCX projects are validated using one of two methods: (1) Projects that adhere strictly to the requirements of CCX protocol are validated by CCX staff and do not require a separate Validation by CCX Offsets Committee. (2) Projects seeking to deviate from specific components of a standardized protocol are subject to approval of either the CCX Offsets Committee or CCX Forestry Committee.
Verification:	Systematic, independent, and documented process for evaluation of

a GHG assertion against agreed verification criteria.

Verifier:

An entity that is approved by CCX to conduct verification of CCX Exchange Offset Projects. With the exception of certain small Projects, each Project Registration Filing and Periodic Project Report must be accompanied by a verification statement signed by a CCX-Approved Verifier.

1. CCX OFFSETS PROGRAM OVERVIEW

1.1 Introduction

In 2007 the Intergovernmental Panel on Climate Change (IPCC) identified approximately three dozen currently viable Greenhouse Gas (GHG) mitigation actions, many of which can be implemented at low or negative cost.³ At least half of these mitigation options are not natural for inclusion under the “cap” portion of a cap-and-trade system due to legal, social, institutional or technical reasons. Instead, these mitigation actions are most appropriately activated through the incentives provided by an offset project crediting system. Every Chicago Climate Exchange (CCX) Offset Project advances a “currently viable” mitigation action identified in the IPCC report.

This document provides the general provisions governing the CCX Offsets Program and the development of CCX Offset Project Protocols, Validation, Verification, and Registration of Offset Projects at CCX. Project specific protocol guidance can be found in the individual CCX Offset Project Protocols.

CCX regularly receives creative and environmentally important proposals to allow new project types to earn Offsets. The procedures used to assess these proposals as candidates for now offset project types are also described in this document.

1.2 General Qualifications

Offset Projects can be registered at CCX directly by the Project Owner (as Offset Provider) or through a CCX Offset Aggregator. An Offset Provider is an owner of a registered Offset Project that sells the Project’s Offsets directly on the CCX Trading Platform. Offset Aggregators may serve as administrative agents for multiple small Project Owners in order to minimize transaction costs. Aggregators manage project documentation, arrange for independent verification by CCX-Approved Verifiers, conduct market trades on behalf of Project Owners, and distribute sales proceeds back to the Project Owners.

Entities wishing to register eligible Offset Projects with CCX must first qualify as a CCX Member, Offset Provider or Offset Aggregator. Any entity with an emissions profile of greater than **10,000** metric tons CO₂ equivalent (Mt CO₂e) annually must join as a CCX Member and must commit to the Emissions Reduction Schedule as provided in the CCX Rulebook, prior to registering Offsets with the Exchange.⁴ Emission reductions realized at facilities that are included in a Member’s CCX emission inventory are not Offset Projects as

³ Intergovernmental Panel on Climate Change, 2007, Contribution of Working Group III to the Fourth Assessment Report of the IPCC, available at <http://www.ipcc.ch/pdf/assessment-report/ar4/wg3/ar4-wg3-spm.pdf>

⁴ Governmental entities with direct emissions below 25,000 metric tons of CO₂ equivalent annually are allowed to register CCX-eligible landfill methane offset projects without having to commit to the CCX reduction schedule. Further details on this provision are provided in the Protocol for Landfill Methane Offset Projects.

they cause a decrease in recognized emissions and a decrease in the number of Carbon Financial Instrument (CFI™) contracts needed for compliance.

1.3 Ownership

CCX will not accept registration of Offset Projects that are owned by an entity that is eligible to be a CCX Member but is not a member. This prohibition also extends to entities that may have no direct ownership but have a beneficial interest in such Offset Project(s). A CCX Member that is a partial Owner of an eligible Offset Project may register with CCX its legally-owned portion of the Offsets from the Project, regardless of whether the other Owner(s) of the Project are CCX Members. For such projects, the CCX Member may register a quantity of Offsets up to the amount that corresponds to its percentage ownership share or beneficial interest of the project.

1.4 Use of Offsets

The quantity of mitigation achieved by each Offset Project shall be quantified on the basis of metric tons of carbon dioxide equivalent (MtCO_{2e}). Each Offset represents one MtCO_{2e}, is registered in lots of 100, and is identified by annual Vintage. The minimum trading unit is one CFI contract.

CCX may issue Offsets on the basis of annual emission mitigation. CCX may also issue Offsets for certain projects more frequently with the submission of the required project verification documentation to CCX. In order to ensure that at least half of the total emission reductions realized through operation of CCX occur at the facilities operated by its Members, CCX rules limit total allowed use of Offsets from CCX Offset Projects for compliance to no more than 50% of required program-wide emission reductions.

1.5 Project Types

CCX, in cooperation with experts from the academic, industrial, government and non-governmental sectors, has developed and continues to establish eligibility and technical criteria for a variety of Offset Project categories. Currently, the following mitigation activities have prescriptive eligibility, evaluation and verification requirements:

- Landfill Methane Collection and Combustion
- Avoided Emissions from Organic Waste Disposal
- Agriculture Methane Collection and Combustion
- Coal Mine Methane Collection and Combustion
- Agricultural Best Management Practices
 - Continuous Conservation Tillage

- Grassland Conversion Soil Carbon Sequestration
- Sustainable Rangeland Soil Carbon Sequestration
- Forest Carbon Sequestration
 - Afforestation and Reforestation
 - Sustainable Forest Management
- Small-Scale Renewable Biogas
- Renewable Energy Systems
- Ozone-Depleting Substance Destruction

In addition to the project types for which CCX has prescriptive protocols, CCX has evaluated and approved several projects using eligibility criteria, evaluation and verification methodologies developed by the United Nations Clean Development Mechanism (CDM).

1.6 Principles of the CCX Offset Program

Since the inception of the CCX Offsets Program in 2003, CCX has established programmatic rules designed to provide easy to understand performance criteria for potential Project Proponents. Such criteria allow CCX and CCX-Approved Verifiers to distinguish best-in-class projects from business-as-usual projects and to reduce the subjectivity of project-specific reviews. CCX weighs a variety of factors related to each potential project type such that eligibility would be based on whether or not a particular category of actions provides the following characteristics:

- Rare (e.g. best-in-class actions)
- Voluntary (e.g. not legally required)
- Recent
- Verifiable
- Properly addresses permanence
- Avoids the creation of perverse incentives that would result in increases in GHG emissions on or off the project site
- Conservative

CCX rules ensure that all of the identified principles outlined in ISO 14064-2 *Specification with guidance at the project level for quantification, monitoring, and reporting of Greenhouse Gas emission reductions or removal enhancements* are adopted for projects to ensure that offsets are issued based upon industry accepted standards. The following summarizes the CCX treatment of these issues:

1.6.1 Relevance

CCX Protocols are designed to balance requirements for adequate documentation and verification of environmental effectiveness with the goal of minimizing transaction costs while maintaining environmental integrity.

1.6.2 Completeness

CCX Protocols are developed to ensure all emissions sources are appropriately included and quantified, project leakage is addressed, negative environmental and social impacts are avoided, and reporting requirements are well-defined.

1.6.3 Consistency

CCX project types obtain consistency through the development and use of standardized protocols and to ensure compatibility with emerging national and international standards.

1.6.4 Accuracy

CCX Protocols are designed to generate unbiased estimates of emission reductions. Emission reduction estimates represent the best available scientific and technical information, as evidenced by peer-review published studies and high-quality research findings.

1.6.5 Transparency

CCX Protocols and verification procedures are designed in a transparent fashion to evaluate and incorporate input from multiple stakeholders. Protocols are designed through a tiered committee, peer review and public comment process. First, frameworks are designed through an expert technical design committee based on peer-reviewed literature and scientific research. If the framework is deemed satisfactory, a protocol is then created after review of the framework by either the CCX Offsets Committee or CCX Forestry Committee. The CCX Offsets Committee or CCX Forestry Committee will provide a recommendation to the CCX Executive Committee for official approval subsequent to the development of a draft protocol. Once approved by the CCX Executive Committee the Protocols are posted on the CCX website and comments for revisions can be submitted to CCX at any time. Responses to public comments are provided in the form of Frequently Asked Question documents, also provided on the CCX website.

1.6.6 Conservativeness

Conservative quantification methodologies are adopted to ensure that accurate estimates will, if any potential deviations occur, undercount the quantity of actual GHG mitigation through the application of discounts to parameters used to calculate offset values.

1.7 General Terms and Conditions

By registering a Project with CCX, each Project Owner acknowledges and agrees to the CCX terms and conditions required by a particular project type, as well as the general terms and conditions provided below:

1. The enrolled Offset Project meets all applicable eligibility rules of the CCX.
2. CCX will issue to the CCX Registry Account of the Project Proponent a quantity of Offsets based on the entire recognized mitigation tonnage approved by CCX and that conforms to CCX Rules, rounded to the nearest 100 metric tons.
3. Each sale of Offsets executed through the CCX shall represent a complete transfer of all legal rights associated with the Offsets sold. The transferred legal rights are those corresponding to the quantity and Vintage of the Offsets issued in accordance with the terms and conditions provided in this section and other applicable Rulebook sections.
4. The Project Proponent may sell or retain the Offsets earned under these provisions.
5. The Project Proponent may elect to deregister the Offsets once registered with CCX. The Project Owner or its CCX Offset Aggregator must deregister Offsets prior to entering into an agreement to sell the associated emission reductions outside of CCX.
6. CCX makes no warranty as to the marketability or market value of CCX Offsets.
7. The Project Owner(s), and, when applicable, the CCX Offset Aggregator, is required to submit a signed Project Verification Report through a CCX-Approved Verifier that confirms conformance with the terms herein. Representatives of CCX may conduct onsite inspection of registered Projects and related documents. Each Project Owner agrees to provide access in such cases in a prompt and cooperative manner. All CCX Offset Projects, Project reports and verification reports are subject to inspection and review by the Provider of Regulatory Services designated by CCX, and by other independent experts as may be engaged by CCX.
8. Failure to conform to the rules provided herein may result in termination of enrollment in CCX and prohibition from all further participation in CCX.

1.8 Role of Aggregators

For-profit entities, cooperatives, governmental bodies and non-profit organizations may act as CCX Offset Aggregators. Eligible entities must apply to become a CCX Offset Aggregator by completing and submitting the applicable CCX forms. CCX Offset Aggregators may charge fees for services they provide to Project Owners. CCX Offset Aggregators shall have the discretion to refuse to represent individual Projects.

CCX Offset Aggregators are assigned an account in the CCX Registry and must meet the Eligible Commercial Entity requirements in order to have access to the CCX Trading

Platform.⁵ A CCX Offset Aggregator shall undertake the following actions on behalf of CCX-registered Offset Projects it represents:

1. Accept initial registration forms from owners of CCX-Eligible Offset Projects.
2. Assemble Project Reports from Project Owners and retain copies of Offset Project verification records.
3. Submit Offsets registration fees to CCX.
4. Have sole authority to access the Registry Account(s) holding the Offsets issued to Projects it represents and to access the CCX Trading Platform as an Authorized Trader.
5. Execute sales on the CCX Trading Platform on behalf of Project Owners and distribute sales proceeds to Project Owners in accordance with the terms agreed between the Aggregator and Project Owners. The terms of the business and legal relationships between Offset Aggregators and Project Owners are left to the discretion of those parties.

1.9 Prevention of Double-Counting

CCX provides a public listing of all registered Offset Projects. CCX requires that all registered Projects attest that they have not been registered in other offsets registries or emissions trading programs for the same crediting period in which they seek to register at CCX. Verifiers must confirm this attestation has been made and search the other known registries (i.e. CDM, RGGI, CAR and VCS, etc.). CCX encourages other offsets registries and emissions trading programs to review the CCX public listing of projects prior to issuance of offsets on their registries. Additional requirements to address double-counting are contained in each of the respective CCX Offset Project Protocols.

⁵ The Eligible Commercial Entity questionnaire is included in the CCX Membership Application

2. RULES AND GOVERNANCE STRUCTURE

2.1 Overview

The CCX Offsets Program is overseen by three standing committees that govern and oversee the rules of the offsets program. The CCX Forestry Committee governs and oversees all issues pertaining to Forestry Carbon Sequestration Offset Projects. The CCX Offsets Committee governs and oversees all issues pertaining to all non-Forestry Carbon Sequestration Offset Projects. The two committees are responsible for protocol development, rule interpretation and refinement, case-by-case review of non-standardized projects, and oversight of technical subcommittees. Recommendations by the CCX Forestry Committee and CCX Offsets Committee for rule modifications and protocol developments are subject to final approval by the CCX Executive Committee prior to being adopted by CCX.

2.2 Committee Member Composition

Members of the CCX Offsets and Forestry Committees are comprised of representatives from CCX members and include academic experts, verification experts, and individuals representing both domestic and international perspectives. All proposed candidates for membership of the CCX Offsets Committee and CCX Forestry Committee are subject to the approval by the CCX Executive Committee. The CCX Offsets Committee and CCX Forestry Committee may also have non-voting advisors to assist them with their responsibilities.

2.3 Protocol Development

CCX may elect to develop a formal, standardized protocol for beyond business-as-usual projects that adhere to best management practices. The design of a draft framework is typically assisted by a technical subcommittee comprised of CCX Members and representatives from governments, non-governmental organizations, academia, and industry experts. Technical subcommittees have been developed to advise on the following protocols:

- Landfill methane collection and combustion
- Agriculture methane collection and combustion
- Avoided methane emissions from organic waste disposal
- Continuous conservation tillage and cropland to grassland conversion
- Sustainable rangeland soil carbon sequestration
- Forestry verification
- Avoided tropical deforestation
- Ozone-depleting substance destruction

2.4 Public Feedback and Protocol Revisions

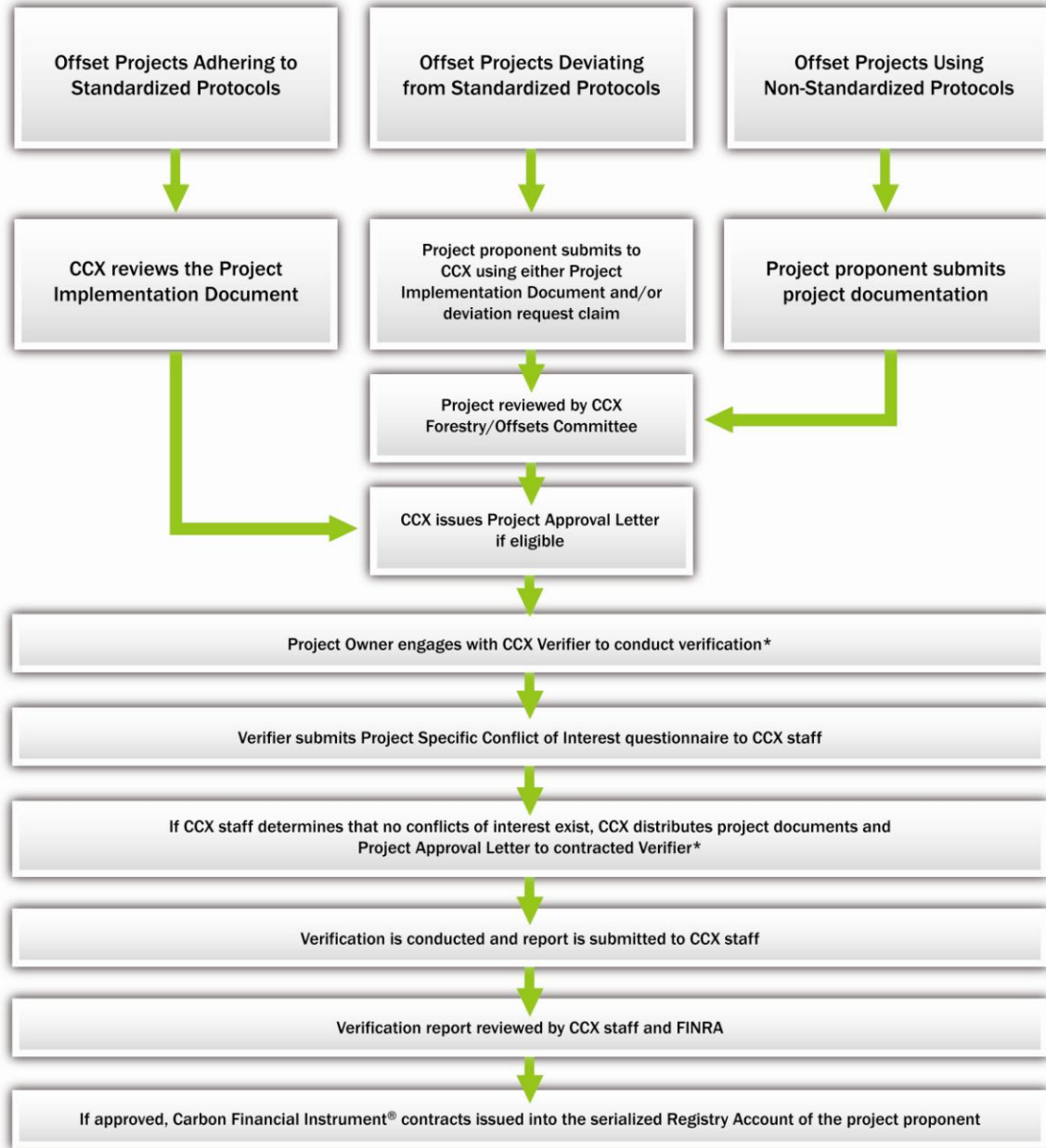
CCX Protocols are available on the CCX website (www.theccx.com) for public review and comment. CCX Protocols are revised regularly by the CCX Offsets and Forestry Committees incorporating input based on the insights gained through practical project-related experience, public feedback, and the emergence of new technologies, scientific information and market regulations.

Individuals wishing to provide feedback on CCX Protocols may submit their comments to offsets@theccx.com.

2.5 Project Validation, Verification, and Registration Procedures

To assure quality and legitimacy of Offsets transacted in CCX, CCX rules require an independent verification report on project eligibility and effectiveness before the exchange will issue Offsets to the Member's CCX Registry account. Every GHG mitigation project enrolled in CCX must be validated as conforming to CCX eligibility standards and undergo independent verification before it can be issued tradable Offsets in the CCX Registry.

The flowchart on the following page provides a summary of the offset registration process in CCX.



Step 1: Determining Eligibility: Project Validation

All projects must submit a CCX Project Implementation Document (PID) or equivalent document. CCX Projects utilizing these guidelines are validated one of two ways. Projects that adhere strictly to the requirements of this protocol are validated by CCX staff and do not require a separate Validation by CCX Offsets Committee. For all Projects seeking to deviate from specific components of this protocol, the Project Proponent must describe the proposed deviation in detail via the deviation request form. Upon receipt and review of the

CCX PID and deviation request, the CCX Offsets Committee will review the feasibility and appropriateness of the requested deviation(s) and, as needed, seek guidance from appropriate technical experts. Project Proponents will be notified of the CCX Offsets Committee decision and shall proceed accordingly.

Regardless of whether a project satisfies the standardized protocol, the Project Proponents have requested a specific deviation approval from an existing standardized protocol, or have requested approval for a new category, all Project Proponents seeking to register a project with CCX must receive a CCX Project Approval Letter prior to initiating verification. Verifiers should request a copy of the letter prior to verification to ensure that the project has been approved by CCX for verification.

Requests for CCX Project Approval Letters should be made through the designated CCX Account Representative or by emailing verification@theccx.com.

Direct Registration

Projects are eligible through “direct registration” provided that they strictly satisfy the standardized requirements of a pre-specified project category with no deviations. Projects that adhere strictly to CCX protocol requirements do not require review by the CCX Offsets or Forestry Committee but are required to obtain a CCX Project Approval Letter from CCX prior to Verification. Eligible categories include:

- Landfill Methane Collection and Combustion
- Avoided Emissions from Organic Waste Disposal
- Agriculture Methane Collection and Combustion
- Coal Mine Methane Collection and Combustion
- Best Management Agricultural Practices
 - Continuous Conservation Tillage
 - Grassland Conversion Soil Carbon Sequestration
 - Sustainable Rangeland Soil Carbon Sequestration
- Afforestation and Reforestation (If using carbon accumulation tables)
 - Sustainable Forest Management
- Small-Scale Renewable Biogas
- Renewable Energy Systems

Committee Approval

Alternatively, projects may be approved as eligible by a CCX governing Committee after the review of the PID. An approval can be granted by either the CCX Offsets Committee or the CCX Forestry Committee. If the project is approved, CCX staff will issue the Project

Proponent a Project Approval Letter with an explicit description of the conditions under which the project was approved.

Committee review is required for all projects that do not adhere strictly to an established CCX offsets protocol and for all projects in the following categories:

- Afforestation / Reforestation (if not using carbon accumulation tables)
- Sustainable Forest Management
- Energy Efficiency
- Fuel Switching
- Projects under an existing eligible category with non-standardized attributes or requests for approval for deviations from the protocol.
- Projects for which a standardized protocol does not exist.

CDM Methodologies

Unless specific circumstances warrant otherwise, CDM-approved projects may be considered CCX-eligible, subject to the terms and conditions provided herein:

1. A crosscheck of the CDM Registry and CCX shall assure that Certified Emission Reductions (CERs) shall only be used for compliance once.
2. Projects that are registered at CDM but have generated emission reductions for the time period prior to their acceptance at CDM, but which adhere to the CDM project standards, may be eligible to register at CCX provided they satisfy the CCX program rules.
3. CDM approval notwithstanding, the following project types are not eligible to be registered on CCX unless the project also satisfies the CCX project methodologies:
 - Hydro power
 - Forestry
 - CDM-approved projects or methodologies that result in net increases in emissions to the atmosphere (e.g. new fossil fuel fired facilities).

Where a project is not CDM approved but uses a CDM project methodology or a methodology other than a CCX Offset Project Protocol, the project must receive an approval by CCX as outlined in this section above.

Step 2: Project Verification

Verification is required of all projects to ensure that the requirements of the applicable protocol, General Provision and Verification Guidance are correctly applied. Project Proponents seeking to register Offset Projects must have the project verified by a CCX-Approved Verifier in accordance with the protocol-specific requirements and General

Provisions outlined in this document before offsets may be issued. A list of Approved Verifiers is found on the CCX website. An additional independent review of the verification report is conducted by the provider of regulatory services designated by CCX to ensure completeness and consistency.

CCX-Approved Verifiers must request approval prior to conducting verification through the following process:

1. Obtaining a copy of the CCX Project Approval Letter from the Project Proponent:

All Projects must have a CCX Project Approval Letter that should be provided to the Verifier ahead of verification to demonstrate project eligibility. Project Proponents seeking approval by CCX must submit a completed PID, outlining the attributes of the project. For projects that use the standardized protocols, CCX will issue the Proponent a CCX Project Approval Letter if the project attributes appear to conform to CCX eligibility requirements. For projects that involve Committee review, any approval will come in the form of a letter. In these instances, the CCX Project Approval Letter will outline the date and conditions of approval and include the PID that was reviewed by the Committee.

2. Receiving CCX approval that no conflicts of interest exist:

CCX-Approved Verifiers must submit the project-specific conflicts-of-interest form, signed by the Verifier and the Project Proponent. This submission also serves as confirmation to CCX that the Project Proponent has given CCX staff permission to disclose project-specific information (e.g. PID, CCX Project Approval Letter etc.) to the prospective Verifier.

Requests for confirmation from CCX should be made through the designated CCX Account Representative or by emailing verification@theccx.com.

CCX retains the right to reject any submitted verification report that does not adhere to this process. Project specific conflicts of interest forms will remain valid through the approval period, provided that no substantive change has occurred in the nature of the relationship between the organizations. If such a change has occurred, a new project specific conflicts of interest form must be submitted.

The cost of the annual verification shall be borne by the Project Proponent. All Project registration documents, verification reports, related documents and documentation of quantification methods shall be subject to inspection and review. Additional provisions governing verification of Offset Projects are provided in the *Chicago Climate Exchange Offset Program Verification Guidance Document*.

Step 3: Project Registration

In order to earn Offsets, the Project Proponent must:

1. Be a CCX Member, CCX Offset Provider or CCX Offset Aggregator.
2. Register the project with CCX.
3. Obtain ongoing independent verification of the project by a CCX-Approved Verifier.

The performance of each project must be quantified and verified in accordance with the provisions of this document. Each Project Proponent must submit their project for verification. Offsets will be issued only if a satisfactory verification report is received by CCX.

Subject to the provisions outlined in this document, Offsets will be recognized as equivalent to Exchange Allowances when surrendered for Compliance. Offsets may be used for compliance in their designated vintage year or in later years. The vintage year assigned to offsets shall correspond to the time period of mitigation realized by the Offset Project in question.

2.6 CCX Serialized Registry

Offset Projects are registered on CCX when Offsets are issued to the Project Proponent's CCX Registry Account. The CCX Registry is a serialized GHG tracking system that provides CCX Registry Account holders a full suite of administration and reporting tools to assist in managing their Allowances and Offsets. The CCX Registry provides full audit trail of each Offset registered on CCX from its creation, transfer through trading, and retirement for compliance.

Additionally, Project Proponents may use their Registry Account to:

1. Manage emissions inventory.
2. Manage CCX Offsets holdings.
3. Search for trades and transfers.
4. Review account statements.
5. Access Member-only information.

Chicago Climate Exchange®

Offset Program Verification Guidance Document

The Offset Program Verification Guidance Document provides an overview of the requirements for verification of Chicago Climate Exchange (CCX®) Offset Projects and describes the roles and responsibilities of CCX-Approved Verifiers. This document is intended to be used in conjunction with project specific verification requirements located within individual CCX Offset Project Protocols. The CCX General Offset Program Provisions and individual CCX Offset Project Protocols can be downloaded by visiting www.theccx.com. Requests for further information or comments may be directed to offsets@theccx.com.

CHICAGO CLIMATE EXCHANGE

Verification Guidance Document

Updated as of 1/21/2010

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ACRONYMS, TERMS AND DEFINITIONS¹

ANSI	American National Standards Institute
CCX	Chicago Climate Exchange
GHG	Greenhouse Gas
IPCC	Intergovernmental Panel on Climate Change
ISO	International Organization of Standardization
WBCSD	World Business Council on Sustainable Development
WRI	World Resources Institute

Approval for Project Verification	Approval provided by CCX to Verifier upon review of a Project-Specific Conflicts of Interest, whereby CCX grants permission for Verifier to provide verification services for a particular project.
Baseline Scenario	Hypothetical reference case that best represents the conditions most likely to occur in the absence of a proposed GHG project.
Exchange Offset:	(also referenced herein as “Offset”) A tradable commodity grouped into lots of 100 metric tons of carbon dioxide equivalent generated by qualifying mitigation GHG projects and registered with CCX by a CCX member.
GHG Assertion	Declaration or factual and objective statement made by the organization that engages the verifier of claimed emission reductions or removal enhancements. The assertion should cover a period of time. The assertion should be clearly identifiable and capable of consistent evaluation and measurement against the CCX rules or project approval conditions.
GHG Project	Activity or activities that alter the conditions identified in the baseline scenario which cause GHG emission reductions or GHG removal enhancements
GHG Project Proponent	Individual or organization that has overall control and responsibility for a GHG project on the CCX. This could either be the entity that

¹ These definitions are either identical or similar to definitions in ISO 14064-3:2006 Specification With Guidance for the Validation and Verification of GHG Assertions.

owns the GHG project or an Aggregator.

Greenhouse Gas (GHG)	Gaseous constituent of the atmosphere, both natural and anthropogenic including carbon dioxide (CO ₂); methane (CH ₄); nitrous oxide (N ₂ O); hydrofluorocarbons (HFCs); perfluorocarbons (PFCs); sulphur hexafluoride (SF ₆) and Ozone Depleting Substances (ODS).
Level of Assurance	The degree of assurance CCX requires in verification. This is used to determine the depth of detail that a verifier designs into their verification plan to determine if there are any material errors, omissions, or misrepresentations. CCX requires a reasonable level of assurance.
Material Discrepancy	Individual or aggregate of actual errors, omissions, and misrepresentations in the GHG assertion that could affect the decision of CCX. Material discrepancy is defined for each CCX protocol in the affiliated protocol documents.
Materiality	Concept that individual or aggregation of errors, omissions, and misrepresentations could affect the GHG assertion and could influence CCX's decision to register the Project. The concept of materiality is used when designing the verification and sampling plans to determine the type of substantive processes used to minimize risk that the verifier will not detect a material discrepancy. The concept of materiality is used to identify information that, if omitted or misstated, would significantly misrepresent a GHG assertion to CCX, thereby influencing the conclusion of CCX. Acceptable materiality is determined by CCX based on the required level of reasonable assurance.
Monitoring	Continuous or periodic assessment of GHG emissions and removals or other GHG-related data.
Offset Aggregator:	A Participant Member that serves as an administrative representative on the CCX for the entity that owns the GHG project.
Offset Project Protocol:	Protocol that outlines the process and requirements for Project Proponents to register GHG emission reductions resulting from the voluntary CCX Offset Project. Otherwise known as "Protocol".
Offset Project:	CCX-registered project that is issued Exchange Offsets in reflection of the amount by which the project reduces, sequesters, or avoids GHG emissions according to CCX rules.
Validation:	CCX projects are validated using one of two methods: (1) Projects that adhere strictly to the requirements of CCX protocol are

validated by CCX staff and do not require a separate Validation by CCX Offsets Committee. (2) Projects seeking to deviate from specific components of a standardized protocol are subject to approval of either the CCX Offsets Committee or CCX Forestry Committee.

Verification Criteria:	Policy, procedure, or requirement established by CCX used as a reference against which evidence is compared.
Verification Statement:	Formal written declaration to the intended user that provides assurance on the statements in the Project Proponents GHG assertion
Verification:	Systematic, independent, and documented process for evaluation of a GHG assertion against agreed verification criteria.
Verifier:	Competent and independent person, or persons, with responsibility for performing and reporting on the verification process.
WRI/WBCSD Protocols:	The GHG calculation tools contained in the “Corporate GHG Accounting and Reporting: Corporate Inventory Module,” found at the website www.ghgprotocol.org , which was developed by the World Resources Institute in conjunction with the World Business Council for Sustainable Development.

1. ROLE OF VERIFICATION IN CCX

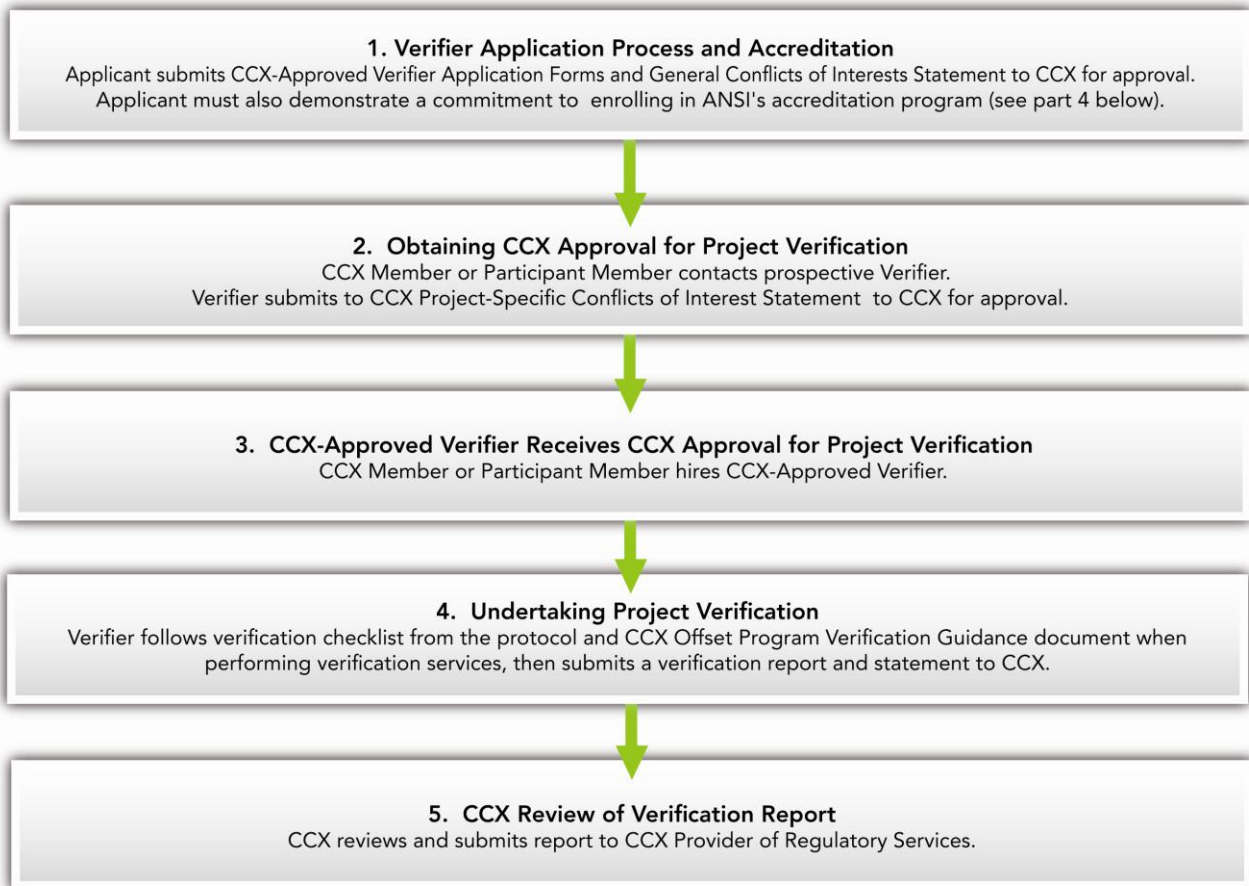
Chicago Climate Exchange (CCX) Offset Projects are subject to initial and annual verification by qualified CCX-Approved Verifiers for the duration of the Project's enrollment in CCX. CCX rules require approved greenhouse gas (GHG) Offset Projects to undergo an independent verification to confirm project eligibility and conformance to the approved Project Implementation Document (PID). CCX project verifications must be conducted and reported in accordance with the principles and requirements outlined in ISO 14064-3:2006, *Specification with Guidance for the Validation and Verification of GHG Assertions*.

The Project Proponent making the GHG assertion is responsible for project conformity to CCX program requirements. The CCX-Approved Verifier is responsible for providing an objective assessment of project eligibility, and for providing a verification statement concerning the Project Proponent's GHG assertion, based on evidence found during the verification. The Verifier shall evaluate the GHG assertion provided by the Project Proponent against the following two guidelines:

1. No errors, omissions, or misrepresentations (i.e., no material discrepancy) exist in the GHG assertion provided by the Project Proponent that would affect the project's eligibility in CCX.
2. The verification activities provide a reasonable level of assurance that the Project Proponent's GHG assertion is materially correct as specified in CCX rules that determine the depth of detail the Verifier must design into their verification plan (i.e., verification requirements of the protocol).

2. CCX OFFSET PROGRAM VERIFICATION OVERVIEW

The flow chart on the following page represents an overview of the process that entities must undergo in order to qualify to perform a verification of a particular CCX Offset Project.



3. CCX VERIFIER APPLICATION PROCESS

Prospective CCX-Approved Verifiers are advised to obtain a copy of the relevant CCX Offset Project Protocols for the project types under which they wish to become accredited by CCX. A detailed understanding of the CCX Offset Protocol requirements is necessary to properly evaluate whether an Offset Project is eligible according to protocol guidelines, and whether the resulting GHG assertion is materially correct. Organizations approved as Designated Operational Entities under the Clean Development Mechanism (CDM), or approved as Verifiers by the Climate Action Reserve, may submit a copy of the application to those programs to satisfy requirements of the corresponding items listed within the CCX-Approved Verifier Application Form.

In addition to submitting the CCX-Approved Verifier Application Form, each prospective Verifier is required to submit a CCX-Approved Verifiers General Statement of Potential or Actual Conflicts of Interest ([Appendix A](#)). The statement outlines any actual or potential conflicts-of-interest that may be created if the organization becomes a CCX-Approved Verifier. Each prospective Verifier will be notified by CCX of their approval or non-approval within one calendar month of submission.

4. CCX VERIFIER ACCREDITATION

CCX is working with the American National Standards Institute (ANSI) to create an accreditation program for third-party verification bodies to evaluate their competency against:

1. The requirements outlined in ISO 14065:2007, *Greenhouse Gases – Requirements for Greenhouse Gas Validation and Verification Bodies for Use in Accreditation or Other Forms of Recognition*.
2. CCX Protocols for Offset Projects.

CCX and ANSI are developing deadlines before which all CCX-Approved Verifiers will have to become accredited by ANSI in order to continue conducting verifications in CCX.² CCX does not accredit individuals as third-party Verifiers. In addition to ANSI, CCX accepts accreditation provided by the ISO Accreditation bodies listed in [Appendix C](#).

5. CCX GHG PROJECTS – DETERMINING ELIGIBILITY

As a first step, Verifiers must confirm that the Project Owner is an eligible entity to register the Offset Project on CCX, and that the project is within a CCX-approved location:

- **Membership Status:** An entity that has an emission profile greater than 10,000 metric tons CO₂ equivalent annually makes it eligible to be a CCX Member. Such entity may register and trade CCX Exchange Offsets only if the entity is a Member of CCX.³
- **Project Location:** Projects located in Annex I countries under the Kyoto Protocol are ineligible, unless explicit approval has been granted by the appropriate CCX committee (on the premise that no double-counting existed towards the Kyoto commitments).⁴ Each of the CCX Protocols has a companion verification guidance and/or checklist document to assist the Verifier and provide guidance in executing the verification.

5.1 Direct Registration

Offset Projects may be eligible for “direct registration” provided that they strictly satisfy the standardized requirements of a pre-specified Project Protocol with no deviations. Project Proponents must submit a PID or equivalent document for the project to be considered for approval. If approved, the Project Proponent will receive an approval letter from CCX, which the project Verifier will confirm as part of the verification process.

² The steps involved in the ANSI Accreditation process are outlined here:

<https://www.ansica.org/wwwversion2/documents/GHGmilestones.pdf>. The process of applying to the ANSI Accreditation program is outlined here: <https://www.ansica.org/wwwversion2/GHGhowtoapply.asp?menuID=200>

³ Subject to certain conditions, governmental entities with direct emissions below 25,000 metric tons of CO₂ equivalent annually are allowed to register CCX-eligible Landfill Methane Offset Projects without having to submit their direct entity emissions to the CCX Reduction Schedule.

⁴ <http://www.theccx.com/info/advisories/2008/2008-01.pdf>

Eligible Offset Project categories include:

- Landfill Methane Capture and Combustion
- Avoided Emissions from Organic Waste Disposal
- Agriculture Methane Capture and Combustion
- Coal Mine Methane Capture and Combustion
- Agricultural Best Management Practices
 - Continuous Conservation Tillage
 - Grassland Conversion Soil Carbon Sequestration
 - Sustainable Rangeland Soil Carbon Sequestration
- Afforestation and Reforestation (if using carbon accumulation tables)
- Renewable Energy Systems
- Ozone-Depleting Substance Destruction
- Select Clean Development Mechanism Project Protocols

5.2 Committee Approval

Projects may become eligible through an approval by a CCX Committee after a review of a PID and other supporting material. An approval will be granted by either the CCX Forestry Committee or the CCX Offsets Committee. If the Project is approved by the Committee, CCX staff will issue to the Project Proponent a CCX Project Approval Letter with an explicit description of the conditions under which the Project was approved.

Committee review occurs for the following categories:

- Afforestation / Reforestation (if not using carbon accumulation tables)
- Sustainably Managed Forests
- Energy Efficiency / Fuel Switching
- Projects for which a standardized protocol does not exist
- Projects with deviations from standardized protocols

6. PROCESS FOR OBTAINING CCX APPROVAL FOR PROJECT VERIFICATION

CCX-Approved Verifiers must request CCX Approval for Project Verification, prior to conducting Verification, through the following process:

- CCX-Approved Verifiers must submit a CCX Project-Specific Conflicts-of-Interest Form, signed by the verifier and Project Proponent, for review in order to conduct the initial verification. A copy of the CCX Project-Specific Conflicts-of-Interest Form is included in Appendix B. This submission also serves as confirmation to CCX that the Project Proponent has given CCX staff permission to disclose project-specific information (e.g. PID and Approval Letter) with the prospective verifier.
- If the conflicts-of-interest disclosure is approved, Verifiers must determine whether the project was approved through a Committee review process. If the project was approved through a Committee, CCX staff will send the Verifier the Committee approval letter outlining the date and conditions under which the Project was approved and the PID that was reviewed by the Committee.

CCX retains the right to reject any GHG project that does not adhere to the above project approval process. If CCX approves the conflicts-of-interest form before conducting the initial verification, the verifier does not need to submit this form to CCX prior to each verification, provided that no substantive changes have occurred in the nature of the relationship between the Verifier and Project Proponent.

Verifiers that have successfully completed ANSI accreditation have satisfied any conflicts of interest requirements and are therefore not required to submit CCX Project-Specific Conflicts-of-Interest Forms.

7. PROCESS FOR UNDERTAKING PROJECT VERIFICATION

7.1 Overview

The objective of the verification is to enable the CCX-Approved Verifier to express an opinion on whether the GHG project meets all applicable criteria and eligibility requirements, and whether the GHG assertion is prepared, in all material respects, in accordance with the CCX program rules. Each of the CCX Protocols contains verification requirements that define materiality thresholds on a protocol-specific basis. CCX staff will provide Verifiers with verification requirements for approved Projects that do not have an affiliated protocol. A discrepancy, or combination of discrepancies, in a GHG assertion is considered to be material if it is probable that CCX's decision to register the project would be changed or influenced by the discrepancies.

7.2 Questions of Materiality

CCX-Approved Verifiers are encouraged to consult with CCX concerning standards of materiality in instances when further interpretation is required beyond what is contained in the CCX rules and verification checklists. CCX staff will either:

- Provide clarification on the item under interpretation
- Consult the appropriate CCX Committee for clarification
- Inform the verifier that further clarification is required between CCX staff and the Project Proponent before verification can proceed. If interpretation is needed for something that is not explicit in CCX rules or in the PID, CCX staff may ask the Project Proponent to submit a deviation request. CCX staff will then review the request internally or bring the request to a Committee for a ruling. CCX staff will inform both the Project Proponent and Verifier in writing once a determination is made.

7.3 Corrective Action

The Verifier has the responsibility to request corrective action from the Project Proponent. Corrective action requests, and the associated corrective actions undertaken by the Project Proponent, should be documented by the Verifier. Corrective action requests should be resolved prior to submitting a verification report to CCX.

7.4 Qualifications / Limiting Conditions

CCX verification reports should not be submitted with qualifications or limiting conditions. Verifiers may address any qualifications or limiting conditions with CCX prior to submitting the assessment and may document the resolution of these qualifications or limiting conditions with CCX in the verification report.

7.5 Verification Report Submittal

Verifiers should submit completed verification reports electronically to the CCX account representative, as well as to the following email account: verification@theccx.com. The final verification report should be reviewed by both the Verifier and Project Proponent prior to submission to CCX signatures must be provided from both parties in the Verification Statement.

7.6 Review of Submitted Verification Reports

If the verification report satisfies the review by CCX staff, the verification report will be submitted to the Provider of Regulatory Services designated by CCX for a quality assurance review. Questions or requested clarifications will be communicated by the Provider of Regulatory Services to CCX staff.

CCX staff will then communicate these directly to the Verifier and, if necessary, the Project Proponent.

If the Provider of Regulatory Services approves the report, they will send the report to the CCX Compliance Department to undertake offset issuance. The CCX Compliance Department will issue the verified Exchange Offsets into the registry account of the CCX Project Proponent and will directly notify the Project Proponent of the issuance.

7.7 Period of Verification Documentation Retention

CCX Verifiers are required to develop and adopt procedures for maintaining confidentiality and safe custody of the verification documentation. Verifiers must retain these documents for a period of at least 5 years.

8. CCX VERIFICATION REPORT AND STATEMENT

Verification reporting requirements by CCX are consistent with those outlined in ISO 14064-3:2006 Annex A.2.9 *Validation and Verification Statement*. The verification report should be formatted in the following form and include the verification statement included in this document:

- An opening or introductory statement including:
 - Identification of the Project Proponent's assertions and CCX Protocol and verification requirements against which the verification was conducted.
 - A statement of the roles and responsibilities of the organization-level or GHG project-level management, and the roles and responsibilities of the Verifier including full contact information.
- A section detailing the scope of the verification work including:
 - Reference to the principles and requirements of the applicable CCX protocol, which may be accompanied by an approved PID, or documented CCX verification requirements against which the verification was conducted.
 - Reference to the verification scope, objectives, and criteria (i.e. project boundaries, period of time in which the reductions occurred and data sources), including the level of assurance required.
 - A description of the work the verification team performed, including the techniques and processes used to test the GHG information and associated GHG assertion prepared by the Project Proponent.
- A section detailing the conclusions containing:

- A reference to the CCX Protocol and approved PID requirements used to prepare the GHG assertion.
 - GHG information and performance verified (e.g. project plan, baseline GHG emissions or removals, emissions reductions, removal enhancements).
 - The level of assurance provided by the verification, consistent with the agreed verification scope, objectives, time period, and criteria assertion.
 - Presentation of the resolution of any qualifications.
 - Conclusions on the GHG assertion.
- A completed CCX verification checklist corresponding to the appropriate project type. The completeness, accuracy, and quality of evidence of each checklist item should be described in this section to ensure that the level of verification was performed such that no material discrepancy exists at the level of assurance required by CCX rules. For each item in the checklist, the Verifier should state the methods by which the criteria were evaluated, including:
 - Review of documentation, records, equipment, data, or measurements.
 - An elaboration of on-site inspections.
 - Interviews and meetings.
 - The identification of and resolution to any corrective action requests.
 - Other relevant evidence utilized by the Verifier to reach their conclusion.
 - A Verification Statement, attached below, containing the statements, signatures, and information in the form outlined in this document.

9. CCX VERIFICATION EVALUATION AND PROJECT PROPONENT AUTHORIZATION

Each verification report submitted to CCX must include the following Verification Statement as provided on the following below.

Verification Statement

This statement confirms that _____ (CCX-Approved Verifier) has evaluated the GHG assertion by _____ (Project Proponent) covering the period from (mm/dd/yy) _____ to _____ (mm/dd/yy) according to the protocols outlined by the Chicago Climate Exchange and that this verification statement is consistent with ISO 14064-3:2006.

_____ (CCX-Approved Verifier) confirms all verification activities as documented in the verification report entitled _____ and dated (mm/dd/yy) _____ are complete and concludes without any qualification or limiting conditions that the GHG assertion by _____ (Project Proponent) is without material discrepancy and that the verification activities provide a reasonable level of assurance as defined by CCX program rules.

The GHG assertion provided by _____ (Project Proponent) has resulted in the removal, emission reduction, or removal enhancement of:

CCX Vintage:	_____	Metric Tons CO ₂ e:	_____
Beginning (mm/dd/yy):	_____		
End (mm/dd/yy):	_____		

CCX Vintage:	_____	Metric Tons CO ₂ e:	_____
Beginning (mm/dd/yy):	_____		
End (mm/dd/yy):	_____		

CCX Vintage:	_____	Metric Tons CO ₂ e:	_____
Beginning (mm/dd/yy):	_____		
End (mm/dd/yy):	_____		

(Repeat for each vintage verified)

Attestation:

_____ Lead Verifier (Print Name)	_____ Senior Internal Reviewer (Print Name)
_____ Lead Verifier (Signature)	_____ Senior Internal Reviewer (Signature)
_____ Title	_____ Title
_____ Date	_____ Date

Project Proponent Authorization:

I, _____ (CCX member), authorize the above-named verifier to submit this Verification Evaluation to the Chicago Climate Exchange.

Member Representative (Print Name)

Member Representative (Signature)

Date (mm/dd/yy)

10. RELATED DOCUMENTS

ISO 14064-3:2006, *Specification with Guidance for the Validation and Verification of GHG Assertions*

ISO 14065:2007, *GHGs – Requirements for GHG Validation and Verification Bodies for Use in Accreditation or Other Forms of Recognition*

Chicago Climate Exchange Offset Project Protocols

Chicago Climate Exchange Rulebook, Chapter 9: CCX Exchange Offsets and Exchange Early Action Credits

Chicago Climate Exchange Rulebook, Chapter 10: Environmental Audits and Offset Project Verification

APPENDIX A: CCX-APPROVED VERIFIERS STATEMENT OF POTENTIAL OR ACTUAL CONFLICTS OF INTEREST

Requirement to Submit a Statement of Conflicts of Interest:

Before a CCX-Approved Verifier begins any verification work for a CCX Member or Participant Member, the CCX-Approved Verifier must submit to CCX a statement of any potential or actual conflicts of interest that may result from undertaking such verification work. The statement shall include proposed steps that may be taken to avoid, mitigate or neutralize the potential or actual conflict of interest. The statement shall be signed by a representative of the CCX Member or Participant Member for which the verification work will be performed. The statement shall also refer to any appearance of conflict of interest that may arise even if this does not lead, in the opinion of the parties signing the statement, to a substantive conflict of interest. CCX Staff shall evaluate statements of potential or actual conflicts of interest on a case-by-case basis and make recommendations on an appropriate course of action.

The CCX-Approved Verifier shall make full disclosure in writing to CCX immediately of any change in circumstances that may lead to the emergence of any conflict of interest in the provision of verification services to any CCX Member or Potential Member for which it is currently providing such services. This disclosure shall include a description of actions taken or that will be taken to avoid, neutralize, or mitigate the actual or potential conflict of interest.

Circumstances that Present an Actual or Potential Conflict of Interest:

Performance of the following services for a CCX Member or Participant Member may result in a conflict of interest for a CCX-Approved Verifier wishing to provide verification services to that CCX Member or Participant Member:

1. Designing, developing, implementing, or maintaining a GHG emissions inventory.
2. Designing or developing GHG information systems.
3. Developing GHG emissions factors or other GHG-related engineering analysis.
4. Designing energy efficiency, renewable energy, or other projects which explicitly identify GHG reductions as a benefit.
5. Preparing or producing GHG-related manuals, handbooks, or procedures specifically for the CCX Member or Participant Member.
6. Appraisal services of GHG liabilities or assets.
7. Brokering in, advising on, or assisting in any way in carbon or GHG-related markets.
8. Management over health, environment and safety functions.

9. Legal and expert services unrelated to verification for CCX purposes.

Conflicts of interest may occur if, in the previous 3 years, the CCX-Approved Verifier, any related organizations such as parent or subsidiary companies or other organizations with which the CCX-Approved Verifier has a long-standing financial or legal relationship, or any of the staff that will be providing the verification services (regardless of whether such staff were employed by the CCX-Approved Verifier at the time) provided any of the services listed above.

In addition, a CCX-Approved Verifier is not allowed to provide any of the services listed above for at least 1 year following the cessation of performance of verification services for the CCX Member or Participant Member.

Currently there is no maximum term for which a CCX-Approved Verifier may provide verification services to a CCX Member or Participant Member. However, in light of SEC rulings and other rules, laws, and regulations, regarding conflicts of interest for auditors and other professionals providing certification and verification services, this position may change.

Other factors that may constitute a conflict of interest include, without limitation:

1. If the CCX-Approved Verifier and the recipient of verification services share any board members or senior management.
2. If there is a financial, functional or structural link (e.g. common ownership, contractual arrangement, or informal contract) between the CCX-Approved Verifier and the recipient of verification services, whether directly or through affiliated organizations (e.g. holding companies, parent companies, subsidiaries, formal partners, affiliates, etc.).
3. If staff and senior management of the CCX-Approved Verifier are involved in any commercial, financial or other processes that might influence their judgment and render it not impartial or not objective.

Process for Evaluating Statement of Conflicts of Interest:

The statement will be evaluated by the CCX Offsets Committee which will recommend a suitable course of action in response to any potential or actual conflicts identified. . The Offsets Committee may request additional information or a personal appearance in order to make their determination.

CCX-Approved Verifier Providing Verification Services

Organization Name:

Organization Website:

Mailing Address:

CCX Member or Participant Member Requesting Verification:

Member Organization Name:

Project Name:

Project Type:

Mailing Address:

Instructions:

- Please print out and complete this form.
- On a separate sheet, please answer the questions in Appendix B.
- Any other papers attached as evidence should be clearly numbered and indexed and attached behind your answer to the questions below.

Please Note:

All information submitted to CCX is strictly confidential.

All questions relating to any CCX-Approved Verifier, CCX Member or Participant Member shall include reference to any other organization with which such CCX-Approved Verifier, CCX Member or Participant Member has a financial, functional or structural link (e.g. common ownership, shared staff and management, contractual arrangement, or informal contract) such as a holding company, parent organization, subsidiary, formal partner or affiliate.

A CCX-Approved Verifier shall be responsible for identification of any form of conflict of interest it may face, even if that type of conflict of interest is not specified in this document.

Appendix B: CCX Project Specific Conflict of Interest Questionnaire

Please respond to all questions:

- Has your organization provided certification or verification services for the above-named CCX Member or Participant Member in connection with CCX or any other GHG trading, registry or other system during the previous three years? If yes, list the years and nature of the verification services provided.
- Has your organization provided any non-verification services of any nature for this CCX Member or Participant Member during the previous three years? Are there any plans or contracts for your organization to continue to provide such services on an ongoing basis or in the future? If yes, what was the nature of the work performed? When was it performed? What was the scale of the work performed in dollars and/or percentage of your organization's revenue?
- Document the structures and procedures in place in your company to identify potential or actual conflicts of interest and to avoid, mitigate or neutralize any potential or actual conflicts of interest identified. Identify steps taken in order to minimize any risks to your company's impartiality.
- Identify all potential sources of conflict of interest that may arise if your organization performs verification services for the above-named CCX Member or Participant Member. If the potential conflict of interest may arise indirectly through an affiliated organization, please describe the nature of that link.
- Please provide a list of names of the staff that may participate in providing verification services to the above-named CCX Member or Participant Members. For these staff, are there any instances of personal or professional relationships or financial interests that may represent a potential conflict of interest? If yes, please detail.
- Provide details about the policies and structures your organization has put in place to avoid, mitigate or neutralize the specific conflicts of interest you have identified related to your organization's provision of verification services to the above-named CCX Member or Participant Member.
- Are there particular reasons why this work should be considered sensitive, highly visible or subject to special scrutiny (e.g., press coverage, special Congressional interest, prior controversy, etc.)?

We hereby warrant the truthfulness of the answers to all questions on this form and the attached statement and documentation and to any other questions that may be asked by CCX or its designated representatives. . We agree to maintain the accuracy and completeness of the information contained in this form and the attached statement and documentation.

We undertake to immediately notify CCX in writing about any material change in any information contained in this form and the attached statement and documentation.

We authorize CCX or its designated representatives to obtain information from sources that they deem appropriate in order to adequately evaluate and process this form and the attached statement and documentation and to ensure the integrity and effective operation of the CCX in the future.

We understand that failure to provide full and accurate information may result in the delay or rendering invalid of any decision made in response to the information contained in this form and the attached statement and documentation.

Signed and accepted by duly authorized representatives of:

_____ CCX-Approved Verifier	_____ CCX Member or Participant Member
_____ Signature of Lead Verifier	_____ Signature
_____ Print Name	_____ Print Name
_____ Title	_____ Title
_____ Date	_____ Date

- | |
|--|
| <ol style="list-style-type: none">1. Completed CCX Conflict of Interest Questionnaire.2. Additional materials attached as evidence, clearly numbered and indexed. |
|--|


APPENDIX B: ISO ACCREDITATION BODIES

Location	Signatory
Argentina	Organismo Argentino de Acreditacion (OAA)
Australia & New Zealand	Joint Accreditation System of Australia and New Zealand (JAS-ANZ)
Austria	Federal Ministry for Economic Affairs and Labor (BMWA)
Belgium	BELAC
Brazil	National Institute of Metrology, Standardization and Industrial Quality (INMETRO)
Canada	Standards Council of Canada (SCC)
China	China National Accreditation Service for Conformity Assessment (CNAS)
Czech Republic	Czech Accreditation Institute, (Český Institut pro Akreditaci, o.p.s.) (CAI)
Denmark	Danish Accreditation (DANAK)
Finland	The Finnish Accreditation Service (FINAS)
France	Comite Francais d'Accreditation (COFRAC)
Germany	German Accreditation Council (DAR) on behalf of - TGA (Traegergemeinschaft fuer Akkreditierung GmbH) - DAP (Deutsches Akkreditierungssystem Pruefwesen GmbH)
Greece	Hellenic Accreditation System (ESYD)
Hong Kong China	Hong Kong Accreditation Service (HKAS)
India	National Accreditation Board for Certification Bodies (NABCB)
Indonesia	Accreditation Body of Indonesia (Komite Akreditasi Nasional) (KAN-BSN)
Ireland	The Irish National Accreditation Board (INAB)
Italy	Sistema Nazionale per l'Accreditamento degli Organsimi di Certificazione (SINCERT)
Japan	The Japan Accreditation Board for Conformity Assessment (JAB)
Republic of Korea	Korea Accreditation Board (KAB)
Republic of Korea	Korean Accreditation System (KAS)
Malaysia	Department of Standards Malaysia (DSM)
México	Mexican Accreditation Entity, (Entidad Mexicana de Acreditacion) (EMA)
Netherlands	Dutch Accreditation Council (Raad Voor Acreditatie) (RvA)
Norway	Norwegian Accreditation (NA)
Philippines	Philippine Accreditation Office (PAO)
Poland	Polish Centre for Accreditation (PCA)
Portugal	Portuguese Institute for Accreditation (IPAC)
Singapore	Singapore Accreditation Council (SAC)
Slovakia	Slovak National Accreditation Service, (Slovenská Národná Akreditačná Sluzba) (Slovakia) (SNAS)
Slovenia	Slovenian Accreditation (SA)
South Africa	South African National Accreditation System (SANAS)
Spain	Entidad Nacional de Acreditacion (ENAC)
Sweden	Swedish Board for Accreditation and Conformity Assessment (SWEDAC)
Switzerland	State Secretariat for Economic Affairs (SECO), Swiss Accreditation Service

	(SAS)
Chinese Taipei	Taiwan Accreditation Foundation (TAF)
Thailand	National Accreditation Council of Thailand, The Office of (NAC)
Turkey	Turkish Accreditation Agency (TURKAK)
United Kingdom	United Kingdom Accreditation Service (UKAS)
USA	American National Standards Institute (ANSI) - American Society for Quality National Accreditation Board (ANAB)

Chicago Climate Exchange®

Forestry Carbon Sequestration Project Protocol



Forestry Carbon Sequestration Projects

The Chicago Climate Exchange (CCX®) Forest Carbon Sequestration Project Protocol contains CCX requirements and guidelines for registering forest carbon offset and commercial forest projects. CCX General Offsets Program Provisions, CCX Offset Project Verification Guidance Document and CCX Offset Project Protocols can be downloaded by visiting www.theccx.com. Requests for further information or comments may be directed to offsets@theccx.com.

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CHICAGO CLIMATE EXCHANGE OFFSET PROJECT PROTOCOL

Forestry Carbon Sequestration Projects

Updated as of 8/20/2009

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Acknowledgements

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CCX Forestry Committee Members:

Robert Fledderman, MeadWestvaco (Chair)
Jim Rakestraw, International Paper (Vice-Chair)
Christoph Bulholzer, Precious Woods
Robert Burke, Lugar Stock Farm
Silvia Gomez Caviglia, Greenoxx Global Environmental Program
David MacFarlane, Michigan State University
David Miller, Agragate Climate Credits Corporation
Rob Olszewski, Plum Creek Timber Company
Todd Parker, Delta Institute
Neil Sampson, National Carbon Offset Coalition (NCOO)
Matt Smith, Forecon EcoMarket Solutions LLC

CCX Forestry Committee Advisors:

Thomas Schmidt, U.S. Forest Service
David Skole, Michigan State University
Gary Kaster, Winrock International
John Shideler, NSF-ISF¹

CCX Forestry Verifier Committee Participants:

John Bennett, SGS
Richard Boitnott, Bureau Veritas Certification
Burl Carraway, Texas Forest Service
Mike Ferrucci, NSF-ISR
Adam Gibbon, Rainforest Alliance
Jeffrey Haywood, Rainforest Alliance
Ron Honea, SGS
Robert Hrubes, Scientific Certification Systems
Robin Jolley, American Forest Management
Gary Kaster, Winrock
Christian Kobel, SGS
Kurt Krueger, Larson & McGowin
Alexander McCall, Larson & McGowin
Janice McMahon, Environmental Services, Inc.
Shawn McMahon, Environmental Services, Inc.
Steve Ruddell, First Environment
Martin Schroeder, TUV SUD

¹ Is also a Member of the CCX Forestry Verifier Committee

ACRONYMS, TERMS AND DEFINITIONS²

ANSI	American National Standards Institute
CCX	Chicago Climate Exchange
DBH	Diameter at Breast Height
GHG	Greenhouse Gas
IPCC	Intergovernmental Panel on Climate Change
WBCSD	World Business Council on Sustainable Development
WRI	World Resources Institute

Above-ground Biomass: That part of a plant's cellular substance that is above the ground, i.e. excluding the root system.

Afforestation: A land-use change followed by the establishment of forest on land that has been in a non-forest use for ten (10) years or longer prior to the afforestation.

Annual Removals: The net volume of growing stock trees removed from the inventory during a specified year by harvesting, cultural operations such as timber stand improvement, or land clearing.

Basal Area: The total area, measured in square feet, occupied by tree trunks at breast height.

Breast Height: The height at which forest inventory measurements are taken (four and one-half feet above the base of a tree).

Carbon Stock: A quantity of carbon stored in soils or biomass, expressed in metric tons carbon dioxide equivalent.

Commercial Forestry Members: Entities that have joined CCX as an emitting member undertaking an emissions reduction commitment that are eligible to accrue CFIs from forest carbon stock flux or long-lived wood products.

² Please refer to CCX General Offsets Program Provisions for additional "Acronyms, Terms and Definitions"

- Crown:** The portion of the top of a tree that is harvested but that is not merchantable or weighed.
- DOE Technical Guidelines, Voluntary Reporting of Greenhouse Gases (1605(b)) Program³:** Hereafter referred to as the *US DOE 1605(b) report*. The purpose of the guidelines is to establish the procedures and requirements for filing voluntary reports, and to ensure that the annual reports of GHG emissions, emission reductions, and sequestration activities submitted by corporations, government agencies, non-profit organizations, households, and other private and public entities to submit are complete, reliable, and consistent.
- Down Dead Wood (U.S.):** Woody material that includes logging residue and other coarse dead wood on the ground and larger than 7.5 cm in diameter, and stumps and coarse roots of stumps.⁴
- Forest Carbon Sequestration:** The removal of carbon dioxide from the atmosphere and retention in a forest system.
- Forest floor (U.S.):** Organic material on the floor of the forest that includes fine woody debris up to 7.5 cm in diameter, tree litter, humus, and fine roots in the organic forest floor layer above mineral soil.⁵
- Forest Land (U.S)⁶:** Land at least 10 percent stocked by forest trees of any size, or formerly having had such tree cover, and not currently developed for nonforest use. (Note: Stocking is measured by comparing specified standards with basal area and/or number of trees, age or size, and spacing.) The minimum area for classification of forest land is 1 acre. Roadside, streamside, and windbreak strips of timber must have a crown width of at least 120 feet to qualify as forest land. Unimproved roads and trails or clearings in forest areas shall be classed as forest if less than 120 feet wide. Water bodies (rivers, streams, or lakes) less than 30 feet in width shall be classed as forest if less than 30 feet wide. Water bodies more than 30 feet in width are classified as water.
- A classification of forest land based on the species forming a plurality of live tree stocking. The associated species for each forest type are based on

³ US DOE 1605b Report: <http://www.eia.doe.gov/oiaf/1605/gdlins.html> (January 2007)

⁴ US DOE 1605b Report: <http://www.eia.doe.gov/oiaf/1605/gdlins.html> (January 2007)

⁵ US DOE 1605b Report: <http://www.eia.doe.gov/oiaf/1605/gdlins.html> (January 2007)

⁶ Forest Inventory and Analysis definition by the U.S. Forest Service.

net volume of growing stock by species group. Major forest types are:

- **Nonforest land:** Land that has never supported forests, and land formerly forested where use for timber management is precluded by development for other uses. (Note: Includes areas used for crops, active Christmas tree plantations as indicated by annual shearing, orchards, nurseries, improved pasture, residential areas, city parks, improved roads of any width and adjoining clearings, powerline clearings of any width, and 1- to 40-acre areas of water classified by the Bureau of the Census as land.) If intermingled in forest areas, unimproved roads and nonforest strips must be more than 120 feet wide and more than 1 acre in area to qualify as nonforest land.
- **Nonforest land without trees:** Nonforest land with no live trees present.
- **Nonforest land with trees:** Nonforest land with one or more trees per acre at least 5 inches d.b.h.
- **Nonstocked land:** Timberland less than 10 percent stocked with all live trees.
- **Other forest land:** Forest land not capable of producing 20 cubic feet per acre per year of industrial wood crops under natural conditions and not associated with urban or rural development. Many of these sites contain tree species that are not currently utilized for industrial wood production or trees of poor form, small size, or inferior quality that are unfit for most industrial products. Unproductivity may be the result of adverse site conditions such as sterile soil, dry climate, poor drainage, high elevation, and rockiness. This land is not withdrawn from timber utilization.

Forest Land (Non-U.S.)⁷:

Forest Land spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10 percent, or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or urban land use.

- Forest is determined both by the presence of trees and the absence of other predominant land uses. The trees should be able to reach a minimum height of 5 meters in situ. Areas under reforestation that have not yet reached but are expected to reach a canopy cover of 10 percent and a tree height of 5 m are included, as are temporarily

⁷ Food and Agriculture Organization (FAO) of the United Nations – Forestry Department: Global Forest Resources Assessment Update 2005, Terms and Definitions, p.16(34), Rome 2004 <http://www.fao.org/forestry/media/7797/1/0/>

unstocked areas, resulting from human intervention or natural causes, which are expected to regenerate.

- Includes areas with bamboo and palms provided that height and canopy cover criteria are met.
- Includes forest roads, firebreaks and other small open areas; forest in national parks, nature reserves and other protected areas such as those of specific scientific, historical, cultural or spiritual interest.
- Includes windbreaks, shelterbelts and corridors of trees with an area of more than 0.5 ha and width of more than 20 m.
- Includes plantations primarily used for forestry or protection purposes, such as rubberwood plantations and cork oak stands.
- Excludes tree stands in agricultural production systems, for example in fruit plantations and agroforestry systems. The term also excludes trees in urban parks and gardens.⁸
- **Other Wooded Land⁹:** Land not classified as Forest, spanning more than 0.5 hectares; with trees higher than 5 meters and a canopy cover of - 10 percent, or trees able to each these thresholds in situ; or with a combined cover of shrubs, bushes and trees above 10 percent. It does not include land that is predominantly under agricultural or urban land use.

Gross Growth: Annual increase in volume of trees at least 5.0 inches d.b.h. in the absence of cutting and mortality. (Gross growth includes survivor growth, ingrowth, growth on ingrowth, growth on removals before removal, and growth on mortality before death).

Live Trees: Live trees refers to: “Live trees with diameter at breast height (d.b.h.) of at least 2.5 cm (1 inch), including carbon mass of coarse roots (greater than 0.2 to 0.5 cm, published distinctions between fine and coarse roots are not always clear), stems, branches, and foliage.”¹⁰

Net Annual Change: Increase or decrease in volume of live trees at least 5.0 inches d.b.h. Net annual change is equal to net annual growth minus average annual

⁸ The term is mainly related to FRA 2005 National Reporting Table T1.

⁹ The term is mainly related to FRA 2005 National Reporting Table T1.

¹⁰ Table 1.1 of the US DOE 1605b Report: <http://www.eia.doe.gov/oiaf/1605/gdlines.html> (January 2007)

removals.

Net Annual Growth:	The average annual net increase in the volume of trees during the period between inventories. Components include the increment in net volume of trees at the beginning of the specific year surviving to its end, plus the net volume of trees reaching the minimum size class during the year, minus the volume of trees that died during the year, and minus the net volume of trees that became cull trees during the year.
PEFC Council:	The PEFC Council (Programme for the Endorsement of Forest Certification schemes) is an independent, non-profit, non-governmental organization, founded in 1999 which promotes Sustainably Managed Forests through independent third party certification. The PEFC provides an assurance mechanism to purchasers of wood and paper products that they are promoting the sustainable management of forests. ¹¹
Pooled Participant:	A landowner or Project Owner that has entered into contract with a CCX Offset Aggregator.
Reforestation:	Reestablishing a forest on land where forest cover has been lost, usually through a severe disturbance that is not the result of intentional management activity or gross negligence, and where the desired forest is not regenerating naturally.
Soil Organic Carbon:	Belowground carbon without coarse roots, but including fine roots and all other organic carbon not included in other pools, to a depth of 1 meter. ¹²
Standing Dead Trees (U.S.):	Standing dead trees with d.b.h. of at least 2.5 cm, including carbon mass of coarse roots, stems, and branches. ¹³
Thinning:	The removal of certain trees in a stand to reduce competition for resources among the trees.
Timber Cruise:	A systematic field measurement of trees for the purpose of establishing a timber inventory.

¹¹ <http://www.pefc.org/internet/html/>

¹² Table 1.1 of the US DOE 1605b Report: <http://www.eia.doe.gov/oiaf/1605/gdlines.html> (January 2007)

¹³ US DOE 1605b Report: <http://www.eia.doe.gov/oiaf/1605/gdlines.html> (January 2007)

1. INTRODUCTION

Chicago Climate Exchange (CCX) is the world's first and North America's only active voluntary, legally binding integrated trading system to reduce emissions of all six major greenhouse gases (GHGs), with Offset Projects worldwide. CCX Members with significant GHG emissions voluntarily enter into a legally binding agreement to reach CCX GHG Emission Reduction Commitment¹⁴. Upon enrollment with CCX, Exchange Allowances are issued to Members in amounts equal to their emission reduction targets. CCX Exchange Offsets are issued to Owners or Aggregators of registered projects on the basis of verified sequestration, destruction or reduction of GHG emissions not included under the CCX Emission Reduction Commitment. Members are required to turn in the amount of Exchange Allowances and/or Exchange Offsets equal their actual GHG emissions annually.

CCX strives to promote transparency and integrity in the carbon market. In accordance with this goal, in developing this document, CCX was guided by the fundamental principles of project GHG accounting outlined in ISO 14064-2: *Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements*, Version 1. These principles include:

- Relevance
- Completeness
- Consistency
- Accuracy
- Transparency
- Conservativeness

The following sections of this Protocol discuss the project criteria, boundaries, monitoring requirements, emissions reduction calculations and other guidelines that each Project Proponent must meet in order to generate Exchange Offsets from Forestry Carbon Sequestration Projects.

2. GENERAL PROVISIONS

Projects are subject to the conditions of this Protocol, the CCX General Offset Program Provisions and determinations of the CCX Forestry Committee. All Project Proponents should review CCX General Offset Program Provisions and CCX Offset Project Protocol for Forestry Carbon Sequestration Offset Projects.

¹⁴ <http://theccx.com/content.jsf?id=72>

3. ASSOCIATED DOCUMENTS

This Protocol references the use of several associated documents. These documents include:

- CCX General Offset Program Provisions
- CCX Project Implementation Document
- CCX Project Specific Conflict of Interest Form
- CCX Greenhouse Gas Emission Factors Form
- CCX Project Ownership Attestation
- CCX General Verification Guideline

These documents are available on the Offsets section of the CCX website: www.theccx.com.

4. PROJECT DEFINITION

Forestry Projects have the potential to make a significant contribution to mitigating climate change and are synergistic with activities promoting adaptation and sustainable development¹⁵. A CCX Forestry Project consists of the sequestration of atmospheric carbon dioxide in defined forest carbon pool in accordance to the eligibility criteria and other requirements outlined in these guidelines.

4.1 Eligible Forestry Carbon Sequestration Project Types

4.1.1 Afforestation / Reforestation Projects

CCX Afforestation and Widely Spaced Tree Planting Projects consist of a land-use change followed by the establishment of forest on land that has been in a non-forest use for ten (10) years or longer prior to the Afforestation. CCX Reforestation Projects consist of reestablishing a forest on land where forest cover has been lost, usually through severe disturbance that is not the result of intentional management activity or gross negligence, and where the desired forest is not regenerating naturally.

CCX Afforestation / Reforestation and Widely Spaced Tree Planting Projects guidelines are available in [section 10](#) of this document.

¹⁵ 2007 Intergovernmental Panel on Climate Change Working Group III Report *Mitigation of Climate Change*, Chapter 9: Forestry.

4.1.2 Sustainably Managed Forest Projects

CCX Sustainably Managed Forest Projects involved sequestration of carbon dioxide through active maintenance or increases in forest carbon stock through sustainable management strategies. Offset Providers or Aggregators seeking to be issued Exchange Offsets from Long-Lived Wood Products (LLWP) must enroll the net change in their Forest Carbon Stock in the Sustainably Managed Forest Protocol to be eligible. CCX Sustainably Managed Forest Projects guidelines are available in [section 11](#) of this document.

5. ELIGIBILITY CRITERIA

Several factors determine a Project's eligibility for generating Exchange Offsets including the Proponent's membership status, ownership status, project start date, location and whether the project meets the CCX performance benchmark. Project Proponents should submit the CCX Project Implementation Document for review and determination of eligibility.

5.1 CCX Membership

The Project Proponent(s) must be a Member or Participant Member (Offset Provider or Aggregator) of CCX. For-profit entities, cooperatives, governmental bodies and non-profit organizations may act as CCX Offset Aggregators. An Aggregator serves as an administrative representative, on behalf of Project Owners, of one or more projects. Forestry Offset Aggregators are responsible for maintaining a database of Pooled Participant records and maintaining accurate records of enrolled Projects' forest inventories. Project Proponents should contact CCX directly for membership rules and information.

5.2 Eligibility Governing Entities with Minor Emissions

Entities with an entity-wide emissions profile greater than 10,000 metric tons of carbon dioxide equivalent (Mt CO_{2e}) for the most recent calendar year may register and trade CCX Exchange Offsets only if the entity is a Member of CCX and undertakes the CCX Emission Reduction Commitment. For specific guidance on this provision, Project Proponents should review CCX General Offset Program Provisions.

Entities who are unsure of their emissions profile should estimate their direct CO₂ emission using well accepted methodologies such as those available at the World Resources Institute (WRI)/World Business Council on Sustainable Development (WBCSD). CCX requires that all entities that are not Members, including producers enrolled with Aggregators, provide an attestation relating to their direct emissions in a the Project Ownership Attestation Form.

Project Emissions shall be calculated in accordance with the CCX Project Emissions Guidance Document. Fossil fuel emissions factors are available at http://www.theccx.com/docs/misc/GHG_Emission_Factors.pdf.

For specific guidance on this provision, Project Proponents should review the CCX General Offset Program Provisions.

5.3 Ownership and Control

The Project Owner must demonstrate clear ownership of the GHG mitigation rights associated with the project in order to register the offsets with CCX.

CCX Offset Aggregators must demonstrate to the project's CCX-Approved Verifier and CCX that they have acquired rights for trading of CCX Exchange Offsets associated with the project activity in order to execute its responsibilities on CCX pursuant to CCX General Offset Program Provisions. This may be demonstrated in the contract from the Project Owner providing the Aggregator the rights to register and trade Offsets on behalf of the Project Owner.

Project Proponents may satisfy the requirement of ownership of GHG mitigation rights by demonstrating that they own the land on which the project is enrolled. Acceptable documentation for legal ownership by participants may include a property deeds, tax receipts from the most recent calendar year, or a title or abstract to the property. Pooled Participants represented by an Aggregator can satisfy this requirement by having the ownership declared by the Pooled Participant in the contract with their Aggregator.

Project Proponents may enroll Carbon Stocks on leased land provided that there is a signed agreement between the Pooled Participant and lessor concerning ownership of the GHG rights on the leased land. For leased land, the Verifier is responsible for reviewing and establishing land ownership by the lessee, the lease agreement between the lessee and lessor, and the signed agreement between the Pooled Participant (lessee) and lessor establishing the ownership of forest carbon on the leased land. Pooled Participants represented by an Aggregator can satisfy this requirement by including a signed statement by the lessee in the contract filing attesting to these requirements.

If the lessor is represented by an Aggregator and the lease arrangement is less than 15 years from the CCX enrollment date, the lessee is responsible for signing a contract with the Aggregator ensuring that the land will satisfy the permanence requirement described in [Section 9](#).

Acceptable requirements for establishing ownership for projects located in non-Annex I countries as defined under the Kyoto Protocol will be evaluated on a case-by-case basis by the CCX Forestry Committee.

5.3.1 Land Acquisition/Disposition Rules

The quantification of changes in Carbon Stocks will be adjusted to reflect acquisition or disposition of forested land. Each Member shall report any acquisitions and dispositions of forested land to the contracted CCX-Approved Verifier in the immediate verification subsequent to the transaction. The report shall state any retrospective adjustments to be made in net changes in the Member's Carbon Stocks as a result of the transaction. Examples of accounting for land acquisition and disposition are included as [Appendix D](#).

5.3.1.1 Land Acquisition

When forested land is acquired, the enrolled landowner may include eligible forest carbon accumulation provided that it meets all of the criteria set forth in this document. When forest parcels are purchased, the carbon stocks on the purchased forest are not credited as growth for remainder of the calendar year in the year that they were purchased, but are added into the baseline at the end of the calendar year of purchase so that the net growth may be credited in subsequent years. A Member shall not be issued CFI's for increases or decreases in Carbon Stocks prior to this year.

Following the acquisition of forested land, a forest inventory shall be conducted and the corresponding Carbon Stocks quantified. A baseline for acquired land is established as December 31 for the year in which it was acquired. Thus, the baseline for the project for the first complete calendar year subsequent to the year this new land was acquired will equal the sum of the baseline for the lands previously owned and for lands newly acquired.

Projected annual changes in Carbon Stocks reported to CCX shall be adjusted to take account of the projected changes in Carbon Stocks on the land acquired for the first full CCX program year subsequent to when it was acquired. Members shall be issued or shall surrender CFIs for increases or decreases in Carbon Stocks on that land through the current CCX Market Period for which the project is enrolled.

5.3.1.2 Land Disposition

If forested land is disposed by a land owner, then the Offset Provider or Aggregator will be penalized by the total amount of Offsets issued by CCX for sequestered carbon from those acres for entire length of time that the land has been enrolled in the program. In such cases, the Member shall surrender an amount of CFIs equivalent to the amount issued to that Member in previous years on the basis of the increase in Carbon Stocks on that parcel of forested land.

Disposition by a Member of a parcel of forested land on which there had been a net reduction in Carbon Stocks between the baseline and the time of its disposition will not result in any adjustments to the net reduction.

Following the disposition of forested land, projected annual changes in Carbon Stocks reported to CCX shall be adjusted to take account of the disposition. A Member shall not be issued or shall not surrender CFIs for increases or decreases in Carbon Stocks on forested land after the date of its disposition.

5.3.1.2.1 Implications of Purchaser on Land Disposed by CCX Member

For all forestry projects, the Member will not be required to surrender accrued CFIs on the disposed land only if the purchaser of the land meets the following conditions on an annual basis:

1. Enrolls the acquired land in CCX as per the CCX Forestry Carbon Sequestration Offset Project Protocol; or
2. Maintains certification for sustainable forest management on the acquired land under a CCX-approved sustainable forest certification standard through the CCX market period; and satisfies **one** of the following criteria:
 - a. Signs an attestation that Carbon Stocks are non-decreasing on this parcel from the time of purchase through the end of the CCX Market Period.
 - b. The CCX Member is able to verify through remote sensing techniques that Carbon Stocks on the purchased land are non-decreasing on this parcel from the time of purchase through the end of the CCX Market Period.
 - c. The CCX Forestry Committee may consider acceptable alternatives to b) and c) on a case-by-case basis. Acceptable alternatives may include requiring a percentage of the accrued CFIs to be surrendered.

5.3.1.3 Anticipated Land Disposition for Commercial Forestry Members

CCX Commercial Forestry Members that have identified beforehand that they intend to dispose forest land after the CCX commitment period will still be required to enroll all of their land in the Program should they elect to be issued CFIs for their forest carbon flux. However, the CCX Member can request the creation of two separate accounts for accounting purposes for land that is anticipated to be sold and land that is not anticipated to be sold. When the anticipated land is eventually sold, CFIs and Super Reductions that have been issued for net carbon increases on this land will be treated under existing rules governing land disposition.

5.3.2 Prevention of Double-Counting

Project Proponents that have enrolled Forest Carbon Stocks are not permitted to either register or sell Forest Carbon Stocks from the corresponding land and time period either over-the-counter, through other GHG registries, programs, or standards, or within CCX through a different Aggregator. To ensure this for aggregated projects, contracts between Aggregators and Pooled Participants must explicitly state that the Forest Carbon Stocks from the enrolled land and time period are being exclusively registered and sold on CCX through that Aggregator.

5.3.3 Required Contract Conditions for Aggregated Projects

Contracts signed between Aggregators and Pooled Participants must stipulate the following conditions that the Pooled Participant will adhere to. These are described in more detail later in the Protocol:

- A 15 year commitment to maintain the land as a forest (if the forest is sustainably managed, then this must be a 15 year commitment to maintain the forest as sustainably certified by a CCX-approved standard) from the date of enrollment.
- A declaration that they own the land under which the forest carbon stocks are enrolled. If the land is leased, then either appropriate documentation of the ownership carbon rights must be provided to the Pooled Participant (outlined below) or the lessee can sign a statement the Aggregator stipulating the ownership of the carbon rights.
- A declaration that the GHG mitigation rights are exclusively being sold through that Aggregator on CCX (i.e., they are not being sold through another registry or program, over-the-counter, or through another Aggregator on CCX).
- For Sustainably Managed Forests Projects, a declaration that they are enrolling all entity-owned land except for exemptions explicitly granted by the CCX Forestry Committee.
- A declaration by the Pooled Participant that they have read and understand the CCX Project Guidelines for Forestry and will accurately report harvest information, land acquisition and disposition, and forest land impacted by a catastrophic loss.
- A declaration that the Pooled Participant's entity-owned emissions are less than 10,000 Mt CO_{2e} per year.
- A declaration concerning any increase in GHG emissions due to project activity that may have occurred as a result of the project.
- A declaration that the project is not required by law or other legally-binding, enforceable agreement.
- The letter-of-intent to maintain the land in a forest beyond the CCX Market Period.

5.4 Project Start Date

Projects must start on or after January 1, 2003, which corresponds with the beginning of the CCX cap and trade program.

5.5 Project Location

Forestry projects shall be located either in the United States or in a country designated as a non-Annex I country under the Kyoto Protocol.

5.6 Eligible Carbon Pools

CCX Exchange Offsets are issued on the basis of increases in Carbon Stocks of enrolled project lands in:

- Above-ground biomass.
- Below-ground biomass.
- Soil organic carbon.
- Standing dead trees.
- Down dead wood.
- Forest floor portions.
- LLWPs are an eligible carbon pool for Sustainably Managed Forest Projects.
- Acceptable methods for the inclusion of coarse roots in the United States are defined in Jenkins JC, Chojnacky DC, Heath LS, Birdsey RA (2003) National-Scale Biomass Estimators for United States Tree Species. *Forest Science* 49(1):12-35.
- Acceptable methods for the inclusion of below-ground biomass for regions outside of the United States are defined in Cairns M, Brown S, Helmer E, Baumgartner G (1997) Root Biomass Allocation in the World's Upland Forests. *Oecologia* 111: 1-11.

The CCX Forestry Committee may consider and approve additional methods for quantification of carbon pools.

5.7 Performance Benchmark

Forestry Carbon Sequestration projects are not eligible to generate Exchange Offsets in instances where the forestry project can be considered a standard business practice (i.e. business as usual) or is required by law or other legally binding framework. CCX has identified two performance criteria that projects must meet to be considered for Exchange Offset issuance.

5.7.1 Additionality

CCX has adopted a “base year” procedure to ensure forestry project additionality. Natural ecosystem dynamics and unpredictable future management make projections of what may happen in the future highly speculative. Project Owners make land-use management decisions, such as planting, harvesting, and other silvicultural practices, to manage the health of forest land continuously on a daily basis. These actions can also be easily reversed and the discontinuation of the practices can result in loss of carbon stored in forests.

To comply with CCX forestry guidelines, Project Owners must make voluntary, legally binding commitments to sequester additional carbon in their forests. The basis for measurement of additional carbon is based on the baseline inventory established at the beginning of the project. The Project Owner is credited when the forest generates positive amounts of carbon above their baseline inventory and debited if the forest is managed in a manner that leads a reduction in stored carbon.

CCX has identified the following additionality tests that projects must pass to be considered for Exchange Offset issuance.

5.7.1.1 Regulatory Criteria

In order to be eligible to generate Exchange Offsets under these guidelines, forestry carbon projects must be voluntary. The project shall not be required by law under any federal, state or local regulations or other legally binding framework or enforceable agreement. For projects located outside the United States, the project shall not be required under any enforceable regulation or agreement.

Pooled Participants of Aggregated Projects are required to declare that the project is not required by law or other legally-binding, enforceable agreement in the contract with the Aggregator. For non-Aggregated Projects, the Project Proponent shall sign an attestation stating that the project is not required under any federal, state, or local regulation or other legally binding framework.

5.7.1.2 Common Practice Criteria

According to the GHG Protocol for Project Accounting, “*Common practice refers to the predominant technologies or practices in a given market, as determined by the degree to which*

those technologies or practices have penetrated the market (defined by a specified geographic area).¹⁶

Plantings for Afforestation and Widely-Spaced Tree projects must have occurred on or after January 1, 2003 on land that had been in a non-forest use for ten years or longer prior to the land being afforested. Methods by which to verify the length of time that the land has been out of forest cover include satellite or photo imagery, federal crop records, or other evidence deemed acceptable by the Verifier. Plantings for Reforestation projects must have occurred on or after January 1, 2003 on land where forest cover has been lost, usually through a severe disturbance that is not the result of intentional management activity or gross negligence, and where the desired forest is not regenerating naturally. These planting dates correspond to the beginning of the CCX cap-and-trade program.

Sustainably Managed Forest projects may be eligible irrespective of the planting date. Evidence of sustainable forest management through certification from a CCX approved standard (see [Appendix E](#)) for each year of enrollment is required. Non compliance to this requirement may result in the cancellation of issued carbon from the Members account. This additionality requirement ensures that the health and ecological function of the forest is maintained, that the management supports socioeconomic and biodiversity principles, and that the lands have been certified beyond business-as-usual management practices.

6. PROJECT BOUNDARY

The Project Boundary includes all entity-owned forest lands of the Project Proponent or entity being represented by the Project Proponent. Exceptions to this requirement are contained in [Section 6.1.3](#) Affected GHG Sources and Sinks, otherwise known as Project Leakage.

6.1 Identification of GHG Sources, Sinks and Reservoirs

ISO 14064-2 requires that the project's GHG Sources and Sinks be categorized as controlled by the Project Proponent, related to the project, or affected by the project. These are discussed below.

6.1.1 Controlled GHG Sources and Sinks

Controlled GHG Sources and Sinks for Forestry Carbon Sequestration Offset Projects are those that occur within the Project Boundary. Therefore, controlled GHG Sources and Sinks

¹⁶ World Resources Institute and World Business Council for Sustainable Development. 2005. *The Greenhouse Gas Protocol for Project Accounting*. WRI/WBCSD, Washington, D.C.

for forestry projects refer to those that are part of the forest planting, management, measurement and monitoring practices.

6.1.2 Related GHG Sources and Sinks

Related GHG Sources and Sinks for Forestry Carbon Sequestration Offset Projects refer to those that have material or energy flows into or out of the project.

6.1.3 Affected GHG Sources and Sinks

Affected GHG Sources and Sinks are those that are influenced by the forestry project and result in new or changed activities outside the boundary of the project that actually increase GHG emissions. This concept is commonly referred to as Leakage. Project Leakage is defined as new or changed activities that result in a decrease or increase in GHG emissions outside of the project's accounting boundary. CCX does not expect forestry projects to result in new or changed activities that change GHG emissions outside of the project boundary, and therefore, no project-specific leakage assessment is required.

The sections 10.6 and 11.6 outline rules governing the definition of project boundaries for Afforestation / Reforestation and Sustainably Managed Forests Project Owners, respectively.

6.2 Determining the Baseline Scenario

In accordance with the process outlined in ISO 14064-2, a baseline scenario assessment is required for each forestry carbon project. The baseline is established as the Forest Carbon Stock in the enrolled parcels on December 31 of the year preceding their registration. Members are eligible to earn Offsets based on verified documentation of net changes in Forest Carbon Stocks from the baseline year. Project documentation must present sufficient data on forest inventories and management activities on enrolled forest land while establishing the baseline for the approved quantification methodology.

Acceptable methodologies for establishing the baseline include direct measurement and approved remote sensing technology. In order to encourage high-quality inventories, smaller discounts are applied to projects with a higher degree of accuracy for a given level of precision. This is elaborated in [Section 11.5.3](#). All methodologies for establishing the baseline are subject to approval by the CCX Forestry Committee.

6.3 Project Emissions

CCX considers direct project emissions as resulting from the use of the combustion of fossil fuel and mobile source emissions resulting from the use of equipment to implement Afforestation / Reforestation and sustainable forest management projects.

7. QUANTIFYING EMISSION REDUCTIONS

CCX approaches for quantifying GHG emission reductions from Forestry Carbon Sequestration Projects are provided in project type-specific subsequent sections,

- [Section 10.5](#) for Afforestation, Reforestation and Widely Spaced Tree Plantings.
- [Section 11.5](#) for Sustainably Managed Forestry Projects.
- [Section 12.2](#) for Long-Lived Wood Products.

8. PROJECT PERMANENCE

To address uncertainty in the permanence of carbon sequestration in forestry projects, Project Proponents shall be required to:

- Hold Exchange Offsets as escrow in a Forest Carbon Reserve Pool.
- Include in the contract from each Pooled Participant a fifteen-year commitment to maintain their land as a forest.
- Sign or obtain from each Pooled Participant a signed statement of intent recognizing the long-term objective of recognizing carbon stored in forest stocks.

8.1 Carbon Reserve Pool

Each CCX Afforestation / Reforestation and Sustainably Managed Forest project shall be required to place 20 percent of the Exchange Offsets it earns into a CCX Forest Carbon Reserve Pool. Such Exchange Offsets shall remain the property of the Member and Exchange Offsets that remain in the Forest Carbon Reserve Pool shall be released to the Member near the end of the CCX Market period.

Exchange Offsets in the Forest Carbon Reserve Pool will be used to compensate for any catastrophic losses that arise from non-management activity. Examples of catastrophic events may include hurricanes, fires, pests, or floods. In the event of a loss of Forest Carbon,

the amount of Exchange Offsets in the Forest Carbon Reserve Pool equal to the amount of the carbon released by the catastrophic event will be cancelled. The maximum amount of such carbon loss to be recognized by CCX for catastrophic losses shall be no more than the total quantity of Offsets available in the Forest Carbon Reserve Pool. This provision applies to project Aggregators at the aggregated pool level.

Aggregated projects may represent Pooled Participants from geographically diverse regions, where a catastrophic event that impacts one Pooled Participant may not impact the other Pooled Participants in the pool. Due to geographic diversification, a catastrophic loss impacting one Pooled Participant of an aggregated project will not imply that other Pooled Participant in the pool will be systematically impacted. Therefore, a Carbon Reserve Pool of 20% for the aggregated project provides assurance that there will be a sufficient reserve of Exchange Offsets to compensate for any individual catastrophic loss that a particular Pooled Participant may experience.

In cases of catastrophic weather events or outbreaks of fire and pest damage that reduce the quantity of Carbon Stocks on a parcel of forested land to levels below those documented for baseline, the Member shall document the quantity of timber destroyed by the fire, pest or adverse weather event. Those stands shall be excluded from future projections of annual changes in Carbon Stocks until the quantity of Carbon Stocks in those stands reaches the reported quantities for baseline. All reports of significant damage caused by pest, fire and adverse weather events shall be subject to audit by a CCX-Approved Verifier.

The registered CFI's attributed to Long-Lived Wood Products are not required to maintain an escrow in the Forest Carbon Reserve Pool.

8.2 Commitment to Maintaining Enrolled Land as a Forest

Upon registration, Members must document that the registered Forest Carbon Stocks in the project will be subject to long-term maintenance. For Pooled Projects, this includes a commitment by each Pooled Participant that the enrolled land will be maintained as a forest for at least 15 years from the date that the Pooled Participant enrolled with the Program to be included in the contract with the Offset Aggregator. For Pooled Participants in the Sustainably Managed Forest program, this commitment must explicitly state that the enrolled land will be maintained in a CCX-eligible sustainably certified forest management program.

The duration of the contract between the Offset Aggregator and Pooled Participant must be for at least the length of the CCX Market Period at a minimum and requires Pooled Participants to maintain enrolled in CCX for that length of time. This contract must be included in the project filing.

8.3 Letter of Intent to Maintain Forest Stocks beyond the CCX Market Period

Each Pooled Participant must sign a statement of intent declaring that the applicant intends to respect and abide by this Protocol for all land enrolled in the Program and, that the applicant intends to preserve the forest beyond December 31, 2010. This letter will be included in the project filing. A sample letter of intent is included as [Appendix C](#).

9. AFFORESTATION / REFORESTATION AND WIDELY-SPACED TREE PLANTING OFFSET PROJECT GUIDELINES

9.1 Project Summary/Definition

- Eligible forestry projects involving Afforestation and Widely-Spaced Trees via plantings initiated on or after January 1, 2003 on land that had been in a non-forest use for ten years or longer prior to the Afforestation, may earn CCX Exchange Offsets. Reforestation projects must have been initiated on or after January 1, 2003.
- Eligible Afforestation / Reforestation and Widely-Spaced Tree projects must not involve any harvesting, including thinning, during the contract period. If projects enrolled under the Afforestation / Reforestation Protocol are subsequently harvested, they must meet the Protocol requirements for Sustainably Managed Forests in order to remain enrolled in CCX. Projects that do not remain enrolled in CCX under the Sustainably Managed Forest Protocol must surrender all accrued Exchange Offsets.
- CCX Aggregators representing individual Pooled Participants must maintain a detailed database documenting the necessary information relevant for verification outlined in [section 13](#).
- CCX Exchange Offsets will be issued to owners of CCX-eligible Afforestation / Reforestation and Widely-Spaced Tree Planting projects on the basis of verified documentation reporting the annual increase in Carbon Stocks on eligible sites included in the project during the years 2003 through 2010. Verification guidelines are contained as [section 13](#).

9.2 Record-Keeping Requirements

Forest Offset Aggregators are responsible for maintaining a database of Pooled Participant records and maintaining accurate records of enrolled project forest inventories. The database

records, model inputs and enrolled lands as outlined in section 13 are subject to third party verification by CCX-Approved Verifiers.

9.3 Sustainable Forest Management Certification Requirements

Sustainable forest management certification is not required since harvesting or thinning is not permitted for Afforestation / Reforestation and Widely-Spaced Tree Planting Offset Projects. In the event that a harvest does occur on Afforestation / Reforestation and Widely-Spaced Tree Planting Offset Projects, the Project is therefore required to either:

- Surrender all accrued Exchange Offsets, or,
- Enroll the Project as a Sustainably Managed Forestry Project, thereby meeting the eligibility requirements of section 10, including sustainable forest management certification.

Project Proponents are required to notify CCX of any harvests and subsequent Project enrollment decisions.

9.4 Project Registration, Verification and Crediting Procedure for Afforestation / Reforestation Offset Projects

Afforestation / Reforestation projects are required to submit a CCX Project Implementation Document. Afforestation / Reforestation projects are eligible for direct registration provided that they are quantified using CCX Carbon Accumulation Tables and strictly satisfy the standardized requirements of the project category with no material deviations. Any material deviations from the standardized requirements of the project category should be described and will be subject to approval by the CCX Forestry Committee.

9.5 Forest Carbon Quantification Methodology

Afforestation / Reforestation projects in the continental United States may quantify carbon sequestered in eligible forests either through either the use of the CCX Carbon Accumulation Tables for Afforestation / Reforestation Projects found in Appendix B or by combining direct measurement with a growth-and-yield modeling approach. See Section 10.5 for guidance on CCX growth-and-yield modeling approach.

9.5.1 CCX Carbon Accumulation Tables

The CCX Carbon Accumulation Tables for Afforestation / Reforestation Projects reflect the live tree and soil organic carbon portion of the carbon pool forest (expressed in Mt CO₂e). The CCX Carbon Accumulation Tables for Afforestation / Reforestation Projects are derived from the Department of Energy Technical Guidelines, Voluntary Reporting of Greenhouse Gases (1605(b)) Program¹⁷. To be conservative, these values are discounted by 30 percent from the reported values to reflect potential uncertainty with regard to using accumulation tables¹⁸. In addition, discounts will be applied in aggregated pooled projects based on verification outcomes as described in [section 13](#) Verification Requirements.

Widely Spaced Tree planting projects in the United States may quantify carbon sequestered through use of the parameters and associated growth rates in [Appendix G](#).

9.5.2 Baseline Year Establishment

Afforestation / Reforestation and Widely-Spaced Tree Plantings baselines are established as the year in which the plantings occur.

9.6 Project Boundary Rule

Project Proponents that own less than 250 forested acres may enroll eligible acres under the Afforestation / Reforestation Protocol without being required to enroll all owned lands in CCX either under the Afforestation / Reforestation Protocol or Sustainably Managed Forest Protocol. These Proponents are required to report any harvests from non-enrolled stands and deduct the carbon loss from any harvest. In the case of aggregated projects this must be included in the contract between the Aggregator and Project Owner.

Project Proponents that own greater than 250 forested acres must enroll all owned land in CCX either under the Afforestation / Reforestation Protocol or Sustainably Managed Forest Protocol in order to enroll any eligible acres under the Afforestation / Reforestation Protocol. Exceptions to this may be granted on a case-by-case by the CCX Forestry Committee under the exceptions outlined under the Sustainably Managed Forest section below.

¹⁷ <http://www.eia.doe.gov/oiaf/1605/gdlins.html> (January 2007)

¹⁸ 30% represents the range of accuracy predicted for using accumulation tables. See Department of Energy *Technical Guidelines for Voluntary Reporting of Greenhouse Gas Program*, Part I Appendix: Forestry, page 3. <http://www.eia.doe.gov/oiaf/1605/gdlins.html> (January 2007)

10. SUSTAINABLY MANAGED FORESTRY OFFSET PROJECT GUIDELINES

10.1 Project Summary/Definition

- Eligible forestry projects involving sustainable management of forests that lead to an increase in Carbon Stocks may earn CCX Exchange Offsets.
- CCX members in the commercial forestry sector are categorized as owners of Sustainably Managed Forests and are issued Exchange Offsets on the basis of increases in Forest Carbon Stocks.
- Long-Lived Wood Products are considered an eligible carbon pool for Sustainably Managed Forests.
- All Sustainably Managed Forest project proposals are subject to review for approval by the CCX Forestry Committee.
- If an enrolled project land does not conform to the Sustainably Managed Forest Protocol requirements, such event shall be promptly reported to CCX. Such reporting shall occur through a project's Aggregator if the project is registered through an Aggregator. CCX will then cancel CCX Exchange Offsets in an amount equal to the quantity of Exchange Offsets previously issued to the project. CCX has the discretion to prohibit the owner of the non-conforming forest project from further participation in CCX.

10.2 Record-Keeping Requirements

Forest Offset Aggregators are responsible for maintaining a database of Pooled Participant records, for maintaining accurate records of enrolled project forest inventories, and for keeping track of management activities in enrolled forest lands. The database records, model inputs and enrolled lands are subject to third party verification by CCX-Approved Verifiers.

10.3 Sustainable Forest Management Certification Requirements

Project Proponents must provide evidence of sustainable forest management of all Sustainably Managed Forest land through certification from agencies or schemes that have been endorsed by the PEFC Council (Programme for the Endorsement of Forest Certification schemes) or the Forest Stewardship Council. A complete list of CCX-approved certification schemes is available in [Appendix E](#).

Provided all other requirements are satisfied, Exchange Offsets may be issued retroactively for CCX program years prior to obtaining certification for sustainable management provided that sustainable certification exists when the project enrolls in CCX for projects that enroll up until 2010. Exchange Offsets may only be issued for years in which certification for sustainable management exists for projects that enroll after 2010.

In addition, acceptable certification schemes include state sustainably programs that have been recognized by the American Tree Farm System (ATFS) as satisfying ATFS requirements. Examples of this include Wisconsin's Managed Forest Law and Indiana's Classified Forest and Wildlands Program.

10.4 Project Registration, Verification and Crediting Procedure for Sustainably Managed Forestry Offset Projects

Sustainably Managed Forestry projects seeking CCX approval are required to submit a CCX Project Implementation Document, describing project eligibility criteria including quantification methodology, sustainable certification (if required), start dates, monitoring plan, and other pertinent information for review by the CCX Forestry Committee. Appendix I provides information required in the CCX Project Implementation Document. The CCX Forestry Committee is responsible for providing expert guidance, Protocol development and interpretation, and recommending approvals for reviewed forestry projects. If approved, CCX staff will issue the Project Proponent an Official CCX Project Approval Letter with an explicit description of the conditions under which the project was approved.

10.5 Forest Carbon Quantification Methodology

Equation 1: Calculating the Net Annual Change in Carbon Stocks

$$\text{Net Annual Change in Carbon Stocks} = (\text{Net Annual Growth of Carbon Stocks}) \text{ minus } (\text{Annual Removals of Carbon Stocks})$$

In addition, Project Owners and Aggregators with entity-owned emissions less than 10,000 Mt CO_{2e} per year must subtract any increase in GHG emissions that have occurred due to project activity.

Quantification of annual net changes in Forest Carbon Stock must involve a combination of direct measurement through either an in-field timber inventory and/or remote sensing techniques. These measurements may be combined with a growth-and-yield models to project growth. Sustainably Managed Forest projects will be issued or debited CFI's on the basis of net annual change in Forest Carbon Stocks through the CCX Market Period. Members are

eligible to earn CFIs based on verification of net changes in Forest Carbon Stocks from the baseline year. Procedures for establishing the baseline year is outlined in [Section 6.2](#).

All methods and procedures approved by CCX for quantifying and reporting changes in Carbon Stocks shall conform to the following standards:

- Relevant mathematical and statistical formulae and models shall be publicly accessible (excluding exemptions granted under provisions stated below).
- Protocols for measuring and monitoring inventories and calculating variances of the estimates shall be publicly accessible (excluding exemptions granted under provisions stated below).
- All aspects of the quantification of changes in the Member's Carbon Stocks shall be subject to verification by independent CCX-approved entities at the Member's expense; and, the verified data and quantification methods are subject to audit by CCX.
- Post-harvest cruises must be conducted for a particular Pooled Participant subsequent to a significant harvest or thinning.
- The quantification of changes in Carbon Stocks will be adjusted to reflect acquisition or disposition of forest land on an annual basis as outlined in [Section 5.3.1](#).

10.5.1 Quantifying Change in Carbon Stocks

Quantification of net changes in Forest Carbon Stocks must involve a measurement-based accounting approach. The timber inventory techniques and growth-and-yield model used to estimate these changes must be approved by the CCX Forestry Committee. A list of approved growth-and-yield models is contained as [Appendix H](#). Members using models that have previously been approved by the CCX Forestry Committee must still obtain project approval from the CCX Forestry Committee for other aspects of their project. In-field timber inventory or remote sensing techniques shall include a plan for direct measurement of tree growth and a method for calculating the variance of estimates of increases in Carbon Stocks due to tree growth in a transparent and statistically valid manner.

Project Proponents that propose to use proprietary quantification models must disclose all aspects of the model to the CCX Forestry Committee for approval. A necessary requirement for the approval of proprietary models is evidence of third-party peer review, validation, and/or client references from entities that have used the model in practice, and the qualifications of the evaluator of the proprietary model.

10.5.2 Baseline Year Establishment

Sustainably Managed Forest projects are eligible for crediting for the CCX program year of the initial baseline inventory and for subsequent years that the project remains enrolled in CCX. Exchange Offsets cannot be issued retroactively based on regressive modeling, or other quantification methodologies, for CCX program years prior to the year of the initial baseline inventory.

Baseline inventories are required to use measurement procedures and a sufficiently large sample size such that there is 90% confidence that the resulting reported value is within 10% of the true mean.

10.5.3 Discounting Net Annual Change

Growth and yield model estimates of net annual changes in carbon from forestry project will be discounted to account for variance in model estimates by two times the reported statistical error associated with a 90% confidence interval of the baseline inventory data.

No discount will be applied for instances when in-field inventories are conducted on an annual basis or for years in which the inventory occurred. Discounts for projects using remote sensing quantification methodologies will be determined by the CCX Forestry Committee on a case-by-case basis. In addition, discounts will be applied in aggregated pooled projects based on verification outcomes as described in [Verification Requirements section 13](#).

10.6 Project Boundary Rule

All Forest Carbon Stocks from Sustainably Managed Forest Projects must be included in CCX accounting for all entity-owned forest lands. This requirement prevents proponents from shifting harvesting activity, and corresponding decrease in forest carbon stocks, from stands that they have enrolled in CCX to other stands that they own.

Forest Carbon Stocks from lands of different species and/or geographic regions may be excluded at the discretion of the CCX Forestry Committee on a case-by-case basis under the following circumstances:

- If the forest land is sustainably certified by a CCX-approved sustainable certification standard.
- If lands are not managed for biomass removal and have long-term protection (such as a land easement).
- If a case can be made that there is no causal relationship in the management activity between the enrolled and non-enrolled lands.
- Immature stands that have not yet undergone an inventory.

Project Proponents may still enroll a Sustainably Managed Forest project in the Program if they have non-enrolled land that does not satisfy these categories if this land is less than 5% of their total owned land. Under such a circumstance, the Project Proponent is required to monitor all harvests from these lands and debit any harvests from accrued CCX Forest Carbon Stocks.

Verification requirements can be satisfied in the case of aggregated projects through a statement in the contract between the Aggregator and Project Owner.

11. LONG-LIVED WOOD PRODUCTS GUIDELINES

Offset Providers or Aggregators seeking to be issued Exchange Offsets from Long-Lived Wood Products (LLWP) must enroll the net change in their Forest Carbon Stock in the Sustainably Managed Forest protocol to be eligible. CCX-approved crediting factors for LLWP are only applicable in the continental United States.

In order to receive Exchange Offsets from eligible LLWP projects, CCX Aggregators must establish contractual agreements with forest Pooled Participants to provide exclusive carbon rights from LLWPs. Pooled Participants must also establish exclusive contractual rights with the primary wood products manufacturer to retain the carbon rights associated with LLWPs. The Project Proponent must provide, on an annual basis, third party verified information documenting the quantity of wood products harvested by category, species and region.

CCX Project Proponents or Aggregators that register LLWP carbon are responsible for maintaining a sound database and monitoring management system capable of tracking annually each individual owner's forest land holding enrolled in CCX, records of management activity, and any sales of harvested wood. All of these records must be available for third-party verification.

11.1 Quantification Methodology for Carbon Dioxide in Long-Lived Wood Products

Members electing to quantify and report carbon sequestration in LLWP need to report harvest quantity by CCX recognized wood product categories. CCX CFIs will be issued for the calendar year based on the fraction of carbon in LLWP in use and landfills after 100 years from the harvested wood.

11.1.1 Conversion Factors for Weight of Wood into Carbon Dioxide Equivalent for Landowners at Harvest

The weight of the wood harvested shall be converted into the amount of carbon dioxide equivalent (CO_{2e}) removed or sequestered from the atmosphere in order to yield that weight of wood in a three stage process:

1. From “green” weight (i.e., including moisture) of the harvested timber into “dry” weight (i.e., not including moisture). The conversion factor for converting dry weight of harvested timber to weight of carbon shall be 0.5.
2. From dry weight to the amount of carbon stored in the harvested timber. The conversion factor for converting dry weight of harvested timber to weight of carbon shall be 0.5.
3. From the amount of carbon stored in the timber to the amount of CO_{2e} sequestered as the harvested timber grew. The conversion factor for converting the weight of carbon in above-ground biomass to weight of CO_{2e} shall be 3.666667.

11.1.2 Recognized Wood Product Categories for Landowners at Harvest

Using procedures outlined in the DOE 1605b technical guidelines for forestry, CCX has developed factors that convert the volume of harvested wood by category to carbon in use and landfills at the end of 100 years across wood categories. Verification requirements will involve an audit of sales receipts from the enrolled forest Pooled Participant. The receipts must specify the wood products being sold from the following categories:

- Softwood saw timber
- Softwood pulpwood
- Hardwood saw timber
- Harwood pulpwood

Equation 3: Quantity of Carbon Dioxide in LLWP at the End of 100 Years

$$CPR = \sum_C \text{Wood Product Category } R, C * \text{Harvest Volume } R, C$$

Where:

CPR	Carbon dioxide in Harvested wood products in Region, R
R	Region
C	Wood product category (Softwood saw log; Softwood pulpwood, Hardwood saw log and Hardwood pulpwood)

Carbon dioxide equivalent in use and landfills after 100 years from LLWP is determined as follows:

1. If the harvest is reported in volume, the harvest must be converted into weight using conversion factors found in [Appendix F](#).
2. If the harvest is reported in weight, determine the dry tons of carbon in CCX recognized wood product categories. This process involves converting green tons of harvested wood to dry tons across CCX wood product categories using a factor of 0.5 and converting dry tons across wood product categories to carbon tons using a factor of 0.5.
3. Distribute carbon tons by wood product category.
4. Use CCX prescribed conversion factors to calculate the quantity in use and landfills after 100 years by wood product category.
5. Convert to metric tons of carbon dioxide. This is done by multiplying by 3.67 (conversion from C to CO₂) and by 0.907 (conversion to MtCO₂).

11.2 Primary Wood Products Manufacturer Overview

Primary wood products manufacturers may elect to register CFIs from LLWPs using CCX conversion factors. CCX Members must provide, on an annual basis, third party verified information documenting the quantity of LLWPs produced under each product category. Members may be issued CFIs for the production of harvested wood from their own Sustainably Managed Forest land.

Primary wood products manufacturers may also acquire rights to carbon sequestered in LLWPs from Pooled Participants provided that this can be documented according to chain of custody and contractual evidence outlined in this document. LLWPs carbon rights cannot be

transferred beyond the primary wood products manufacturer at this time. Members may be issued CFIs on purchased timber provided that:

- The seller of the wood transfers the LLWPs rights of the sequestered carbon in the wood in the sales contract to the Member.
- The Member is eligible to be issued CFIs for purchased timber from forests that have certification for sustainable forest management from one of the schemes outlined in the [Appendix E](#). CFIs may be issued for the production of LLWPs pro rata across all LLWPs equal to the percentage obtained from sustainably certified sources.
- Independent third party verification for purchased wood is required through chain-of-custody certification. Chain-of-custody practices for primary wood products manufacturers must be certified by the Forest Stewardship Council or the Sustainable Forestry Initiative if purchased wood is to be credited.

11.3 Primary Wood Products Manufacturer Quantification Methodology

Members must quantify Carbon sequestered in the production of LLWPs using CCX prescribed default product utilization coefficients. CCX parameters developed to estimate the Carbon sequestered in LLWPs are contained in [Appendix F](#).

Recognized product categories for crediting include the following:

- Softwood lumber / Laminated veneer lumber / glulam lumber / I joints
- Hardwood lumber
- Softwood plywood
- Oriented strandboard
- Nonstructural panels:
 - Hardwood veneer / plywood
 - Particleboard/Medium density fiberboard
 - Hardboard
 - Insulation board
- Paper

The quantity of LLWPs to be included in the determination of net Carbon Stock changes will be the fraction of carbon dioxide equivalent in LLWPs in use and landfills at the end of 100

years, based on the U.S. Department of Energy 1605b technical guidelines for forest products.

12. SUPPLEMENTAL INFORMATION FOR COMMERCIAL FOREST MEMBERS

12.1 Commercial Forest Company Overview

Commercial forest companies that enroll in CCX as an emitting member, provided that they satisfy the previously outlined eligibility requirements, have the following options:

- Elect to register Forest Carbon sequestered under the Sustainably Managed Forest Protocol provided that this occurs for each year of their CCX Commitment Period.
- Elect to register carbon sequestered in Long-Lived Wood Products (LLWPs).
- Elect to register both:
 - Forest Carbon sequestered under the Sustainably Managed Forest Protocol for each year of their CCX commitment period.
 - Carbon sequestered in LLWPs.
- Elect to not register sequestered carbon under either the Sustainably Managed Forest or Long-Lived Wood Products Protocol.

Commercial forest companies enrolling in CCX as Emitting Members must also sign the non-binding statement, contained in [Appendix C](#), with respect to permanence.

12.2 Limitations on Use of CFIs Issued on the Basis of Net Changes in Carbon Stocks

For all commercial forest companies registering Forest Carbon sequestration, the maximum net increases or decreases in Carbon Stocks for Sustainably Managed Forests and LLWPs of CFIs shall be limited to the levels identified in Table 1. Exceptions to this may be granted on a case-by-case basis by CCX to commercial forest companies with a sufficiently small GHG baseline.

Table 1 – Maximum Levels of Annual Increases / Decreases in Carbon Stocks

Year	Maximum Annual Increase	Maximum Annual Decrease
PHASES I & II MEMBER		
2007	7.25% of Member's baseline	7.25% of Member's baseline
2008	7.5% of Member's baseline	7.5% of Member's baseline
2009	8% of Member's baseline	8% of Member's baseline
2010	9% of Member's baseline	9% of Member's baseline
PHASES II MEMBER		
2007	4.5% of Member's baseline	4.5% of Member's baseline
2008	6% of Member's baseline	6% of Member's baseline
2009	7.5% of Member's baseline	7.5% of Member's baseline
2010	9% of Member's baseline	9% of Member's baseline

The limitations specified above on the Surrender, sale or use for True-up of CFIs shall be applied separately to the limitations on the Surrender, sale or use for True-up of CFIs associated with changes in Direct Emissions and Electricity Purchase Opt-ins (Sections 4.8, 4.10 & 4.11.2 of the CCX Rulebook).

The Single Firm Sales Limit (Section 4.11.3 & 4.11.4 of the CCX Rulebook) and the limitations on Banking (Section 4.11.5 of the CCX Rulebook) shall be applied to Exchange Allowances issued on the basis of increases in Carbon Stocks separately to the application of these limitations to other CFIs issued to a Member.¹⁹

CFIs issued on the basis of increases in Carbon Stocks in excess of the limits on the sale of such CFIs as specified above may be marketed as Super Reductions in accordance with Section 4.11.2.1 of the CCX Rulebook.

12.3 Alternative Method for Defining Maximum Net Increases or Decreases in Carbon Stocks

The maximum net increases or decreases in Carbon Stocks that shall be recognized for the purpose of True-up and sales on the CCX can be defined on the basis of a Synthetic Direct Emission Baseline. The Synthetic Direct Emission Baseline is defined as a quantity of metric tons of carbon dioxide emissions calculated.

¹⁹ i.e. a Member that has reached its Single Firm Sales Limit with regard to Exchange Allowances sold on the basis of a reduction in Direct Emissions, shall nevertheless be able to sell Exchange Allowances issued on the basis of increases in Carbon Stocks up to the quantity specified by the Single Firm Sales Limit, and vice versa.

Equation 4: Synthetic Direct Emission Baseline

$$\text{Synthetic Direct Emission Baseline} = \text{Total heat content of all fuels combusted on-site (in gigajoules)} \times 0.0273$$

Where:

Total heat content of all fuels combusted on-site (in gigajoules)	The heat content associated with total fuel consumption (to include fossil fuels and biomass-based fuels) during a year that is representative of the CCX Direct Emissions baseline period.
0.0273	The average emissions factor for U.S. paper and pulp companies. ²⁰

The quantity of total heat content of all fuels combusted on-site that is reported to CCX must be supported by documented evidence provided by a third party entity that has experience in developing GHG emission inventories. A hypothetical example is included as [Appendix I](#).

13. VALIDATION AND VERIFICATION REQUIREMENTS

13.1 Validation

CCX Projects utilizing these guidelines are validated using one of two methods. Afforestation / Reforestation and Widely-Spaced Tree Planting Projects that adhere strictly to the requirements of this Protocol are considered to be validated and do not require a separate validation by the CCX Forestry Committee. The Project Proponent is required to submit the CCX Project Implementation Document with the project described in detail for all Sustainably Managed Forestry Projects or any Afforestation / Reforestation and Widely-Spaced Tree Planting Projects not using the standard carbon accumulation tables. Upon receipt and review of the CCX Project Implementation Document, the CCX Forestry Committee will review the proposal and, as needed, seek guidance appropriate technical experts. Project Proponents will be notified of the CCX Forestry Committee decision and shall proceed accordingly.

²⁰ Energy sources for the U.S. pulp and paper industry are contained in *Profile of Pulp and Paper Industry 2nd Edition*, EPA Office of Compliance Sector Notebook Project.

13.2 Verification

Verification of CCX Afforestation / Reforestation and Sustainably Managed Forest projects must be conducted by a CCX-Approved Verifier on an annual basis. Verification is intended to confirm the reported species mix and characteristics, verify acreage enrolled in the CCX, confirm that forest management practices on enrolled land are in compliance with the CCX criteria, and to identify any acres not in compliance with eligibility criteria. Verification costs are borne by the Member. Pool Participants that are unable to provide sufficient documentation will be ineligible. A checklist list of verification requirements is contained in Appendix A. Further information about the roles and responsibilities of Verifiers and the roles and responsibility of Members during verification are discussed in detail in *Chicago Climate Exchange Offset Program Verification Guidance Document* available on the CCX webpage: www.theccx.com.

13.2.1 In-Field Inspection Requirements

In-field inspections must occur with the first verification after the project is initially approved and at the end of the CCX commitment period for all projects irrespective of size. The stands selected for field verification are chosen at the discretion of the Verifier. The frequency and size of the in-field verification will be conducted corresponding to the size of the project according to the following requirement:

- For pooled projects with pools greater than 25,000 acres, in-field verification must occur every other year of at least 20% of both Pool Participants (in the case of aggregated projects) and acreage enrolled in CCX every other year.
- For pooled projects with pools less than 25,000 acres but greater than 10,000 acres, in-field verification must occur every third year of at least 15% of both Pooled Participants (in the case of aggregated projects) and acreage enrolled in CCX every other year.
- For pooled projects with pools less than 10,000 acres, in-field verification must occur every fourth year of at least 10% of both Pooled Participants (in the case of aggregated projects) and acreage enrolled in CCX every other year.

The CCX Forestry Committee will review state forest programs that involve monitoring on a case-by-case basis to determine if the verification process associated with state programs could act as a substitute for CCX field verification.

13.2.2 Desk Audit Requirements

A desk audit of at least 40% of both enrolled Pool Participants and acreage is required in years when an in-field inspection does not occur.

13.2.3 Materiality Thresholds for Afforestation / Reforestation, Widely-Spaced Tree Planting and Long-Lived Wood Products Offset Projects Using CCX Carbon Accumulation Tables

Some offset project types at CCX typically consist of Aggregators representing a collection of Pooled Participants that are each individually adhering to CCX eligibility requirements. In these instances, the GHG assertion presented to CCX represents the sum of the individual contribution of each Pooled Participant. Because there could be many Pooled Participants, materiality threshold for errors, omissions, and misrepresentations for each participant are defined relative to the individual Participants contribution to the GHG assertion rather than the aggregate GHG assertion.

For Forest Carbon Sequestration Offset Projects for which GHG emission reduction assertions are based upon standardized annual carbon accumulation rates, the materiality threshold applies to 3% of the calculated GHG emission reductions per individual Pooled Participant. Any identified discrepancy (or the aggregation of all discrepancies) that exceeds the materiality threshold of 3% will be considered material. If a project is found to have a material discrepancy, the calculated GHG emission reductions for project must be corrected accordingly. Further, the GHG emission reduction assertion for the non-sampled projects in the pool must be discounted by an amount equal to the percentage correction that occurred as a consequence of verification from the participants in the verified sample.

13.2.4 Materiality Thresholds Afforestation/Reforestation and Sustainably Managed Forestry (using direct measurements)

Forest Carbon Sequestration Offset Projects quantified using direct measurements establish baseline inventory through in-field measurements or remote-sensing technology; and/or utilize growth-and-yield modeling for annual carbon accumulation. Materiality thresholds for GHG sequestration calculations and associated data are not defined in terms of a percentage of the overall GHG assertion. Many aspects of the calculations involved with quantifying the GHG assertion either cannot be replicated, such as obtaining the measurement of a tree from a historical time period, or are prohibitively expensive to replicate. Thus, CCX has outlined qualitative materiality criteria the Verifier is required to evaluate to ensure that the calculation and associated data satisfy the eligibility requirements. These principles are outlined in the CCX Forestry Verification Guidelines and Checklist.

13.2.5 Procedures for Evaluating Reported In-Field Inventory

CCX-Approved Verifiers are responsible for using their professional judgment to evaluate that the reported inventory is accurate to a reasonable level of assurance. These procedures must be involved as part of this verification:

- Verify that inventory documentation data is supported by:
 - Confirming inventory procedures followed approved methodology (when, procedures, and quantity of plots established) through review of records, documents, and interview of foresters that conducted inventory. Documents to review include field files, maps, inventory specifications and records, digital tally files, inventory processing software outputs, and other equivalent documents.
 - Verify measurements were accurately performed to review overall field conditions in comparison to carbon accounting and mapping for the project by selecting sample of stands for empirical field review or walk-through inspections, reviewing site mapping and stand or tract reports, air photos, harvest records, planting records, and other equivalent documentation.

A full re-inventory or audit of inventory plots is not required. Verification or audits of actual plot data may be conducted, when the data plots or points are monumented, if the Verifier is of the opinion that there may be a significant divergence between field conditions and the reported data for a stand.

- For projects using annual measurements from fixed plots, Verifiers should visit and verify randomly selected plot level measurements and records at a level appropriate to the size and scale of the project being verified.
- Confirm management activity from harvest or thinning is properly accounted for and that reinventory occurred
- Verify inventory and growth-and-yield calculations were performed correctly through spot-check of calculations

13.2.6 Procedures for Evaluating Remote Sensing Measurements

CCX-Approved Verifiers are responsible for using their professional judgment for confirming the remote sensing inventory results is accurate to a reasonable level of assurance. These procedures must be followed as part of this verification:

- Verify that the flight took place by reviewing flight mission plan, GPS flight records, or equivalent documentation.

- Verify data covered appropriate property boundaries by reviewing images and maps produced.
- Verify instrument was calibrated by reviewing calibration records.
- Verify raw data was corrected for errors.
- Verify ground-truthing was performed (see procedures on review of inventory).
- Verify correlations from remote sensing were determined using ground-truthing inventories.
- Verify calculations of error around total volume estimate.

14. REFERENCES

International Standard Organization 14064-2:2006. Greenhouse Gases Part 2: Specification with Guidance at the Project Level for Quantification, Monitoring, and Reporting of Greenhouse Gas Emission Reductions or Removal Enhancements.

U.S. Department of Energy. Technical Guidelines for Voluntary Reporting of Greenhouse Gas (1605(b)) Program. Chapter 1, Emission Inventories. Part I Appendix: Forestry. March 2006.

U.S. Department of Energy. Method for Calculating Carbon Sequestration by Trees in Urban and Suburban Settings. Voluntary Reporting of Greenhouse Gases. April 1998.

Intergovernmental Panel on Climate Change Working Group III Report *Mitigation of Climate Change*, Chapter 9: Forestry. 2007.

Profile of Pulp and Paper Industry 2nd Edition, EPA Office of Compliance Sector Notebook Project.

APPENDIX A: VERIFICATION CHECKLIST

CCX Requirement	Assessment Criteria	Verification Findings
	Management staff and titles; Organizational chart; Defined roles, responsibilities, and authorities regarding forest carbon and CCX verification.	
Forestry Program General Guidelines		
Validation	CCX Project Approval Letter.	
Verification: Conflicts of Interest	Complete a conflicts of interest assessment.	
Contract Information	Verifier must obtain and review the contract to confirm inclusion of the information listed in the Protocol.	
CCX Membership	Confirm the Project Owner is a CCX Member or working through CCX Member.	
	Entity acknowledges understanding and to comply with CCX Project Guidelines in contract.	
Ownership and Control	Confirm the CCX Member / Participant Member has management control of the enrolled land and the GHG mitigation rights associated with the project.	
Project Location	Project is in approved location.	
Project Boundary	Appropriate acreage, species, and age.	
Eligible Carbon Pools	Only approved carbon pools are included.	
Project Emissions	Entity has less than 10,000 Mt CO _{2e} annually if emissions not enrolled in CCX in contract.	
	Project-based emissions that occurred as result of project in contract.	
Additionality -- Regulatory Test	Project is not required by law.	
Prevention of Double- Counting	Explicit statement to prevent double-selling included in contract.	
Project Permanence	Catastrophic loss (if any) reported.	

	Lands with catastrophic loss excluded until baseline level (if applicable).	
	15-year commitment included in contract.	
	Letter of Intent signed.	
Land Acquisition / Disposition	Confirm acquisition / disposition accurately reported.	
	Confirm land acquisition / disposition properly quantified.	
Afforestation / Reforestation and Widely-Spaced Tree Planting Guidelines		
Additionality -- Performance Test	Plantings were initiated on or after 1/1/03.	
	Land was in unforested condition for 10 years (for Afforestation).	
	Land satisfies definition of a forest (for Afforestation / Reforestation).	
Management Activity	Confirm no biomass removal, harvest, or thinning has occurred.	
Sustainably Managed Forest Guidelines		
Additionality -- Performance Test	Entity-wide sustainable certification by CCX-approved standard.	
Project Leakage	Confirm all entity-owned forest lands included.	
	Confirm lands excluded as approved (if applicable).	
	Confirm harvests deducted from lands excluded as approved (if applicable).	
Quantification Methodology		
Carbon accumulation tables Afforestation or Widely-Spaced Tree Only	Appropriate region, acreage, species, and age.	
Inventory Establishment through In-Field Measurement	Sampling procedure implemented and processed as approved.	
	Measurements accurately performed.	
	Baseline calculated as approved.	
	Confirm harvests are properly documented and consistent with	

	management plan.	
	Confirm post-harvest cruise conducted after harvest.	
	Inventory documentation is sufficient to support reported data and that calculations were performed correctly.	
	CCX conversion factors correctly used.	
	Statistical error at 90% CI.	
Inventory Establishment through Remote Sensing	Confirm flight occurred.	
	Confirm data covered appropriate boundary.	
	Confirm instrument calibrated.	
	Confirm data corrected for errors.	
	Confirm ground-truthing performed.	
	Confirm remote sensing correlations were determined using ground-truth inventories.	
	Confirm calculations of error around total volume estimate.	
	Confirm in-field inventory verified according to standard procedures.	
Growth-and-Yield Model	Use of model implemented as approved.	
	Retroactive modeling is not occurring prior to baseline establishment.	
	Parameters estimated / model calibrated as approved.	
	Carbon flux from all project land included in each project accounting year.	
	Carbon loss from harvests properly debited.	
Long-Lived Wood Products		
Conditions for Landowner at Harvest	Confirm entity using proper CCX quantification method.	
	Confirm sales contract retaining carbon rights from manufacturer.	

Primary Wood Products Manufacturer Conditions	Confirm entity using proper CCX quantification method.	
	Confirm sales contract retaining carbon rights for purchased timber (if purchased timber included).	
	Confirm entity has chain-of-custody certification by CCX-approved standard (if purchased timber included).	
	Confirm % of purchased timber from sustainably certified forest (if purchased timber included).	

APPENDIX B – AFFORESTATION / REFORESTATION SUPPLEMENTAL INFORMATION

Table 2 – Classification of Afforestation / Reforestation Regions

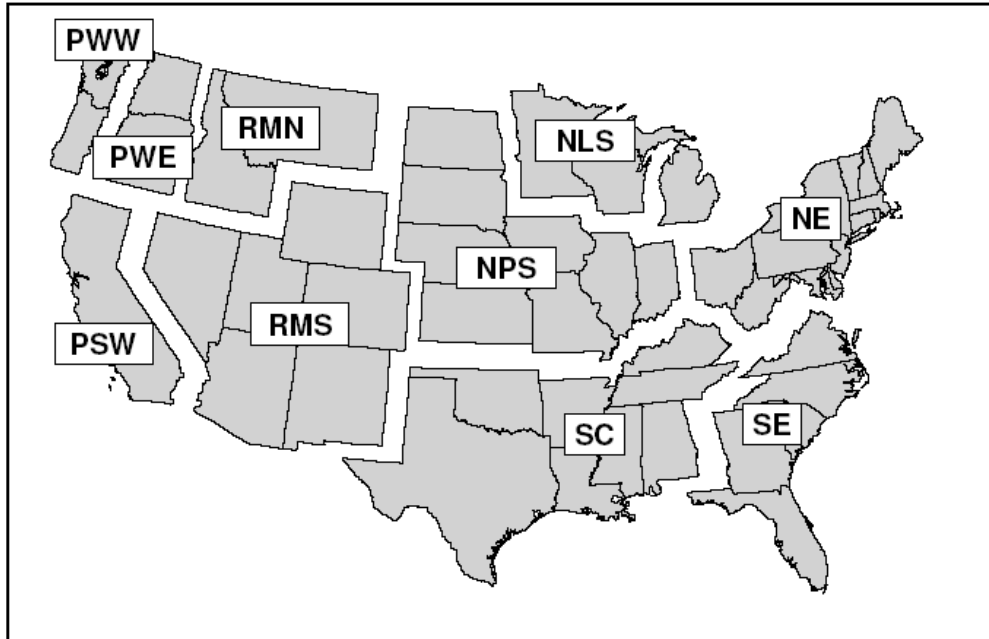


Figure 1.1—Definition of regions: Pacific Northwest, West (PWW); Pacific Northwest, East (PWE); Pacific Southwest (PSW); Rocky Mountain, North (RMN); Rocky Mountain, South (RMS); Northern Prairie States (NPS); Northern Lake States (NLS); Northeast (NE); South Central (SC); and Southeast (SE). Note that regions are merged for some tables, these combinations include: NLS and NPS as North Central; PWW, PWE, and PSW as Pacific Coast; RMN and RMS as Rocky Mountain; SC and SE as South; and RMN, RMS, PWE, and PSW as West (except where stated otherwise).

Table 3 – Regional Estimates of Annual Carbon Accumulation in Live trees and Soil Organic Carbon for Afforestation / Reforestation (Metric tons CO₂/ acre/ year age of tree)

Region	Species	1 through 5	6 through 10	11 through 15	16 through 20	21 through 25	26 through 30
Northeast	Aspen-birch	1.424	1.628	1.706	1.852	1.852	1.883
Northeast	Maple-beech-birch	1.571	2.199	2.702	2.638	2.481	2.449
Northeast	Oak-hickory	1.467	2.718	3.886	3.592	3.215	3.016
Northeast	Oak-pine	1.320	1.874	2.314	2.460	2.502	2.423
Northeast	Spruce-balsam fir	1.508	1.617	1.570	1.679	1.642	1.768
Northeast	white-red-jack pine	1.571	2.037	2.388	2.230	1.957	1.868
Northern Lake States	Aspen-birch	1.592	1.402	0.983	1.531	1.861	2.044
Northern Lake States	Elm-ash-cottonwood	0.921	1.098	1.024	1.483	1.661	1.802
Northern Lake States	Maple-beech-birch	1.131	1.240	1.140	1.788	2.239	2.379
Northern Lake States	Oak-hickory	1.466	1.429	1.266	1.752	2.082	2.160
Northern Lake States	Spruce-balsam fir	0.837	1.185	1.138	2.010	2.487	2.805
Northern Lake States	white-red-jack pine	0.146	0.679	1.036	2.260	3.297	3.396
Northern Prarie States	Elm-ash-cottonwood	0.859	0.826	0.669	0.909	1.014	1.359
Northern Prarie States	Maple-beech-birch	1.110	0.942	0.691	0.931	1.067	1.287
Northern Prarie States	Oak-hickory	1.425	1.251	1.016	1.256	1.413	1.476
Northern Prarie States	Oak-pine	1.089	1.063	0.984	1.419	1.801	1.916
Pacific Northwest, East	Douglas-fir	0.607	0.784	0.816	2.198	3.434	3.884
Pacific Northwest, East	Fir-spruce-mountain hemlock	0.691	0.581	0.397	0.868	1.235	1.742
Pacific Northwest, East	Lodgepole pine	0.419	0.628	0.754	1.361	1.884	1.905
Pacific Northwest, East	Ponderosa pine	0.712	0.691	0.586	0.910	1.162	1.177
Pacific Northwest, West	Alder-maple	1.739	2.272	2.638	5.193	7.572	6.932
Pacific Northwest, West	Douglas-fir	1.802	2.214	2.482	5.503	8.379	8.331

CCX Offset Project Protocol: Forestry Carbon Sequestration

<u>Region</u>	<u>Species</u>	<u>1 through 5</u>	<u>6 through 10</u>	<u>11 through 15</u>	<u>16 through 20</u>	<u>21 through 25</u>	<u>26 through 30</u>
Pacific Northwest, West	Fir-spruce-mountain hemlock	0.712	0.890	0.994	2.277	3.456	4.079
Pacific Northwest, West	Hemlock-Sitka spruce	1.299	1.717	1.968	4.182	6.220	6.644
Pacific Southwest	Mixed conifer	0.901	0.738	0.502	0.722	0.858	0.962
Pacific Southwest	Fir-spruce-mountain hemlock	0.712	0.675	0.586	0.926	1.172	1.350
Pacific Southwest	Western oak	0.566	0.487	0.377	0.418	0.418	1.429
Rocky Mountain, North	Douglas-fir	0.587	0.544	0.439	1.120	1.749	2.167
Rocky Mountain, North	Fir-spruce-mountain hemlock	0.670	0.549	0.366	0.884	1.329	1.890
Rocky Mountain, North	Lodgepole pine	0.419	0.387	0.303	0.774	1.193	1.518
Rocky Mountain, North	Ponderosa pine	0.712	0.576	0.387	0.774	1.120	1.434
Rocky Mountain, South	Aspen-birch	0.670	0.622	0.471	0.774	0.994	1.261
Rocky Mountain, South	Douglas-fir	0.566	0.565	0.534	1.015	1.434	1.707
Rocky Mountain, South	Fir-spruce-mountain hemlock	0.398	0.366	0.293	0.638	0.942	1.214
Rocky Mountain, South	Lodgepole pine	0.461	0.387	0.283	0.466	0.607	0.774
Rocky Mountain, South	Ponderosa pine	0.377	0.340	0.251	0.481	0.680	0.885
Southeast	Loblolly-shortleaf pine	2.367	2.472	2.303	2.136	2.261	2.135
Southeast	Longleaf-slash pine	1.173	1.644	1.957	2.061	2.281	2.239
Southeast	Oak-gum-cypress	1.487	2.219	2.637	2.532	2.521	2.363
Southeast	Oak-hickory	1.739	2.262	2.430	2.136	2.178	2.041
Southeast	Oak-pine	1.571	2.157	2.440	2.220	2.083	1.968
South Central	Elm-ash-cottonwood	1.823	2.000	2.052	2.031	2.104	2.041
South Central	Loblolly-shortleaf pine	2.284	2.482	2.367	2.147	2.199	2.010
South Central	Oak-gum-cypress	1.152	1.948	2.534	2.419	2.345	2.104
South Central	Oak-hickory	2.053	2.252	2.220	2.073	2.042	1.958
South Central	Oak-pine	1.844	2.304	2.535	2.262	2.157	1.989

APPENDIX C: SAMPLE LETTER OF INTENT TO MAINTAIN FOREST STOCKS BEYOND THE CCX MARKET PERIOD FOR FORESTRY PROJECTS

CHICAGO CLIMATE EXCHANGE FORESTRY SECTOR

STATEMENT LETTER OF INTENT TO MAINTAIN FOREST STOCKS BEYOND 2010

[COMPANY]

[ADDRESS]

TO: CHICAGO CLIMATE EXCHANGE

This Statement of Intent issued by _____ (Pool Participant / Member), to Chicago Climate Exchange (“CCX”) confirms Pool Participant’s / Member’s intent to respect the Principle of Permanence regarding its Forest Carbon Stock to maintain beyond December 31, 2010, excluding catastrophic events and land sales, the quantity of Carbon Stocks held by the Pool Participant / Member in its CCX-registered Forestry Project as defined in the CCX Rulebook including any amendments and/or interpretations thereto.

It is recognized by Pool Participant / Member and CCX that this is a non-binding Statement that reflects the Pool Participant’s /Member’s intent in regards to the issues described herein. The Pool Participant / Member acknowledges that the effectiveness of forest stocks in sequestering carbon dioxide depend on the forests stocks being maintained for a considerable time period. The Pool Participant /Member acknowledges that an objective of the Chicago Climate Exchange is the development of Offset Project Protocols to advance climate change mitigation objectives and that the Chicago Climate Exchange issues offsets for Forest Carbon Stocks with the objective that the forest stocks sequester carbon for a considerable time period. The Pool Participant / Member acknowledges that they support the objectives of the Chicago Climate Exchange and the use of forest Offset Projects as a means of carbon sequestration.

DATED this ____ day of _____, [Year]

By: _____

Name: _____

Title: _____

APPENDIX D: EXAMPLE OF LAND ACQUISITION AND DISPOSITION

Example: Land Acquisition

Suppose a member owns 100 hectares on January 1 with a carbon stock of 14,000 metric tons of carbon dioxide equivalent (Mt CO_{2e}). On December 31 of that year, the carbon stock on those hectares had increased to 14,500 Mt CO_{2e}. Suppose that the member acquired an additional 25 hectares on August 23 with a carbon stock of 3,000 m Mt CO_{2e} at the time of purchase, and that the carbon stock had increased to 3,250 Mt CO_{2e} by December 31 of that year of purchase.

During the subsequent year, the carbon stock on the initial 100 hectares decreased to 14,400 Mt CO_{2e} and the carbon stock on the newly acquired 25 hectares increased to 3,500 Mt CO_{2e}. If we disregard the application of any discount CCX rules may require, forest carbon stocks would be quantified on CCX in the following manner:

Category	2002	2003
Total Owned Area – Beginning of Year (ha)	100	125
Total Owned Area – End of Year (ha)	125	125
Total Metric Tons of Carbon Dioxide Equivalent on January 1 – Land Owned at Beginning of Year (Mt CO _{2e})	14,000	17,750
Total Metric Tons of Carbon Dioxide Equivalent on December 31 – Land Owned at Beginning of Year (Mt CO _{2e})	14,500	17,900
Total Metric Tons of Carbon Dioxide Equivalent on December 31 – Land Acquired During that Year (Mt CO _{2e})	250	N/A
Total Volume Change Eligible for CCX Crediting in Metric Tons of Carbon Dioxide Equivalent (Mt CO_{2e})	500	150

Example: Land Disposition

Suppose a member owns 200 hectares that they had enrolled in CCX for three years. At the end of three years, the member had been issued CFIs equal to 5,000 Mt CO_{2e}. Suppose that the member decided to sell 50 hectares, and of the total 5,000 Mt CO_{2e} for which they had been credited, 1,000 Mt CO_{2e} had accrued on those hectares. Thus, unless the member was able to demonstrate or satisfy one of the requirements necessary for retaining the 1,000 Mt CO_{2e} in the sale, they would be responsible for surrendering all of the accrued CFIs on those lands.

APPENDIX E: SUSTAINABLY MANAGED FOREST SUPPLEMENTAL INFORMATION

Table 4 – CCX-approved Certification Schemes for Sustainable Forest Management

Country	Name	Schemes
Australia	Australian Forestry Standard Limited	Australian Forest Certification Scheme
Austria	PEFC Austria	Austrian Forest Certification Scheme (2006)
Belarus	Belarusian Association of Forest Certification	
Belgium	WoodNet - Commission PEFC Belgique	Belgian Forest Certification Scheme
Brazil	National Institute of Metrology, Standardization and Industrial Quality	Cerflor - Brazilian Program of Forest Certification
Canada	CSA International; SFI Canada	CSA Sustainable Forest Management Program
Chile	CertforChile Forest Certification Corporation	CertforChile
Czech Republic	PEFC Czech Republic	Czech Forest Certification Scheme (2006)
Denmark	PEFC Denmark	Danish Forest Certification Scheme
Estonia	Estonian Forest Certification Council	Estonian Forest Certification Scheme
Finland	Finnish Forest Certification Council	Finnish Forest Certification Scheme
France	PEFC France	French Forest Certification Scheme (2006)
Gabon	PAFC Gabon	PAFC Gabon Forest Certification Scheme
Germany	PEFC Germany e.V	Revised German Forest Certification Scheme (2005)
Ireland	PEFC Council of Ireland	
Italy	PEFC Italy	Italian Forest Certification Scheme
Latvia	PEFC Latvia Council	Latvian Forest Certification Scheme
Lithuania	PEFC Lietuva (PEFC Lithuania)	Lithuanian Forest Certification Scheme
Luxembourg	PEFC Luxembourg	Luxembourg Certification Scheme for Sustainable Forest Management
Malaysia	Malaysian Timber Certification Council	
Norway	PEFC-Norway	Norwegian Living Forest Standard

		and Certification Scheme
Poland	PEFC Polska	Polish Forest Certification Scheme
Portugal	Portuguese Forestry Sector Council	Portuguese Forest Certification Scheme
Russia	Partnership on the Development of PEFC Forest Certification	
Slovakia	Slovak Forest Certification Association	Slovak Forest Certification Scheme
Slovenia	Institute of Forest Certification Slovenia	Slovenian Forest Certification Scheme
Spain	PEFC España	Spanish Forest Certification Scheme
Sweden	Swedish PEFC Co-operative	Swedish Forest Certification Scheme
Switzerland	PEFC Switzerland and HWK-Zertifizierungsstelle	Swiss Q-label certification scheme
United Kingdom	PEFC UK Ltd.	UK Scheme for Sustainable Forest Management
		PEFC UK certification scheme for sustainable forest management (revised 2006)
United States	Sustainable Forestry Initiative (SFI Inc.) American Forest Foundation (AFF)	SFI - Sustainable Forestry Initiative American Tree Farm System
International	Forest Stewardship Council (FSC)	Forest Stewardship Council (FSC)

APPENDIX F: LLWP SUPPLEMENTAL INFORMATION

Conversion Factors

Table 5 – Selected CCX factors for Average Disposition Patterns of Carbon as fractions of Roundwood by Region and Roundwood Category (assuming no bark on roundwood and excluding fuel wood)²¹

Region	Softwood Sawlog	Softwood Pulpwood	Hardwood Sawlog	Hardwood Pulpwood
Northeast	0.318	0.09	0.316	0.261
North Central	0.346	0.092	0.297	0.304
Pacific Northwest (East)	0.337	0.337	0.265	0.265
Pacific Northwest (West)	0.409	0.076	0.207	0.207
Pacific Southwest	0.355	0.355	0.265	0.265
Rocky Mountain	0.367	0.367	0.265	0.265
Southeast	0.336	0.141	0.304	0.188
South Central	0.334	0.162	0.285	0.176

²¹ Source: Technical Guidelines for Voluntary Reporting of Greenhouse Gas Program. Part I Appendix Forestry. Table 1.6 Average disposition patterns of carbon as fraction in roundwood by region and roundwood category. Pages 36-48 March 2006

Table 6 – Volume Multipliers for Converting Timber and Chip Units into Thousand Cubic Feet (MCF)²²

Unit	Factor
Bone Dry Tons	0.0713
Bone Dry Units	0.0825
Cords	0.075
Cubic Meters	0.0353
Cunits-Chips (CCF)	0.1
Cunits-Roundwood	0.1
Cunits-Whole tree chip	0.126
Green Tons	0.0315
MBF-Doyle	0.222
MBF-International 1/4"	0.146
MBF-Scribner ("C" or "Small")	0.165
MBF-Scribner ("Large" or "Long")	0.145
MCF-Thousand Cubic Feet	1
Oven Dried Tonnes	0.0758

²² American Forest & Paper Association, Sustainable Forestry Initiative Program Annual Progress Reporting Form.

Table 7 – Basic Factors for Converting Merchantable Wood Yield to Carbon Yield by Species²³

Region	Forest Type	Specific Gravity	Lbs. per Dry cu. foot	Percent Carbon	Lbs C per Cubic foot
SE	Loblolly Pine	0.47	29.33	0.531	15.57
SE	Longleaf Pine	0.54	33.70	0.531	17.89
SE	Oak-Hickory (SI=79)	0.61	38.06	0.479	18.23
NE	Pines	0.41	25.58	0.521	13.33
NE	Spruce-fir	0.37	23.09	0.521	12.03
NE	Oak-hickory (all)	0.61	38.06	0.498	18.96
NE	Maple-beech-birch	0.61	38.06	0.498	18.96
NC	Pines	0.41	25.58	0.521	13.33
NC	Spruce-fir	0.37	23.09	0.521	12.03
NC	Oak-hickory	0.61	38.06	0.498	18.96
NC	Maple-beech	0.58	36.19	0.498	18.02
NC	Aspen-birch	0.46	28.70	0.498	14.29
West	Douglas-fir	0.45	28.08	0.512	14.38
West	Ponderosa pine	0.38	23.71	0.512	12.14
West	Fir-spruce	0.35	21.84	0.512	11.18
West	Hemlock-Sitka sp.	0.43	26.83	0.512	13.74
West	Lodgepole pine	0.42	26.21	0.512	13.42
West	Redwoods	0.42	26.21	0.512	13.42
West	Hardwoods	0.38	23.71	0.496	11.76

²³ Birdsey 1996 (See also Appendices 2 & 3, Sampson and Hair 1996)

LLWP Pooled Participant Quantification Examples

Example 1 – Harvest Reported in Weight

Consider a harvest in the Northeast of the United States produced 4,000 tons green weight of round wood. Further assume that the harvest was distributed across wood product categories in following fashion:

Wood Product Category	Distribution of Harvest (%)
Softwood saw timber	7.9%
Softwood pulpwood	5.1%
Hardwood saw timber	46.5%
Harwood pulpwood	40.5%

The 100 year in-use carbon dioxide in Long-Lived Wood Products (expressed in metric tons) is determined as follows:

Step 1: Convert green weight of roundwood to dry tons:

$$(4000 \text{ green tons} * 0.5 \text{ (green tons / dry tons)}) = 2,000 \text{ dry tons}$$

Step 2: Convert dry tons to carbon tons:

$$(2,000 \text{ dry tons} * 0.5 \text{ (dry tons / carbon tons)}) = 1,000 \text{ carbon tons}$$

Step 3: Distribute carbon tons across categories:

Wood Product Category	Carbon Tons
Softwood saw timber	79 carbon tons
Softwood pulpwood	51 carbon tons
Hardwood saw timber	465 carbon tons
Harwood pulpwood	405 carbon tons

Step 4: Estimate 100 year in use value by wood product category

Wood Product Category	Carbon Tons	Carbon as fractions of Roundwood by Region and Roundwood Category	100 Year Value (Total = 282.357 t Carbon)
Softwood saw timber	79 carbon tons	0.318	79 tons of carbon * 0.318 = 25.122 tons
Softwood pulpwood	51 carbon tons	0.090	51 tons of carbon * 0.090 = 4.59 tons
Hardwood saw timber	465 carbon tons	0.316	465 tons of carbon * 0.316 = 146.94 tons
Harwood pulpwood	405 carbon tons	0.261	405 tons of carbon * 0.261 = 105.705 tons

Step 5: Convert to metric tons of carbon dioxide:

$$282.357 * 3.67 * 0.907 = 939.88 \text{ Mt CO}_2$$

Example 2 – Harvest Reported in Volume

Consider a harvest of maple-beech-birch forest in the Northeast that produced 200 MBF of hardwood sawtimber and 1,000 cords of hardwood pulpwood.

Step 1: Convert volumes to common unit:

$$\text{Sawtimber: } 200 \text{ MBF} * 0.146 = 29.2 \text{ MCF}$$

$$\text{Pulpwood: } 1,000 \text{ cords} * 0.075 = 75 \text{ MCF}$$

Step 2: Convert volumes to metric tons of carbon:

$$\text{Sawtimber: } 29.2 \text{ MCF} * 18.96 \text{ lb c/cu ft} = 553.6 \text{ thousand pounds}$$

$$553.6 \text{ thousand pounds} / 2.204 = 251.2 \text{ metric tons carbon}$$

$$\text{Pulpwood: } (75 * 18.96) / 2.204 = 645.2 \text{ metric tons carbon}$$

Step 3: Estimate 100 year in-use value by wood product category

$$\text{Sawtimber: } 251.2 * 0.316 = 79 \text{ metric tons}$$

$$\text{Pulpwood: } 645.2 * 0.261 = 168 \text{ metric tons}$$

Step 4: Convert to metric tons of carbon dioxide equivalent

$$(79 + 168) * 3.67 = 909 \text{ metric tons of carbon dioxide equivalent}$$

Table 8 – Product Categories Included in CCX LLWP Protocols²⁴

		A	B	C	D
Product Category	Units	Factor to convert units of product to metric tons of carbon	Factor to convert units of product to metric tons carbon dioxide	Fraction remaining after 100 year end use and landfills	CCX Woods Products Crediting Factor (metric tons of CO₂)
Softwood lumber / laminated veneer lumber/	thousand board feet	0.443	1.624	0.639	1.038
Hardwood lumber	thousand board feet	0.765	2.805	0.554	1.554
Softwood plywood	thousand square feet, 3/8-inch basis	0.236	0.865	0.645	0.558
Oriented strand board	thousand square feet, 3/8-inch basis	0.275	1.008	0.696	0.702
Non structural panels (average)	thousand square feet, 3/8-inch basis	0.289	1.060	0.592	0.628
Hardwood veneer/ plywood	thousand square feet, 3/8-inch basis	0.286	1.049	0.592	0.621
Particleboard / medium density fiberboard	thousand square feet, 3/4-inch basis	0.587	2.152	0.592	1.274
Hardboard	thousand square feet, 1/8-inch basis	0.138	0.506	0.592	0.300
Insulation board	thousand square feet, 1/2-inch basis	0.220	0.807	0.592	0.478
Paper	Tons, air dry	0.496	1.819	0.151	0.275

Notes:

- i. Conversion from carbon to carbon dioxide uses standard conversion factor of 3.6667
- ii. CCX wood products crediting factor (column D) is the product of columns B and

²⁴ Source: Technical Guidelines for Voluntary Reporting of Greenhouse Gas Program. Forestry Tables- Table 1.7, Table 1.8. Department of Energy, March 2006

Example 3 – Estimating LLWP Carbon for Commercial Forest Companies with CCX Registered Forest Land

Consider a Member with the following production statistics for a reporting year.

Product From Owned/Managed Forest Land	Quantity Wood for Production
Non structural panels	1,500,000 thousand square feet 3/8 inch
Hardwood Lumber	2,000,000 thousand board feet
Medium density fiberboard	2,500,000 thousand square feet 3/4 inch
Product From Purchased Wood	Quantity Wood for Production
Non structural panels	2,500,000 thousand square feet 3/8 inch
Hardwood Lumber	1,000,000 thousand board feet
Medium density fiberboard	500,000 thousand square feet 3/4 inch

Let us assume that all of the owned forest land by member is certified as sustainably managed under a PEFC endorsed program. However, for the sake of this hypothetical example let us consider two scenarios with regards to purchased logs.

1. Scenario 1: All of the purchased logs are certified as sustainably managed under a CCX-approved program and independently verified through chain of custody.
2. Scenario 2: Fifty percent of the purchased logs are certified as sustainably managed under a CCX-approved program and independently verified through chain of custody.

The estimation of Carbon Stocks to be recognized under the Protocol for Long-Lived Wood Products is presented as follows.

Step 1. Estimate the eligible stock of Long-Lived Wood Products for recognition under the Protocol. The example assumes evidence of CCX-approved certification program for sustainable forest management exists.

Column	Product category	Non structural panels (thousand square feet 3/8 inch)	Hardwood Lumber (thousand board feet)	Medium density fiberboard (thousand square feet 3/4 inch)
A	Scenario 1 and 2: Production from Own Sources	1,500,000	2,000,000	2,500,000
B	Scenario 1: 100% Purchased logs certified for sustainable forest management (Eligible purchased logs = 100%*Wood Products from Purchased logs)	2,500,000	1,000,000	500,000

C	Scenario 2: 50% Purchased logs certified for sustainable forest management (Eligible purchased logs = 50%*Wood Products from Purchased logs)	1,250,000	500,000	250,000
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Using the above figures, we can estimate total eligible production of wood products for crediting as follows:

Product	Units	Scenario 1 (A + B)	Scenario 2 (A + C)
Non structural panels	(thousand square feet 3/8 inch)	4,000,000	2,750,000
Hardwood Lumber	(thousand board feet)	3,000,000	2,500,000
Medium density fiberboard	(thousand square feet 3/4 inch)	3,000,000	2,750,000

Step 2: The total eligible production of Long-Lived Wood Products is converted to metric tons of CO₂ using the CCX product conversion factors established in [Appendix F](#).

Product	CCX Products Conversion factor	Credits from Long-Lived Wood Products (metric tons of CO ₂)	
		Scenario 1	Scenario 2
Non structural panels	0.628 per thousand square feet 3/8 inch	2,512,000	1,727,000
Hardwood Lumber	1.554 per thousand board feet	4,662,000	3,885,000
Medium density fiberboard	1.274 per thousand square feet 3/4 inch	3,822,000	3,503,500
Total		10,996,000	9,115,500

APPENDIX G: WIDELY-SPACED TREE PLANTING SUPPLEMENTAL INFORMATION

Methods for Quantifying Carbon Accumulation for Widely-Spaced Tree Plantings (Urban and Suburban Tree Planting Programs)

Step 1: Determine the number and species of qualifying live trees standing at the end of 2002 (or upon Project registration) on lands included in the CCX-registered Project. Qualifying trees are those planted after December 31, 2002 on sites not forested at that time.

Annual carbon sequestration values are calculated per one hundred trees.

Step 2: Reference Table 9 to determine how many trees in the Project (rounded to the nearest hundred) correspond to the tree types listed below

(Species: H = Hardwood, C = Conifer) and growth rates (S = Slow, M = Moderate, F = Fast).

Do not include trees with diameters less than 1 inch at breast height.

Step 3: Apply the annual carbon accumulation values provided in Table 10 to determine annual Mt CO₂.

For the purpose of calculating Tree Age in order to use Table 10, zero-year trees are 1 inch in diameter at Breast Height (total diameter at Breast Height of all trunks for multi-trunk trees).

To calculate Tree Age for trees with a diameter greater than 1 inch, use the following formula:

Equation 6: Calculating Age of Widely Spaced Trees

$$\text{Tree Age} = (\text{Tree diameter (in inches)} - 1) \times 3$$

NOTE: Round the result to the nearest whole number. Retain all worksheets, calculations, field assessments and other information on tree counts.

Calculation Example:

A city planted 10,000 two-inch diameter White Ash trees in 2007, so they are age 1 during 2008. The city concludes that 90% of the trees were successfully planted (9,000 remain alive).

The carbon sequestration calculation is as follows:

Tree type:	White Ash
Tree count:	9,000
Tree types, growth rate:	H, F
Carbon accumulated during 2008:	$90 \times 2.25 = 42.3 \text{ Mt CO}_2$

Table 9 – Tree Types and Growth Rates Applied to Widely-Spaced Tree Plantings (Urban and Suburban Tree Planting Programs)²⁵

Species	Type	Growth Rate	Species	Type	Growth Rate
Ailanthus, Ailanthus altissima	H	F	Maple, bigleaf, Acer macrophyllum	H	S
Alder, European, Alnus glutinosa	H	F	Maple, Norway, Acer platanoides	H	M
Ash, green, Fraxinus pennsylvanica	H	F	Maple, red, Acer rubrum	H	M
Ash, mountain, American, Sorbus americana	H	M	Maple, silver, Acer saccharinum	H	M
Ash, white, Fraxinus americana	H	F	Maple, sugar, Acer saccharum	H	S
Aspen, bigtooth, Populus grandidentata	H	M	Mulberry, red, Morus rubra	H	F
Aspen, quaking, Populus tremuloides	H	F	Oak, black, Quercus rubra	H	M
Baldcypress, Taxodium distichum	C	F	Oak, blue, Quercus douglasii	H	M
Basswood, American, Tilia americana	H	F	Oak, bur, Quercus macrocarpa	H	S
Beech, American, Fagus grandifolia	H	S	Oak, California black, Quercus kelloggii	H	S
Birch, paper (white), Betula papyrifera	H	M	Oak, California White, Quercus lobata	H	M
Birch, river, Betula nigra	H	M	Oak, canyon live, Quercus chrysolepsis	H	S
Birch, yellow, Betula alleghaniensis	H	S	Oak, chestnut, Quercus prinus	H	S
Boxelder, Acer negundo	H	F	Oak, Chinkapin, Quercus muehlenbergii	H	M
Buckeye, Ohio, Aesculus glabra	H	S	Oak, Laurel, Quercus laurifolia	H	F
Catalpa, northern, Catalpa speciosa	H	F	Oak, live, Quercus virginiana	H	F
Cedar-red, eastern, Juniperus virginiana	C	M	Oak, northern red, Quercus rubra	H	F
Cedar-white, northern, Thuja occidentalis	C	M	Oak, overcup, Quercus lyrata	H	S
Cherry, black, Prunus serotina	H	F	Oak, pin, Quercus palustris	H	F
Cherry, pin, Prunus pennsylvanica	H	M	Oak, scarlet, Quercus coccinea	H	F
Cottonwood, eastern, Populus deltoides	H	M	Oak, swamp white, Quercus bicolor	H	M

²⁵ “Method for Calculating Carbon Sequestration by Trees in Urban and Suburban Settings,” in Energy Information Administration, U.S. Department of Energy, *Voluntary Reporting of Greenhouse Gases*, April 1998.

Crabapple, Malus spp.	H	M	Oak, water, Quercus nigra	H	M
Cucumbertree, Magnolia acuminata	H	F	Oak, white, Quercus alba	H	S
Dogwood, flowering, Cornus florida	H	S	Oak, willow, Quercus phellos	H	M
Elm, American, Ulmus Americana	H	F	Pecan, Carya illinoensis	H	S
Elm, Chinese, Ulmus parvifolia	H	M	Pine, European black, Pinus nigra	C	S
Elm, rock, Ulmus thomasi	H	S	Pine, jack, Pinus banksiana	C	F
Elm, September, Ulmus serotina	H	F	Pine, loblolly, Pinus taeda	C	F
Elm, Siberian, Ulmus pumila	H	F	Pine, longleaf, Pinus palustris	C	F
Elm, slippery, Ulmus rubra	H	M	Pine, ponderosa, Pinus ponderosa	C	F
Fir, balsam, Abies balsamea	C	S	Pine, red, Pinus resinosa	C	F
Fir, Douglas, Pseudotsuga menziesii	C	F	Pine, Scotch, Pinus sylvestris	C	S
Ginkgo, Ginkgo biloba	H	S	Pine, shortleaf, Pinus echinata	C	F
Hackberry, Celtis occidentalis	H	F	Pine, slash, Pinus elliottii	C	F
Hawthorne, Crataegus spp.	H	M	Pine, Virginia, Pinus virginiana	C	M
Hemlock, eastern, Tsuga canadensis	C	M	Pine, white eastern, Pinus strobus	C	F
Hickory, bitternut, Carya cordiformis	H	S	Poplar, yellow, Liriodendron tulipifera	H	F
Hickory, mockernut, Carya tomentosa	H	M	Redbud, eastern, Cercis canadensis	H	M
Hickory, shagbark, Carya ovata	H	S	Sassafras, Sassafras albidum	H	M
Hickory, shellbark, Carya laciniata	H	S	Spruce, black, Picea mariana	C	S
Hickory, pignut, Carya glabra	H	M	Spruce, blue, Picea pungens	C	M
Holly, American, Ilex opaca	H	S	Spruce, Norway, Picea abies	C	M
Honeylocust, Gleditsia triacanthos	H	F	Spruce, red, Picea rubens	C	S
Hophornbeam, eastern, Ostrya virginiana	H	S	Spruce, white, Picea glauca	C	M
Horsechestnut, common, Aesculus Hippocastanum	H	F	Sugarberry, Celtis laevigata	H	F
Kentucky coffeetree, Gymnocladus dioicus	C	F	Sweetgum, Liquidambar styraciflua	H	F
Linden, little-leaf, Tilia cordata	H	F	Sycamore, Platanus occidentalis	H	F
Locust, black, Robinia pseudoacacia	H	F	Tamarack, Larix laricina	C	F
London plane tree, Platanus X acerifolia	H	F	Walnut, black, Juglans nigra	H	F
Magnolia, southern, Magnolia grandifolia	H	M	Willow, black, Salix nigra	H	F

Note: H = Hardwood, C = Conifer; Growth Rate: S = Slow, M = Moderate, F = Fast

Table 10 – Annual CCX Carbon Accumulation Quantities for Widely-Spaced Tree Plantings (Urban and Suburban Tree Planting Programs) (Mt CO₂) per One Hundred Trees by Tree Type and Age

Annual Sequestration Rates by Tree Type and Growth Rate (metric tons CO ₂ per one hundred trees)							
		Hardwood			Conifer		
Tree Age*	Tree diameter (at 4.5 feet height)	Slow	Moderate	Fast	Slow	Moderate	Fast
0	1 inch	0.15	0.22	0.31	0.08	0.12	0.16
1	1.33"	0.19	0.31	0.47	0.10	0.17	0.26
2	1.66"	0.23	0.41	0.63	0.13	0.23	0.36
3	2.0"	0.28	0.50	0.80	0.16	0.29	0.48
4	2.33"	0.33	0.61	0.99	0.19	0.36	0.61
5	2.66"	0.37	0.71	1.18	0.22	0.43	0.75
6	3.0"	0.43	0.83	1.38	0.26	0.51	0.89
7	3.33"	0.48	0.94	1.59	0.29	0.59	1.04
8	3.66"	0.54	1.06	1.81	0.33	0.68	1.19
9	4.0"	0.58	1.19	2.03	0.36	0.77	1.36
10	4.33"	0.64	1.31	2.25	0.41	0.86	1.54
11	4.66"	0.70	1.43	2.48	0.44	0.96	1.71
12	5.0"	0.76	1.57	2.72	0.49	1.06	1.90
13	5.33"	0.82	1.70	2.96	0.54	1.15	2.09
14	5.66"	0.87	1.84	3.21	0.57	1.26	2.28
15	6.0"	0.94	1.97	3.46	0.62	1.38	2.49
16	6.33"	1.00	2.11	3.72	0.66	1.48	2.70
17	6.66"	1.06	2.26	3.97	0.71	1.60	2.91
18	7.0"	1.13	2.40	4.23	0.77	1.71	3.14
19	7.33"	1.19	2.55	4.50	0.82	1.83	3.36
20	7.66"	1.26	2.70	4.78	0.86	1.95	3.59
21	8.0"	1.33	2.84	5.05	0.92	2.07	3.82
22	8.33"	1.40	3.01	5.33	0.97	2.20	4.07
23	8.66"	1.46	3.16	5.61	1.03	2.33	4.31
24	9.0"	1.53	3.31	5.90	1.07	2.46	4.56
25	9.33"	1.60	3.47	6.19	1.13	2.59	4.81
26	9.66"	1.67	3.64	6.48	1.19	2.73	5.07
27	10.0"	1.75	3.79	6.77	1.25	2.87	5.33
28	10.33"	1.82	3.95	7.08	1.31	3.01	5.59
29	10.66"	1.89	4.11	7.38	1.36	3.15	5.86

APPENDIX H: CCX-APPROVED GROWTH-AND-YIELD MODELS

The CCX Forestry Committee has approved the following growth-and-yield models:

- SiMS / GaPPS / PMRC for southern yellow pine
- TWIGS for hardwoods (all U.S. regional variants approved)
- U.S. Forest Service FVS for hardwoods and conifers (all regional variants approved)
<http://www.fs.fed.us/fmrc/fvs/>
- Southern Hardwood Research Cooperative “SOHARC” growth-and-yield model for Southern U.S. hardwoods
- CO₂ FIX model for tropical tree species

APPENDIX I: SYNTHETIC BASELINE – HYPOTHETICAL EXAMPLE

Consider a hypothetical firm with total energy usage of 100,000,000 GJ for baseline years. The following is the energy mix for the hypothetical firm:

Type of Energy	Energy Mix (%)	Energy Mix (GJ)	Emissions (Mt CO ₂ e)*
Fossil Fuel	15%	15,000,000 GJ	840,900 (Mt CO ₂ e)
Renewable Energy	85%	85,000,000 GJ	N/A

**In this example, we assume that the only fossil fuel energy source for the firm is natural gas. Based on WRI/WBCSD CO₂ emission factors, the direct emissions baseline is 840,900 metric tons of CO₂.*

Applying the proposed procedure the synthetic emissions baseline for the firm is computed as 2,727,727 metric tons of CO₂ (100,000,000 GJ*0.0273 metric tons per GJ). Computations for maximum allowed sales from Forest Carbon Stocks will be based on this Synthetic emissions baseline. The limits on sales from net increases in Forest Carbon Stocks for the firm are presented in the following table.

Table 11 – Modified Limitations on Sales of Exchange Allowances from Net Increases in Forest Carbon Stocks for Firm (metric tons of CO₂)

Compliance Year	Maximum Recognized net increases in forest stocks
2003	81,832
2004	109,109
2005	163,664
2006	190,941
Total	354,605