Viterra Inc.

Tillage Management Offset Project

Project Report

February 19, 2009

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1.0 Introduction

The purpose of this report is to summarize Viterra's Tillage Management Offset Project and to clearly demonstrate how Viterra has followed the activities and procedures outlined in Viterra's Offset Project Plan (appended to this report).

2.0 Project and Proponent Identification

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3.0 Project Description

This project involves aggregating carbon offsets created from reductions in greenhouse gas (GHG) emissions through the implementation of reduced till or no-till practices on agricultural lands in Alberta. The GHG offsets generated by this project are generated and quantified in accordance with the Alberta Environment's Quantification Protocol for Tillage System Management ("The Protocol").

The Offset Project Plan is appended to this report and provides detailed information on Viterra's Tillage Management Offset Project. Overall, the project did not deviate significantly from the Offset Project Plan.

4.0 Reporting Period

The time period covered by this report is January 1, 2002 to December 31, 2008. All offset credits that Viterra has aggregated to date were generated within this time period.

5.0 Data Collection & Monitoring

5.1 Overview

The Carbon Credit Asset Management System (CCAMS) developed by Carbon Credit Corp was used in this project to aggregate acreage. CCAMS is a web-based system accessed only by authorized users via a web browser, customized to enable Viterra to store data, provide an initial indication of the eligibility of land for offsets, calculate the number of offsets the farmer is eligible for, issue contracts to farmers for the purchase of offsets, and manage the contracts.

See the CCAMS User Manual for details about the system's operations.

6.0 Quality Assurance

Viterra followed the plan for data monitoring and quality assurance/quality control outlined in the Offset Project Plan.

For applications that are sent in directly from the applicant, the same program administrator completes part 1 of the preliminary eligibility assessment and enters the data for that application into CCAMS, as appropriate. This is done so that only the person who is familiar with the farmer's application and the results of the eligibility assessment can enter data into the system for this applicant. If part 2 of the eligibility assessment is required, the same program administrator will contact a Financial Products Sales Specialist (SPSS) and have them complete the assessment. Once complete, the FPSS will send the results to the same program administrator will be process the application, as appropriate.

Financial Products Sales Specialists are not able to login in to CCAMS. For quality assurance purposes, it was determined that only personnel at the program headquarters would have access to the system. All related documentation, including completed application forms and eligibility assessment forms are sent by the FPSS to the office in Winnipeg to be processed. All information received from the FPSSs is reviewed from by a trained program administrator prior to entering the information into CCAMS. There are communication channels and processes in place to ensure that there is an accurate transfer of information amongst the staff involved. These processes evolved through the course of the project to create a high quality and streamlined aggregation process.

7.0 Farm-Level Data Collection

Farmers signed up for Viterra's program in one of two ways:

1. Fill out an application form and send it directly to Viterra's program office
2. Sign up through a Viterra Financial Products Sales Specialist

The majority of the offset credits that Viterra has aggregated during the reporting time period were generated by either current or past Viterra customers from either the Grain or Agri-Products Divisions of Viterra. This allowed Viterra to capitalize on the relationship with the farmer and the existing records of the applicants farming practices.

See the Offset Project Plan for further information on data collection.

7.1 Verification Measures

For all applications received; whether directly from an applicant or through a Viterra Financial Products Sales Specialist, Viterra sought to confirm the eligibility of the applicant to generate offset credits according to The Protocol requirements. During the process of completing of an

eligibility assessment, an authorized program administrator or FPSS would use any reasonable methods to obtain information needed to complete the assessment. Methods of obtaining information included talking with Viterra business unit staff familiar with the applicant's farming practices, consulting Viterra customer records (including AgroManager) and visiting the site of the applicant.

7.2 CCAMS Data Input

All data was manually entered into CCAMS by an authorized program administrator at Viterra. The program administrator first determined whether or not the farmer had a customer account number with Viterra. If the farmer did not have a customer account number, a Viterra account was created and the assigned number was used as the customer ID in CCAMS.

The risk of transcription errors were mitigated by using trained data entry personnel and through the use of pre-determined questionnaire fields in CCAMS. The interface is very user-friendly, using drop-down lists in many of the data entry fields in order to avoid potential transcription errors. Once a carbon questionnaire was completed, the employee double checked the field entries to ensure that the data had been entered correctly.

Data input procedures documented in the CCAMS User Manual.

8.0 Legal Contract between Viterra and Producer

When all the required information was entered into CCAMS for an eligible applicant, a contract was viewed or printed out by an authorized user. The contract includes a confirmation of the details provided by the farmer in the application form as well as the legal elements of the contract.

The contract between Viterra and the farmer is an annual contract. If a farmer wishes to participate in Viterra's Carbon Credit Program in future years he or she must sign up on an annual basis. Farmers can express an interest in claiming credits for future years; however, only on or after a certain date (noted in the contract) can a farmer enter into a contract for the credits for that year. Prior to that date, a farmer can only claim credits from 2002 to the year prior to the current year.

9.0 Quantification of Reductions/Removals

9.1 Methodology

For this project, carbon offsets were quantified using methodologies outlined in the Tillage Protocol; raw input used for the calculations can be found in Appendix B. The emission factors, summarized in Table 1, were calculated using the formulae presented in Appendix C from the Tillage Protocol, which are detailed in Appendix B of this report.

9.2 Emission Factors

The project coefficients noted in the table below were used as appropriate for each region. All project lands practicing no-till or reduced-till received the same emission factor per area, regardless of what tillage systems were performed in the past.

Following the Tillage Systems Protocol, the following coefficients were calculated for each of the relevant soil zones:

Table 1 - Emission Factors

Soil Zone	Tillage Practice	Coefficient (tCO2e)
Parkland	No Till	0.164
	Reduced Till	0.011
Dry Prairie	No Till	0.088
	Reduced Till	-0.006
Irrigated Dry Prairie	No Till	0.128
	Reduced Till	-0.009

9.3 Carbon Credit Calculations

For each acre claimed, carbon credits were calculated using the appropriate emission factor (Table 1) multiplied by the number of years under No Till (or Reduced Till). The earliest year permitted was 2002, and the latest year (for the calculation of eligible credits) was 2008.

For example, if a farmer wanted to claim 160 acres (in Parkland) that had been under No Till from 2005 to 2008, then the following example shows how the number of credits were calculated:

Number of Credits Calculated

= Acreage x # Years under No Till x Emission Factor
= 160 acres x 4 years x 0.164
= 104.96 tCO_2e

9.4 Ownership of Carbon Credits

In order to claim credits, the applicant had to indicate whether they owned the land, or had the rights to claim the credits. If the famer leased the land, they were responsible for obtaining written authorization from the legal land owner that they could claim credits on the land they were operating under no till or reduced till.

9.5 GHG Reduction Totals (point 5, section 2.3.6)

Year	tCO2e
2002	4440.64
2003	4880.49
2004	6255.03
2005	6499.59
2006	6928.26
2007	6959.06
2008	6983.99
Total	42,947.06

10.0 Project Changes

At the start of the project, before Financial Products Sales Specialists (FPSS) were hired and trained, farmers could only sign up for Viterra's program directly. As described in the Offset Project Plan, if there were any concerns with the applications that could not be resolved without a site visit, those applications were put on hold until the FPSSs were able to complete the eligibility assessment.

Once the FPSS had been hired and trained, they began signing growers up for the program and completed an eligibility assessment for all applicants. They also attempted to resolve any issues with applications that had been sent directly to Viterra.

Near the end of the reporting period the producer contract was revised to clarify at what point farmers could claim credits for future years as the contract between Viterra and the applicant is an annual contract. See the Offset Project Plan for further information.

11.0 References

- Additional Guidance for Interpretation of the Quantification Protocol for Tillage System Management for Carbon Offsets in Alberta, Alberta Environment, Version 1, February 2008
- Climate Change Central. Tillage System Management – Alberta Protocol
- Climate Change Central. Alberta Offset System.[1]
- Quantification Protocol for Tillage System Management, Alberta Environment, Version 1.3, February 2008.

[1] www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/cl11618/$FILE/offset.pdf

12.0 Signatures

For Viterra Inc.

George Prosk
Senior V. P. Financial Products

Marina de Luna
Program Development Specialist

APPENDIX A: Project Offset Plan

Viterra Inc.

Tillage Management Offset Project

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1.0 Introduction

This project will involve aggregating carbon offsets created from reductions in greenhouse gas (GHG) emissions through the implementation of reduced till or no-till practices on agricultural lands in Alberta.

The project proponent is Viterra, Canada's leading agribusiness, with extensive operations and distribution capabilities across Western Canada, and with operations in the United States, Japan and Singapore. Viterra is diversified into sales and services of crop inputs and equipment, grain handling and marketing, livestock feed, agri-food processing and financial products. These operations are complemented by value-added businesses and strategic alliances, which allow Viterra to leverage its pivotal position between Prairie farmers and destination customers. The Company's common shares are listed on the Toronto Stock Exchange under the symbol VT.

Viterra's credibility as a carbon offset aggregator is evidenced by the company's adherence to the Alberta Government Protocols, the verification measures in place to determine farmer eligibility and carbon offset credit ownership, long-standing relationships with farmers in Alberta, professional management, and financial stability.

2.0 Project and Proponent Identification

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3.0 Project Description

See appended Offset Project Plan

3.1 Project Scope

Offsets can be claimed from the current year to as far back as January 1, 2002, provided that it can be verified that the farmer has been practicing no-till or reduced-till during this time period. Once a transfer of ownership has taken place for offsets from this period, farmers will be able to claim future offsets on an annual basis.

In this project, Viterra is an aggregator and will purchase offsets from eligible farmers located in Alberta who engage in no-till or reduced-till practices on annually seeded agricultural land, as outlined in The Protocol.

Viterra will seek to accumulate a large number of offsets in order to justify the transaction costs, which in this case will be spread across numerous sellers. This will enable a regulated emitter in the province of Alberta to purchase a significant amount of offsets for compliance purposes.

3.1.1 Offset Eligibility Requirements

The offsets aggregated in this project will meet the following requirements stated in The Protocol:

- Result from actions taken on or after January 1, 2002;
- Be real, demonstrable, quantifiable;
- Not be required by law;
- Have clearly established ownership;
- Be counted once for compliance purposes; and,
- Be verified by a qualified third party

3.2 Project Site Definition

3.2.1 Geographical Jurisdiction

The geographical jurisdiction of this project is the land in the Parkland and Dry Prairie regions of Alberta as specified in the Alberta Protocol. Each of these regions has different coefficients for both no-till and reduced-till systems practiced on agricultural land that are used to calculate the amount of tC02e per acre that is sequestered in the soil. The Black-Dark Brown soil zone boundary is the boundary between Dry Prairie and Parkland. The offsets generated through the practice of conservation tillage will be based on agricultural land within the Protocol area and may vary from year to year. A list of the legal land descriptions (LLD) for the applicable land will be included in the forthcoming Project report.

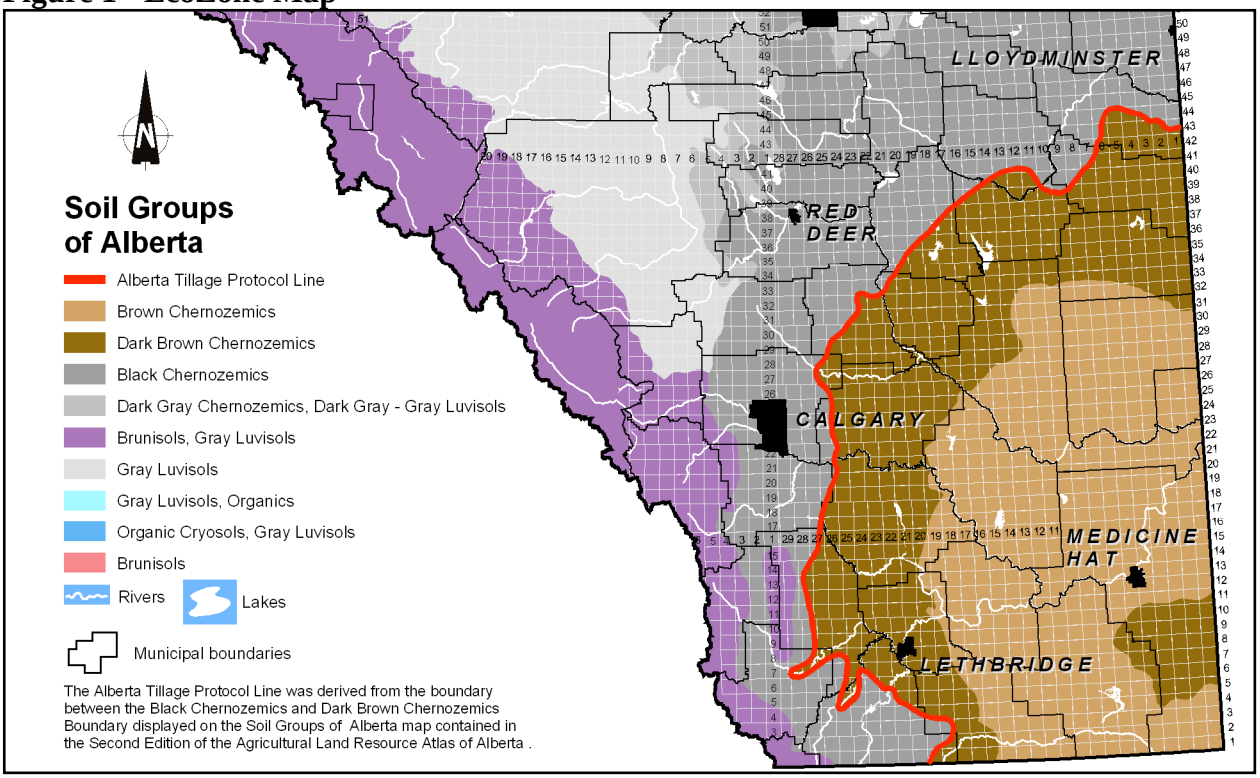
As described in the Alberta Protocol, the boundary between the protocol areas is based on the following criteria:

Soil zone: The Black-Dark Brown soil zone boundary is an important demarcation of soil organic matter levels and thus potentials to sequester or emit carbon, based upon tillage management practices.

Moisture regime: The boundary coincides with the -300 Climatic Moisture Index (precipitation minus evapotranspiration).

Historical precedence: Crop and fertilizer recommendations, research analysis and coefficients have historically been separated by soil zone boundaries.

Figure 1 - EcoZone Map



Source: Alberta Agriculture, 2007

3.2.2 Tillage Practices

As outlined in The Protocol, tillage practices can be divided into three categories: Full Till (FT), Reduced Till (RT), and No Till (NT). The definition of each tillage system as defined in The Protocol is presented in Table 1 below.

Table 1: Definitions of tillage systems in the Parkland and Dry Prairie protocol areas

Tillage System	Cropped Land Period	Fallow Period
No Till	Up to two passes with low-disturbance openers (up to 38%) 4,5 or one pass with a slightly higher disturbance opener (up to 46%) to apply seed, fertilizer or manure6, discretionary tillage of up to 10%5, no cultivation	No cultivations
Reduced Till	Soil disturbance to apply seed, fertilizer, or manure exceeds no till definition and/or one cultivation in fall	One to two cultivations

	or spring	
Full Till	More than one cultivation between harvest and subsequent seeding if no fallow in that period, or, more than three cultivations between harvest to seeding if fallow	More that two cultivations

Notes:
1 The Peace River Lowland ecoregion is contained within the Parkland zone.
2 Cropped land period applied to the management cycle that terminates at harvest (e.g. harvest to harvest is the cropped land period). This includes land preparation for seeding which may occur in the previous fall.
3 Fallow period extends from harvest for one full year to the next fall.
4 Percentage values associated with openers are based on maximum opener width (e.g. 5 inch openers actually measure 5.5 inches) divided by the shank spacing of the implement.
5 Additional operations with harrows, packers, or similar non-soil disturbing implements are accepted. Where a second low soil disturbance operation is performed it is normally for injection of fertilizer or manure.
6 Discretionary tillage of up to 10% means that up to 10% of the surface area of a single agricultural field may be cultivated to address specific management issues. These areas are determined on an annual basis, meaning that specific areas may change from year to year.

3.3 Inventory of Sources and Sinks (SS)

The GHG sources and sinks relevant to this project, as per The Protocol, are provided in Table #2. The list includes the entire scope of activities relevant to this project.

Table 2 - Upstream Sources and Sinks (SS) during Project Operation:

Sources/Sinks	Description	Controlled, Related or Affected	Include or Exclude from Quantification	Justification for Exclusion
Seed Production	Seed production may include several energy inputs such as natural gas, diesel and electricity. Quantities and types for each of the energy inputs would be contemplated to evaluate functional equivalence with the project condition.	Related	Baseline=Exclude Project=Exclude	Excluded as these SS's are not relevant to the project as the emissions from these practices are covered under the proposed greenhouse gas regulations. Further, the baseline and project conditions will be functionally equivalent.
Seed Transportation (Off-Site)	Seeds may be transported to the project site by truck, barge and/or train. The related energy inputs for fuelling this equipment are captured under this SS, for the purposes of calculating the resulting greenhouse gas emissions. Type of equipment, number of loads and distance traveled would be used to evaluate functional equivalence with the baseline condition.	Related	Baseline=Exclude Project=Exclude	Excluded as the emissions from transportation are negligible and likely functionally equivalent to the baseline scenario.
Fertilizer and Lime Production	Fertilizer and lime production may include several material and energy inputs such as natural, diesel and electricity. Quantities and types for each of the energy inputs would be contemplated to evaluate functional equivalences with the project condition.	Related	Baseline=Exclude Project=Exclude	Excluded as these SS's are not relevant to the project as the emissions from these practices are covered under the proposed greenhouse gas regulations. Further, the baseline and project conditions will be functionally equivalent.
Fertilizer and Lime Distribution (Off-Site)	Fertilizer and lime may be transported to the project site by truck, barge, and/or train. The related energy inputs for fuelling this equipment are captured under this SS. For the purposes of calculating the resulting greenhouse gas emissions. Type of equipment, number of loads and distance traveled would be used to evaluate functional equivalence with the baseline condition.	Related	Baseline=Exclude Project=Exclude	Excluded as the emissions from transportation are negligible and likely functionally equivalent to the baseline scenario.
Pesticide Production	Pesticide production may include several material and energy inputs such as natural gas, diesel and electricity. Quantities and types for each of the energy inputs would be contemplated to evaluate	Related	Baseline=Include Project=Include	N/A

	functional equivalence with the project condition.			
Pesticide Distribution (Off-Site)	Pesticide may be transported to the project site by truck, barge and/or train. The related energy inputs for fuelling this equipment are captured under this SS, for the purposes of calculating the resulting greenhouse gas emissions. Type of equipment, number of loads and distance traveled would be used to evaluate functional equivalences with the baseline condition.	Related	Baseline=Exclude Project=Exclude	Excluded as the emissions from transportation are negligible and likely functionally equivalent to the baseline scenario.
Fuel Extraction and Processing	Each of the fuels used throughout the on-site component of the project will need to be sourced and processed. This will allow for the calculation of the greenhouse gas emissions from the various processes involved in the production, refinement and storage of the fuels. The total volumes of fuel for each of the on-site SS's are considered under this SS. Volumes and types of fuels are the important characteristics to be tracked.	Related	Baseline=Exclude Project=Exclude	Excluded as the emissions from the baseline are greater that the project condition so this is a conservative approach, allowing application of the default methodology with available factors.
Fuel Delivery	Each of the fuels used throughout the on-site component of the project will need to be transported to the site. This may include shipments by tanker or by pipeline, resulting in the emissions of greenhouse gases. It is reasonable to exclude fuel sourced by taking equipment to an existing commercial fuelling business unit as the fuel is used to take the equipment to the site is captured under other SS's and there is no other delivery.	Related	Baseline=Exclude Project=Exclude	Excluded as these SS's are not relevant to the project as the emissions from these practices are covered under the proposed greenhouse gas regulations.

Onsite Sources and Sinks during Project Operation:

Sources/Sinks	**Description**	**Controlled, Related or Affected**	**Include or Exclude from Quantification**	**Justification for Exclusion**
Seed Distribution (On-Site)	Seed would need to be transported from storage to the field. The related energy inputs for fuelling this equipment are captured under this SS, for the purposes of calculating the resulting greenhouse	Controlled	Baseline=Include Project=Include	N/A

	gas emissions. Type of equipment, number of loads and distance traveled would be used to evaluate functional equivalence with the baseline condition.			
Seed Use	Emissions associated with the use of the seeds. Inputs of embedded energy and materials would need to be tracked to ensure equivalency with the baseline condition.	Controlled	Baseline=Exclude Project=Exclude	Excluded as the emissions from seeding are negligible and likely functionally equivalent to the baseline scenario.
Fertilizer and Lime Distribution (On-Site)	Fertilizer and lime would need to be transported from storage to the field. The related energy inputs for fuelling this equipment are captured under this SS, for the purposes of calculating the resulting greenhouse gas emissions. Type of equipment, number of loads and distance traveled would be used to evaluate functional equivalences with the baseline condition.	Controlled	Baseline=Include Project=Include	N/A
Fertilizer and Lime Use	Emissions associated with the use of the fertilizer and lime. Timing, composition, concentration and volume of fertilizer need to be tracked.	Controlled	Baseline=Exclude Project=Exclude	Excluded as the emissions from seeding are likely functionally equivalent to the baseline scenario.
Pesticide Distribution (On-Site)	Pesticide distribution would need to be transported from storage to the field. The related energy inputs for fuelling this equipment are captured under this SS, for the purposes of calculating the resulting greenhouse gas emissions. Type of equipment, number of loads and distance traveled would be used to evaluate functional equivalence with the baseline condition.	Controlled	Baseline=Include Project=Include	N/A
Pesticide Use	Emissions associated with the use of the pesticide. Timing, composition, concentration and volume of fertilizer need to be tracked to ensure equivalency with the baseline condition.	Controlled	Baseline=Exclude Project=Exclude	Excluded as the emissions from pesticide use are likely functionally equivalent to the baseline scenario.
Soil Crop Dynamics	Flows of materials and energy that comprise the cycling of soil and plant carbon and nitrogen, including deposition in plant tissue, decomposition of crop residues, stabilization in organic matter and emission as carbon dioxide and nitrous oxide.	Controlled	Baseline=Include Project=Include	N/A
Farm Operations	Greenhouse gas emissions may occur that are associated with the operation and maintenance of	Controlled	Baseline=Exclude Project=Exclude	Excluded as the farm operations are likely functionally equivalent to the baseline

	the farm facility and related equipment. This may include running vehicles and facilities at the project site. Quantities and types for each of the energy inputs would be tracked.			scenario.
Crop Product Transportation (On-Site)	Crops would need to be harvested and transported from the field to storage. The related energy inputs for fuelling this equipment are captured under this SS, for the purposes of calculating the resulting greenhouse gas emissions. Type of equipment, number of loads and distance traveled would be used to evaluate functional equivalence with the baseline condition.	Controlled	Baseline=Exclude Project=Exclude	Excluded as the emissions from crop harvesting and transportation are likely functionally equivalent to the baseline scenario.

Downstream Sources and Sinks during Project Operation:

Sources/Sinks	Description	Controlled, Related or Affected	Include or Exclude from Quantification	Justification for Exclusion
Crop Product Transportation (Off-Site)	Crops would need to be transported from storage to the market by truck, barge and/or train. The related energy inputs for fuelling this equipment are captured under this SS, for the purposes of calculating the resulting greenhouse gas emissions. Type of equipment, number of loads and distance traveled would be used to evaluate functional equivalence with the baseline condition.	Related	Baseline=Exclude Project=Exclude	Excluded as the emissions from transportation are negligible and likely functionally equivalent to the baseline scenario.
Crop Product Processing	Inputs of materials and energy involved in the processing and end product utilization of the crop would need to be tracked to ensure functional equivalence with the baseline condition.	Related	Baseline=Exclude Project=Exclude	Excluded as the emissions from crop product processing are functionally equivalent to the baseline scenario.

Other:

Sources/Sinks	Description	Controlled, Related or Affected	Include or Exclude from Quantification	Justification for Exclusion

Building Equipment	Equipment may need to be build either on-site of off-site. This includes all of the components of the storage, handling, processing, combustion, air quality control, and system control and safety systems. These may be sourced as pre-made standard equipment of custom built to specification. Greenhouse gas emissions would be primarily attributed to the use of fossil fuels and electricity used to power the equipment delivering the equipment to the site.	Related	Baseline=Exclude Project=Exclude	Project: Emissions from building equipment are not material given the long project life, and the minimal building equipment typically required. Baseline: Emissions from building equipment are not material for the baseline condition given the minimal building equipment typically required.
Transportation of Equipment	Equipment built off-site and the materials to build equipment on-site, will all need to be delivered to the site. Transportation may be completed by train, truck, by some combination, or even by courier. Greenhouse gas emissions would be primarily attributed to the use of fossil fuels to power the equipment delivering the equipment to the site.	Related	Baseline=Exclude Project=Exclude	Project: Emissions from transportation of equipment are not material given the long project life, and the minimal transportation of equipment typically required. Baseline: Emissions from transportation of equipment are not material for the baseline condition given the minimal transportation of equipment typically required.
Testing of Equipment	Equipment may need to be tested to ensure that it is operational. This may result in running the equipment using test anaerobic digestion fuels or fossil fuels in order to ensure that the equipment runs properly. These activities will result in greenhouse gas emissions associated with the combustion of fossil fuels and the use of electricity.	Related	Baseline=Exclude Project=Exclude	Project: Emissions from testing of equipment are not material given the long project life, and the minimal testing of equipment typically required. Baseline: Emissions from testing of equipment are not material for the baseline condition given the minimal resting of equipment typically required.

4.0 Identification and Justification of Baseline

According to The Protocol, the baseline condition for this project is a performance-based approach. Thus, it is not required that the project baseline be proven at the onset of the project and therefore, historical practices associated with the land for which carbon offsets are derived is not relevant to the project. In this project, carbon sequestration results from a change in tillage practice relative to a baseline condition of full tillage. As stated in The Protocol "The performance standards for no-till and reduced-till farming are set relative to a 1990 baseline and would be subject to revision over time. The uptake of no-till and reduced-till farming is considered within the coefficients implicit within the default methodology approach to assessing the relevant performance standard. The established baseline would be considered as static, where the coefficients remain constant, subject to periodic revision to reflect the evolving performance standard."

5.0 Quantification of Reductions/Removals

5.1 Quantification Approach

Quantification of the reductions, removals and reversals of relevant sources and sinks will be achieved using the approach described in section 2.5.1 of The Protocol, as shown below:

These calculation methodologies serve to complete the following three equations for calculating the emissions reductions from the comparison of the baseline and project conditions.

$$\text{Emission Reduction} = \text{Emissions}_{\text{Baseline}} - \text{Emissions}_{\text{Project}}$$

$$\text{Emissions Baseline} = \text{Emissions}_{\text{Energy Use}} + \text{Emissions}_{\text{Carbon Sequestration}} * \text{Assurance Factor} + \text{Emissions}_{\text{Nitrogen}}$$

$$\text{Emissions}_{\text{Project}} = 0$$

Where:

$\text{Emissions}_{\text{Baseline}}$ = sum of the emissions under the baseline condition.

$\text{Emissions}_{\text{Energy Use}}$ = component of emissions under SS B9 Pesticide Production, B3 Seed Distribution (On-Site), B7 Fertilizer and Lime Distribution (On-Site), B11 Pesticide Distribution (On-Site)

$\text{Emissions}_{\text{Carbon Sequestration}}$ = component of emissions under SS B13 Soil and Crop Dynamics

Assurance Factor = Factor to account for reversals due to tillage events. Relevant assurance factors are provided in **Appendix B.**

Emissions $_{Nitrogen}$ = component of emissions under SS B13 Soil and Crop Dynamics

Emissions $_{Project}$ = sum of the emissions under the project condition.

5.2 Quantification Parameters

As outlined in The Protocol, Alberta Environment has created a default methodology for the quantification of offsets for projects that carry out conservation tillage on agricultural land in the applicable soil zones. This project will use the defined procedures to measure and estimate each parameter.

Table 3: Quantification Parameters

1.0 Project/ Baseline SS	**2. Parameter / Variable**	**3. Unit**	**4. Measured / Estimated**	**5. Method**	**6. Frequency**	**7. Justify measurement or estimation and frequency**
B9 Pesticide Production	Emissions $_{Energy\ Use}$ = ∑Area $_{Till\ Practice\ y}$ * EF$_{Energy\ Use}$					
B3 Seed Distribution (On-Site)	Emission Reductions from Carbon Sequestration / Emissions $_{Energy\ Use}$	kg CO_{2E} / yr	N/A	N/A	N/A	Quantity being calculated.
B7 Fertilizer and Lime Distribution (On-Site)	Area of Field under Each Till Practice / Area $_{Till\ Practice\ Y}$	ha	Measured		Continuous	
B11 Pesticide Distribution (On-Site)	Reduction Factor For Relevant Till Practice in Relevant Area and Geographic Zone / EF $_{Energy\ Use}$	kg CO_{2E} / ha / yr	Estimated	Default factor based on project farm location, as available at January 1 of the first year of the project. Transition zones should be characterized based on the dominant soil zone.	Annually	As per NCGAVS process.
B13 Soil and Crop Dynamics	Emissions $_{Carbon\ Sequestration}$ = ∑Area $_{Till\ Practice\ y}$ * EF $_{20\ yr\ Linear\ SOC\ Coefficient}$					
	Emission Reductions from Carbon Sequestration / Emissions $_{Carbon\ Sequestration}$	kg CO_{2E} / yr	N/A	N/A	N/A	Quantity being calculated.

	Area of Field under Each Till Practice / Area $_{\text{Till Practice Y}}$	ha	Measured		Continuous	
	Sequestration Factor For Relevant Till Practice in Relevant Area and Geographic Zone / EF $_{10\ \text{yr Linear SOC Coefficient}}$	kg CO_{2E} / ha / yr	Estimated	Default factor based on project farm location, as available at January 1 of the first year of the project. Transition zones should be characterized based on the dominant soil zone.	Annually	As per NCGAVS process.
	Emissions $_{\text{Nitrogen}} = \sum$Area $_{\text{Till Practice y}}$ * EF $_{\text{N2O Coefficient}}$					
	Emission Reductions from Nitrogen Oxide Reduction / Emissions $_{\text{Nitrogen}}$	kg CO_{2E} / yr	N/A	N/A	N/A	Quantity being calculated.
	Area of Field under Each Till Practice / Area $_{\text{Till Practice Y}}$	ha	Measured		Continuous	
	Reduction Factor For Relevant Till Practice in Relevant Area and Geographic Zone / EF $_{\text{N2O Coefficient}}$	kg CO_{2E} / ha / yr	Estimated	Default factor based on project farm location, as available at January 1 of the first year of the project. Transition zones should be characterized based on the dominant soil zone.	Annually	As per NCGAVS process.

5.3 Coefficient Adjustments

According to the protocol, a baseline coefficient adjustment takes into account the area of agricultural land that is currently under conservation tillage management. An assurance factor is used to account for the average risk of a reversal in tillage management practice across all farms with a given region.

Table 4: Baseline Adjusted Emission Factors (T CO_2e per acre per year)

Region	Practice	Carbon Sequestered	Assurance Factor	Nitrous Oxide Reduction	Energy Reduction
Parkland	FT to NT	0.144	0.875	0.008	0.030
	FT to RT	0.008	0.875		-0.004
Dry Prairie	FT to NT	0.079	0.925	0.002	0.012
	FT to RT	-0.007	0.900		-0.002

5.4 Key Sources and Sinks

A description of the key sources and sinks to be quantified can be found in table 2 of this document.

5.5 Quantification Coefficients

Project coefficients will be used so that in a given region, all project lands practicing no-till or reduced-till will receive the same emission factor per area, regardless of what tillage systems were performed in the past.

Following the Tillage Systems Protocol, the following coefficients were calculated for each of the relevant soil zones:

Table 5: Quantification Coefficients

Soil Zone	Tillage	Coefficient
Parkland	No Till	0.164 tCO_2e/acre
	Reduced Till	0.011 tCO_2e/acre
Dry Prairie	No Till	0.088 tCO_2e/acre
	Reduced Till	-0.006 tCO_2e/acre
Dry Prairie (Irrigated)	No Till	0.128 tCO_2e/acre
	Reduced Till	-0.009 tCO_2e/acre

The irrigated Dry Prairie coefficients were derived using the raw Parkland CO_2e and N_2O coefficients, and the Dry Prairie energy, land use % and assurance factors.

5.6 Data Quality Management

5.6.1 Data Management System Overview

The Carbon Credit Asset Management System (CCAMS) was developed by Carbon Credit Corp. CCAMS is a web-based system accessed only by authorized users via a web browser that requires users to enter a password to gain entry into the system. The system has been customized to enable Viterra to store data, provide an initial indication of the eligibility of land for offsets, calculate the number of offsets the farmer is eligible for, issue contracts to farmers for the purchase of offsets, and manage the contracts. Further information on CCAMS and the data management process is provided in the following sections.

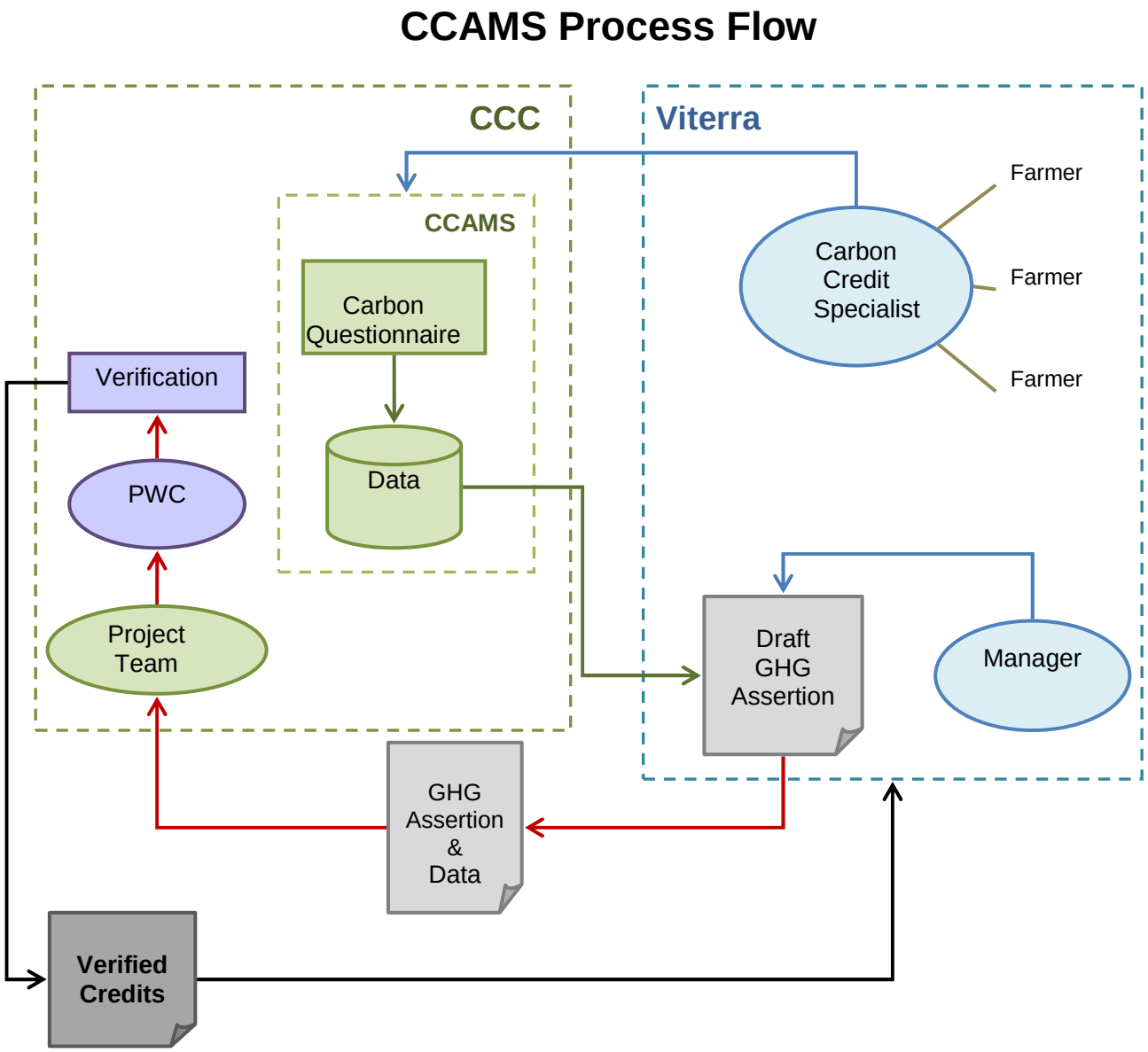
6.0 Data Monitoring and QA/QC

Viterra has developed a plan for data monitoring and quality assurance/quality control that will provide assurance that the aggregated offsets are of high quality based on the verification measures instituted throughout the aggregation process. The following sections provide details of this plan.

6.1 Data Process Flow

The data flow process and general monitoring and QA/QC plan is illustrated in Figure #2

Figure 2 – General Data Flow Diagram



A more detailed process flow diagram can be found in Appendix D.

6.2 Farm-Level Data Collection

One of Viterra's key advantages is its strong ties to farmers in Western Canada and currently conducts business with over 7,000 farmers in Alberta. The various communication channels with farmers in Alberta will help to ensure that offsets resulting from this project are based on real, demonstrable, and quantifiable reductions or removals of greenhouse gases.

Farmers can sign up for Viterra's program in one of two ways:

1) Fill out an application form and send it directly to Viterra's program office
2) Sign up through a Viterra Financial Products Sales Specialist

In both cases an applicant must fill out an application through which they express an interest in claiming offsets for the land on which either no-till or reduced-till farming is practiced. The application form includes such fields as the applicant's name and address, detailed information on farming practices associated with the land (including seeding equipment used), as well as a list of the annually seeded acres by quarter section.

Depending on how the applicant applies for Viterra's program, appropriate procedures will be followed in order to determine the eligibility of the farmer to participate in the program. These steps are described in the following sections.

6.2.1 AgroManager

AgroManager™[2] is owned by Viterra and is a comprehensive and integrated suite of agronomic software products used primarily by front-line staff. Modules currently include Task Management, Customer Relationship Management, Field Record Keeping, Blending, Fertilizer Recommendation, Irrigation Management, Weeds, Insects and Diseases.

While the information obtained from AgroManager cannot be considered sufficient to determine the eligibility of a customer to generate offsets as part of Viterra's program, it is a tool that can be used to better understand the current and past farming practices of a farmer. These data would be available for verification, as required.

The following modules will be used as part of the eligibility assessment completed for past or current Viterra customers who wish to apply for Viterra's Carbon Credit Program:

Customer Relationship Management is an extensive record-keeping system that contains information about customers and their farms. Stored information includes such this as: equipment used, farm type, farm size, tillage practices and more. Current sales information and sales history from previous years in populated from core systems. Seeded acres information is either downloaded from CWB or entered directly by Viterra staff.

AgroPlan is an extensive record-keeping system that provides easy access to organized detailed field records in such areas as cropping history, environmental conditions, soil tests, field conditions, seeding, harvesting, fertilizer applications, and more.

6.2.2 Sign-up: Financial Products Sales Specialists

[2] AGROMANAGER is trademark of Viterra Inc.

Financial Products Sales Specialists (FPSS) are Viterra employees who will work with farmers who are interested in signing up for Viterra's Carbon Credit Program. The FPSSs receive extensive training and are equipped with the knowledge and experience required to provide farmers with in-depth information on:

i) Tillage-based carbon credits
ii) Viterra's Carbon Credit Program
iii) Eligibility requirements

In addition, FPSSs are trained to complete an assessment of the eligibility of farmers to generate carbon credits. An FPSS will complete a Viterra carbon credit eligibility assessment for every farmer that they sign up for the program. The assessment is a two part process.

Part 1: Preliminary Eligibility Assessment

The purpose of this assessment is to obtain a high level of confidence as to whether or not a Viterra customer is eligible according to The Protocol.

All reasonable methods for obtaining information will be used including: talking with Viterra business unit staff, consulting Viterra customer records (including AgroManager) and talking with the applicant.

Part 2: On-Site Eligibility Assessment

The purpose of this assessment is to obtain a high level of confidence as to whether or not a Viterra customer is eligible according to The Protocol when the results of the Preliminary Eligibility Assessment are inconclusive.

In order to complete this portion of the assessment, the FPSS will arrange for a site visit with the applicant. The FPSS will follow various steps while on-site in order to determine whether the applicant is eligible to generate offsets.

Once the application form has been filled out and the eligibility assessment has been completed, a qualified program administrator will enter the land and farming details for all eligible applicants into the data management system and the system will calculate the number of credits that the applicant is eligible for.

6.2.3 Sign-up: Farmer Direct Application

For all applications received directly from farmers who are current or past Viterra customers, a qualified program administrator at Viterra will attempt to determine whether or not the applicant is eligible to generate carbon credits by completing part 1 of the Viterra carbon credit eligibility assessment.

All reasonable methods for obtaining information will be used including: reviewing the information in the application form, talking with Viterra business unit staff, consulting Viterra customer records (including AgroManager) and talking with the applicant.

If the results of the Preliminary Eligibility Assessment are inconclusive, the program administrator will contact the applicant and inform them that a site visit is required to continue with the application process. In this case, a program administrator will arrange for an FPSS to conduct a site visit in order to complete part 2 of the Viterra carbon credit eligibility assessment.

For applications received from farmers who are not current or past Viterra customers, a program administrator will automatically arrange for an FPSS to conduct a site visit in order to complete part 2 of the Viterra carbon credit eligibility assessment (see Appendix B).

Once the application form has been filled out and the eligibility assessment has been completed, a qualified program administrator will enter the land and farming details for all eligible applicants into the data management system and the system will calculate the number of credits that the applicant is eligible for.

6.2.4 Data Input into Data Management System

Data is manually entered into CCAMS by an authorized program administrator at Viterra. The program administrator will first determine whether or not the farmer has a customer account number with Viterra. If the farmer does not have a customer account number, a Viterra account will be created and the assigned number will be used as the customer ID in CCAMS.

The risk of transcription errors is mitigated by using trained data entry personnel and through the use of predetermined online questionnaire fields. The interface is very user-friendly and uses drop-down lists in many of the fields in order to avoid potential data entry errors. Once a carbon questionnaire has been completed, the employee will double check the field entries to ensure that the data has been entered correctly.

6.3 Quantification of Offsets

Offsets are linked to the associated legal land descriptions (LLD) for the quarter sections of land where either reduced till or no till is being practiced. CCAMS contains information on the LLDs for each soil zone; therefore, once an LLD is entered into the system, the system will automatically confirm the correct soil zone. This will prevent the wrong coefficient being used to calculate the number of offsets.

The data management system used for this project will used the PFRA[3] locator (PFL) format, which is a modified version of the Dominion Land Survey (DLS) format. The format used will be as follows: TTTRRSSQQtrsMM (see description below).

Table 6: PFRA Codes, Description and Range of Data Values

[3] Prairie Farm Rehabilitation Administration

Code	Description	Range of Data Values
TTT	Township	001 to 130
RR	Range	01 to 34
SS	Section	01 to 36
QQ	Quarter Section	NE, NW, SE, SW DL,LL,PL,SL,OT,IT,CA,CB,CS, CM,RL,WL,HB,IR,IL
Trs	TRS Modifier	A,B,C, or X (X=no modifier)
MM	Meridian	E1,W1,W2,W3,W4,W5,W6

CA = Cadastral Lot in Alberta
CB = Cadastral Lot in British Columbia
CM = Cadastral Lot in Manitoba
CS = Cadastral Lot in Saskatchewan
DL = District Lot
HB = Hudson Bay Lot
IL = Irrigation Lot (irrigation project)
IR = Indian Reserve (Boundary)
IT = Inner Two miles (of river lot)
LL = Lake Lot
OT = Outer Two miles (of river lot)
PL = Parish Lot
RL = River Lot
SL = Settlement Lot
WL = wood Lot
From: http://gisweb1.serm.gov.sk.ca/Reference_Information/pfl_nw.pdf

The LLD data is specified down to the quarter section level and uniqueness syntax checks are performed on these data; special quarter sections are also allowed. If an LLD is specified in a contract for a given period of time (i.e. land use change start/end dates), that LLD is effectively locked from being used by another customer for another carbon credit application. The goal is to ensure that each land parcel is used only once to create carbon offsets for a given period of time, which is bound to the life of a contract. The LLD uniqueness is a fundamental requirement of The Protocol, and it guarantees the highest quality of carbon offsets.

A quarter section covers an area of 160 acres, but there are special cases where the area can be up to 180 acres. If the entered acres fall within the range of 160 to 180, a pop-up window will warn the user of this and ask if they wish to proceed.

The location of an LLD is determined through an ecozone lookup table. The lookup table is the total list of all LLDs that falls within the Parkland or Dry Prairie ecozone. The ecozone data was provided by Dr. Brian McConkey (Agriculture and Agri-Food Canada). All LLDs that fall outside of these ecozones are ineligible to receive carbon offsets. This automatic checking of ecozones against LLD eliminates the risk of data input errors.

CCAMS will calculate the number of tonnes of $C0_2e$ based on the data entered according to the coefficients in The Protocol. The authorized user is responsible for accurately entering the information from the application form into the data management system. The use of drop down

lists and warning messages when information is not provided in the correct form reduces the risk of incorrect calculations. For example, if the LLD is not entered correctly, a notification will appear at the right side of the LLD sections if there is something wrong with the data entry. The data entry field will have a red wavy underline to call attention to the error. In general, errors will be related to an incorrect LLD specification, overlapping contract dates or a value that exceeds the allowance for quarter section acreage.

6.4 Offset Types

Credits for retroactive years are those credits generated from 2002 up to the end of the year prior to the current year.

Credits for the current year are those credits generated in the current year.

Credits for future years are those credits that will be generated in the years following the current year.

6.5 Farmer Contract

Only when all the required information has been entered into CCAMS can a farmer contract be viewed or printed out by an authorized user. The contract includes a confirmation of the details provided by the farmer in the application form as well as the legal elements of the contract.

The contract between Viterra and the farmer is an annual contract. If a farmer wishes to participate in Viterra's Carbon Credit Program in future years he or she must sign up on an annual basis. Farmers can express an interest in claiming credits for future year; however, only on or after a certain date (noted in the contract) can a farmer enter into a contract for the credits for that year. Prior to that date, a farmer can only claim credits from 2002 to the year prior to the current year.

6.6 Data Integrity

CCAMS is a web-hosted application, and the application data is not directly accessible by the authorized Viterra users, except through data exchange functions. For example, contract status or carbon offset pool data can be exported to an external file and reported on using a graphing package, such as Microsoft, Corel, Crystal Reports or any spreadsheet/graphing package.

CCAMS is protected by Secure Socket Layer (SSL), the leading securing protocol on the Internet. SSL is widely used for the following purposes: (1) validate the identity of a Web site; and (2) create an encrypted connection for sending credit card and other personal data.

A dedicated application database is maintained on the server for Viterra's exclusive use. User accounts already exist, but passwords are managed by Viterra.

Both the SQL[1] database and the CCAMS application code are backed up daily. Backups are scheduled every four (4) hours, followed by the database being copied to a secure FTP[2] site. The backup is, therefore, maintained on the main server, and a secondary FTP server, and the compressed database is copied to a local PC and then burned to DVD once per day.

7.0 References

Additional Guidance for Interpretation of the Quantification Protocol for Tillage System Management for Carbon Offsets in Alberta, Alberta Environment, Version 1, February 2008

Climate Change Central. Tillage System Management – Alberta Protocol

Climate Change Central. Alberta Offset System.
www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/cl11618/$FILE/offset.pdf

Quantification Protocol for Tillage System Management, Alberta Environment, Version 1.3, February 2008