

**Practice Standard
for the
Greenhouse Gas Assessment and Management Practice Area**



ALBERTA INSTITUTE OF AGROLOGISTS

**Prepared by the Alberta Institute of Agrologists'
Greenhouse Gas Assessment and Management Practice Area Expert Committee**

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Disclaimer

The views and opinions expressed in this document are those of the Alberta Institute of Agrologists and not necessarily those of Agriculture and Agri-Food Canada, or Alberta Agriculture and Rural Development.

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EXECUTIVE SUMMARY

Alberta's *Climate Change and Emissions Management Act (2003/2009)* and the related *Specified Gas Emitter Regulation (SGER) (2007/2012)* demonstrate Alberta's commitment to reducing greenhouse gases (GHG). Facilities unable to meet their emission reduction obligations through facility improvements may purchase offset credits from management improvements that reduce or remove GHG emissions at facilities and sectors not subject to the SGER or emitters may currently pay \$15 into the Climate Change and Emissions Management Fund for every tonne over their reduction targets. In the 2013 compliance year nearly 2 million tonnes of CO₂e¹ in offsets were submitted for compliance in Alberta, with 20% coming from the agricultural sector.

Under the SGER, carbon offset credits must be generated using a protocol approved by Alberta Environment and Sustainable Resource Development (AESRD). The standards and processes for protocol development were recently revised and are available in the "Technical Guidance for Offset Project Developers, Version 4.0", released in February 2013. This technical document indicates that a key component of a quantification protocol is third party verification. Third party verification is used to ensure that offset credits meet a reasonable level of assurance before they are submitted to the Alberta Emissions Offset Registry for use by facilities.

In response to the Auditor General's finding and related GHG offset protocols, Alberta Agriculture and Rural Development (AARD) obtained input from experienced agricultural offset auditors and the resulting advice note identified "Field Agents" or professionals that may include regulated agrologists, as having the "potential to provide strength of evidence to support producer assertions of GHG emission reductions from agricultural management practices." (KPMG, 2011)

Of all professions within Alberta, regulated members in the Alberta Institute of Agrologists (AIA) with the GHG Assessment and Management Practice Area (PA) are at the forefront of understanding agricultural practices and land management techniques encompassed by the GHG protocols addressed in this practice standard. In general, regulated members are not trained with ISO auditing principles, however, if AIA regulated members obtain training in ISO 16064-3 audit principles then the combination of training and his/her agricultural expertise may make him/her an excellent candidate to act as a third party verifier as identified in some SGER protocols. Currently, in the GHG protocols approved by AESRD, a regulated agrologist may collect corroborating evidence relevant for the "Quantification Protocol for Conservation Cropping" (CCP) as well as development and implementation of the 4R Plan for the "Quantification Protocol for Nitrous Oxide Emissions Reduction" (NERP). AESRD is developing other GHG offset protocols for cropping systems although the details of evidence requirements are not approved at this time.

The *Agrology Profession Act of 2007 (the Act)*, requires that the AIA "establish, maintain and enforce standards of practice" so that the public is assured that AIA members demonstrate competence. The AIA has developed practice areas with defined competencies. The *Act* defines competence as the "combined knowledge, skills, abilities and judgement required to provide professional service". Therefore, there is a need to clearly identify, define and understand the knowledge, skill sets and experience required within the AIA's GHG Assessment and Management PA. The Practice Standard (PS), addressed in this report defines the minimum requirements for AIA's regulated members to practice in the GHG Assessment and Management PA as it relates to the GHG offset protocols for cropping systems. Commonalities with other GHG offset protocols, such as livestock and energy, especially with respect to the regulated members practice, may be extrapolated. The intent of this PS is to ensure that the public, employers, clients and other professional colleagues will better understand the responsibilities of AIA's regulated members who work within the GHG Assessment and Management PA. These core competencies will enable AIA regulated members to assess their qualifications and expertise in relation to the PS and thus provide assurance to the public that AIA members are competent, if they have met these requirements.

¹ Carbon Dioxide Equivalent (CO₂e) is the 100-year global warming potential average of a unit of greenhouse gas (e.g. methane) compared to an equivalent unit of carbon dioxide (reference gas).

All regulated members are also bound by the professional conduct expected and defined within the General Practice Standard (Alberta Institute of Agrologists, 2012) (Appendix 2) as well as the Code of Ethics (Alberta Institute of Agrologists, 2010) (Appendix 3) and other related practice standards that may apply to specific PAs. It is the responsibility of each registered member practicing in this PA, to conduct themselves in accordance with these standards as it describes the expected knowledge, skills and addresses the values of the AIA and the profession.

To determine the required knowledge, skills sets, behaviours and experience required practice in the GHG offset protocols related to cropping systems the AIA struck an expert committee to support this work. The resulting GHG Assessment and Management Practice Area Expert Committee (PAEC) members consist of practicing members who are recognized by their peers as authorities within this PA. They are seen as leaders in this PA and have assumed a mentorship role for more junior practitioners. The PAEC deliberated extensively about the requirements to complete the work for the four approved cropping GHG offset protocols under the SGER. The roles defined for a regulated member under each SGER protocol differ, especially between cropping and livestock systems. Although numerous GHG offset protocols were reviewed and discussed at length by the PAEC, this PS specifically addresses protocols related to management of cropping systems and includes an example using the “Quantification Protocol for Conservation Cropping” (AESRD, 2012). The intent of this PS is not to define what steps would need to be accomplished by a regulated member in any particular SGER protocol, but to define what knowledge, skills and experience is required for a regulated member to practice within this PA.

A summary of the requirements that a regulated agrologist working in the GHG Assessment and Management PA must meet is outlined in Table 1 and further described in detail in this document.

Table 1 – Summary of requirements to practice under the GHG Assessment and Management PA.

Requirement	Mandatory or Recommended	AIA Enforcement
Required Core Knowledge Area	Mandatory as per Table 2	Registration Committee reviews transcripts upon initial entrance to the PA.
Supplementary Scientific Disciplines	Recommended as per Table 3	Upon request of the regulated agrologist.
Required Skill Sets	Mandatory as per Table 4	Not Applicable as it is the responsibility of the regulated agrologist under the GPS. Practice reviews in the future may accomplish this task.
5 years of relevant work experience	Mandatory as per Section 6 of this PS.	Registration Committee review relevant work experience and relevant references.
Continuing Professional Development	Mandatory as per the GPS.	Annually before a Permit to Practice is issued to the regulated agrologists.

GHG offset protocols do not explicitly identify regulated agrologists as third party verifiers, however, SGER (Section 18(1)(a)(ii)) does allow for other qualified professionals to act in this role, provided that they meet the requirements as specified in those protocols. If AIA's regulated members who are qualified in the GHG Assessment and Management Practice Area also meet requirements specified in the SGER, they may be considered as a valid third party verifier and to act as a valuable member of the verification teams for agricultural protocols.

1. Agrology Profession Background

The agrology profession is dynamic and continually evolves in response to the shifting needs, demands and requirements of the Alberta Legislature in order to protect the public interest. It is a profession with a unique combination of higher education and knowledge which results in professional and specialized practice. The Alberta Institute of Agrologists (AIA) is the regulatory body for the practice of agrology in Alberta. The practice of agrology focuses on science as it applies directly or indirectly to the management of biophysical resources, food production systems, food security, food safety and environmental quality.

The AIA was first established under the provincial *Agrology Act* in 1947, which was amended in 1980. In April 2007, the *Agrology Act* was repealed and the Government of Alberta proclaimed the new *Agrology Profession Act* (the *Act*) and the *Agrology Profession Regulation* (the *Regulation*). This legislation introduced significant changes to the mandate of the AIA. In particular, the *Act* brought in the principles of (i) mandatory registration, (ii) right-to-practice and (iii) mandatory continuing professional competence. The profession both influences and is influenced by provincial policies, procedure, guidelines, protocols and legislation which governs the profession and impacts on practice. For example, Alberta Environment and Sustainable Resource Development's (AESRD) policy on professional sign-off for remediation and reclamation work issued in January 2002 altered the mandate of the AIA requiring a more rigorous approach to registration and demonstration of continuing competence of the AIA's regulated members. A similar policy change resulted in the Alberta Environment (AENV) 2006 report titled "Competencies for Remediation and Reclamation Advisory Committee: Recommendations Report" and the "Professional Responsibilities in Completion and Assurance of Reclamation and Remediation Work in Alberta: Joint Practice Standard v1.0. (Alberta Institute of Agrologists, Alberta Society of Professional Biologists, Association of the Chemical Profession of Alberta, Association of Professional Engineers, Geologists and Geophysicists of Alberta, College of Alberta Professional Foresters, and College of Alberta Professional Forest Technologists, 2007).

Specifically, Section 3(1) of the *Act* states the following;

"The Institute must

- (a) carry out its activities and govern its regulated members in a manner that protects and serves the public interest,
- (b) provide direction to and regulate the practice of agrology by its regulated members,
- (c) establish, maintain and enforce standards of practice, registration and continuing competence for the practice of agrology,
- (d) establish, maintain and enforce a code of ethics, and
- (e) carry on the activities of the Institute and perform other duties and functions by the exercise of the powers conferred by this Act."

The "practice of agrology" is expressed in Section 1(1v) of the *Act* as the "development, acquisition or application of or advising on scientific principles and practices relating to the cultivation, production, utilization and improvement of plants and animals and the management of associated resources and includes

- (i) the certification of compliance with Acts, regulations, directives, standards and guidelines related to agrology,
- (ii) the conducting of economic, statistical, financial, sociological and other studies related to agrology,
- (iii) the production, processing, marketing and protection of agricultural and related products and supplies,
- (iv) the analysis, classification and evaluation of land and water systems,
- (v) the undertaking of agricultural design and advising on the use of buildings, structures, machinery and equipment,
- (vi) the conservation, decommissioning, reclamation, remediation and improvement of soils, land and water systems, and
- (vii) the development, management and use of waste treatment and ecological systems"

The definition reveals that the "practice of agrology" is extremely diverse. No individual member is likely to claim expertise in all seven activities described in the definition because of the wide range of knowledge and skills that would apply across the activities. Specific practice areas (PAs) require more explicit definition to reduce confusion and to complement the definition within the *Act*. In 2009, to meet

the requirements of the *Act*, the AIA identified four (4) broad Agrology Sectors of Environment, Agriculture, Life Sciences and Food, within which forty three (43) PAs were eventually identified.

To further define the duties and responsibilities of its regulated members, the AIA developed a General Practice Standard (GPS) in 2012. The GPS describes the values of the AIA and the expectation for each regulated member with respect to their practice based on their particular expertise and knowledge (Alberta Institute of Agrologists, 2012). It is the responsibility of each registered member to conduct themselves in accordance with these standards.

The GPS states that a registered member has a duty to protect the public and to conduct his or her work with an appropriate standard of care. Standard of care is the legal duty to exercise the watchfulness, attention, caution and prudence that a reasonable professional in the same circumstances would exercise. If a professional's actions do not meet this standard the professional may be found negligent or may have committed unprofessional conduct (Alberta Institute of Agrologists, 2012).

Individual PAs are defined as an area of expertise that requires specialized knowledge, skills and experience (i.e. overall competencies) that are somewhat unique to the PA. The objective of identifying PAs is to identify functional areas of practice within the profession of agrology with as little overlap as possible. PAs also assist regulated members in targeting their Continuing Professional Development (CPD) based on the core competencies or skill sets required to work in that PA. Members may identify a single PA or they may identify multiple PAs based on their education, work experience and ongoing CPD. The Greenhouse Gas (GHG) Assessment and Management Practice Standard falls under the GPS but provides more detailed direction to the practice expected within that PA (see Figure 1 below).

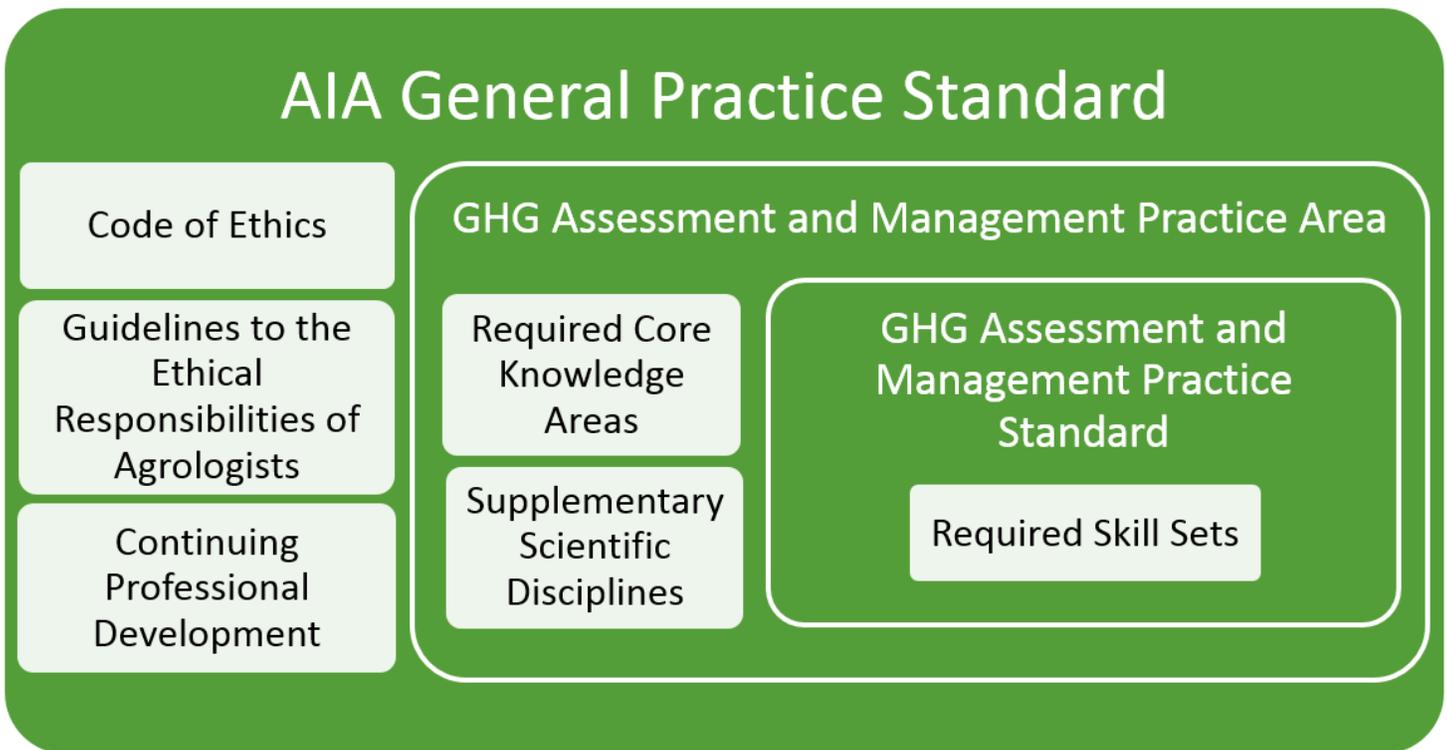


Figure 1. The relationship of the General Practice Standard to the GHG Assessment and Management Practice Area and this Practice Standard.

The GHG Assessment and Management Practice Standard (PS) is to act as a guide to regulated agrology professionals in their exemplary practice within the GHG Assessment and Management Practice Area. These are to be considered minimum standards, or cornerstones upon which to build a solid foundation for professional excellence. The intent is to assist the profession in evaluating the quality of practice,

provide a common base for agrologists in this PA to coordinate their practice and to assist the public in understanding what is expected by an agrology professional performing within this PA.

All practice permits issued by the AIA are subject to the Code of Ethics (see Appendix 3) and by identifying a particular PA; the member commits himself/herself to practicing within what is considered a PS or, in other words, what is commonly accepted as competent practice by peers working in the same PA. Section 43 of the *Act* and Section 18 of the *Regulation* specifies the requirements of the continuing competence program and the “Continuing Professional Development Program” (Alberta Institute of Agrologists, 2013) further outlines the specifics that all regulated members must undertake with their practice and specific PAs. Individual PAs define the agrology-related core knowledge activities for member competence. It does not necessarily indicate that the member is actively participating in these activities at the present time; however, the member has maintained competence with respect to knowledge, skills and experience required of the particular PA.

2. Introduction

2.1 Regulatory Context for the Alberta Offset System

By enacting the *Climate Change and Emissions Management Act* Alberta formalized its commitment to manage greenhouse gas emissions in the province. In 2003, by passing the *Specified Gas Reporting Regulation* (SGER) (amended in 2007) Alberta now requires all facilities emitting over 100,000 tonnes of carbon dioxide equivalent (CO₂e) annually to report their emissions and to reduce their emissions intensity by 12 per cent below their 2003-2005 baseline emissions intensity. New facilities (those facilities that began operation on or after January 1, 2000 and that have completed less than 8 years of commercial operation) have been given a graduated reduction obligation increasing 2 per cent per year starting in their fourth year of commercial operations to the 12 per cent reduction obligation starting in the 9th year of commercial operation.

Facilities unable to meet their emission reduction obligations through facility improvements may purchase offset credits generated at facilities and sectors not subject to the SGER or emitters may pay \$15 into the Climate Change and Emissions Management Fund for every tonne over their reduction targets. In the 2013 compliance year nearly 2 million tonnes of CO₂e² in offsets were submitted for compliance in Alberta, with 20% coming from the agricultural sector.

The 2008 Climate Change Strategy committed Alberta to a 50 megatonne reduction in provincial greenhouse gas emissions by 2020, and a 200 megatonne reduction by 2050 (Figure 2 below).

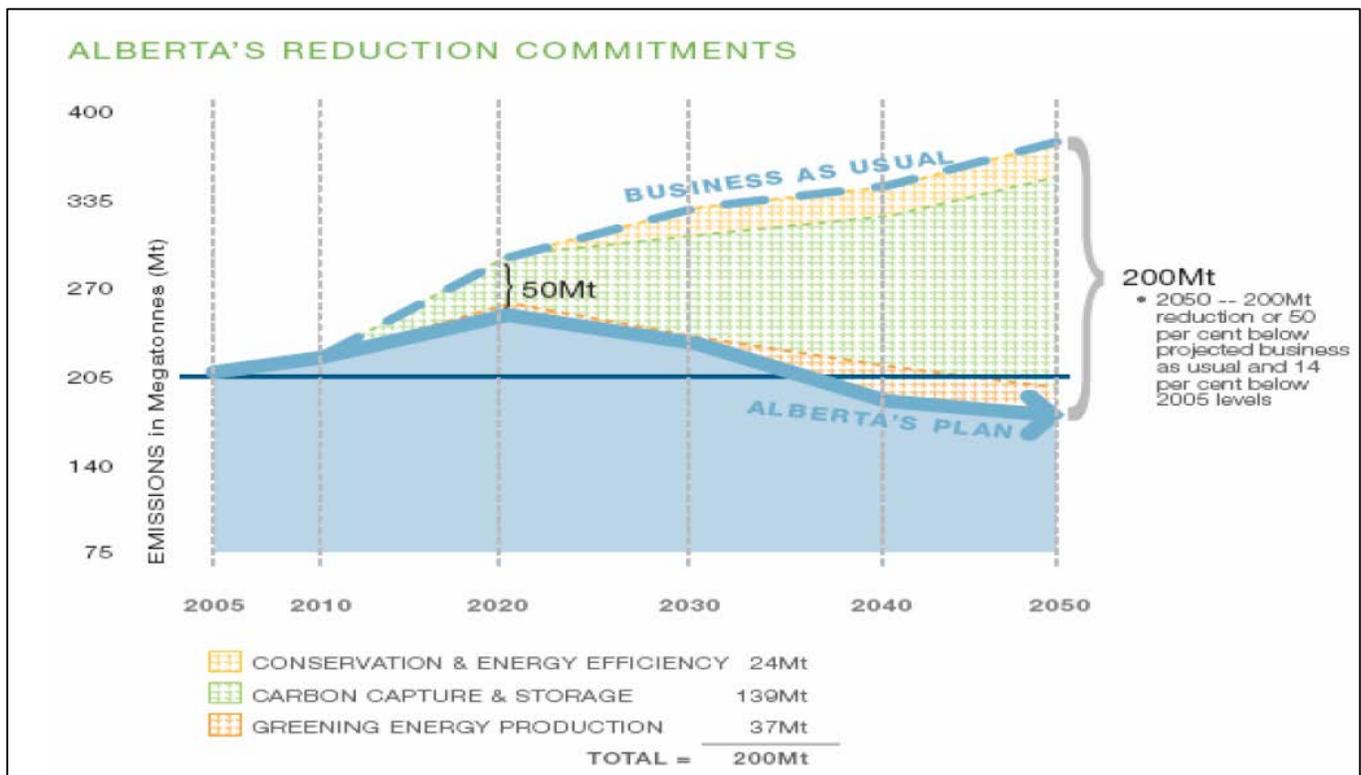


Figure 2. Alberta's 2008 Greenhouse Gas Reduction Commitments

The Alberta offset system has been established as a market-based compliance option for regulated facilities under SGER. Facilities unable to meet their emission reduction obligation through direct facility improvements may choose to purchase offset credits (greenhouse gas

² Carbon Dioxide Equivalent (CO₂e) is the 100-year global warming potential average of a unit of greenhouse gas (e.g. methane) compared to an equivalent unit of carbon dioxide (reference gas).

emission reduction credits) generated at facilities and sectors not subject to SGER. The Alberta offset system also supports Alberta's commitment to reducing provincial greenhouse gas emissions.

"Agricultural offsets, particularly tillage offsets, are a significant source of emission reductions used by major emitters in Alberta to meet their compliance obligations under the SGER. As the Province moves forward with changes to the requirements for the creation of offsets – particularly in relation to verification requirements – there is an opportunity to review the current system for developing agricultural offsets and provide observations and recommendations that can be considered in the development of new guidance and protocols for project developers and verifiers" (KPMG, 2011).

The "Quantification Protocol for Tillage System Management" (February 2009) has been replaced with the "Quantification Protocol for Conservation Cropping" (CCP) (March 2012) effective January 1, 2012 for offset credits generated in 2012 and forward. A main requirement of this change is that starting January 1, 2012 AESRD required verification of offset projects to be completed to a "reasonable" level of assurance rather than the former "limited" level of assurance. This change does not affect the record retention requirements for farmers or project developers; however they may be required to maintain more farm records in order to substantiate an assertion in the offset claim process. Additionally, verifiers are now expected to perform more detailed work to assess offset claims including examining the data quality controls employed by project developers. An increased need to assess samples of supporting documentation is required and this role can be successfully filled by regulated agrologists. For example, the CCP has specific item requirements for farm records and these might need to be designed to fit the information required by the GHG protocol rather than relying on existing data to support the offset claims (KPMG, 2011).

Under the SGER, carbon offset credits must be generated using a protocol approved by Alberta Environment and Sustainable Resource Development (AESRD). The standards and processes for protocol development were recently revised and are available in the "Technical Guidance for Offset Project Developers, Version 4.0", released February 2013. This technical document indicates that a key component of a quantification protocol is third party verification. Third party verification is used to ensure that offset credits meet a "reasonable level" of assurance threshold before they are submitted to the Alberta Emissions Offset Registry for use by facilities.

Verification is defined as an "independent third party review of a project to assess project operating conditions against the baseline conditions to confirm the offset credits being claimed in the greenhouse gas assertion" (AESRD, 2012). The CCP states that "third party verifiers are required to assess the data management system, the internal procedures manual, and quantification and project records as part of the third party verification. Incomplete adherence to any protocol terms are considered a contravention and will not be accepted by Alberta Environment and Water"³. The regulated agrologist acts within this context as an independent source of corroborating evidence of farming practices that identify carbon capture.

"As of January 1, 2012, AESRD requires reasonable assurance on facility baseline emission intensity applications, annual compliance reports, and on all offset project assertions. From 2007 to 2011, Alberta accepted limited level assurance to reflect the fact that greenhouse gas quantification and reporting was new and evolving. Reasonable level assurance starting in 2012 will require a higher level of review of greenhouse gas assertions by large final emitters and offset project developers to ensure compliance with the *Specified Gas Emitters Regulation*." (AESRD, 2014). The "Technical Guidance for Offset Project Developers" was revised in February 2013 and the "Technical Guidance for Completing Specified Gas Compliance Reports" was revised in January 2014.

Based on the "Technical Guidance for Completing Specified Gas Compliance Reports" (January 2014) the following definitions are of importance to the GHG Assessment and Management PS. "Reasonable assurance" is a high level of assurance, or positive assurance, in which the verifier states that the submitted GHG statement, along with all supporting documentation is true and accurate. A reasonable assurance statement is a direct factual statement expressing the opinion of the verifier. A "verifier" is a person or organization that meet the requirements of a third party auditor stated in Section 18 of the *Specified Gas Emitters Regulation* and "verification" is an independent third party review of a project to assess project conditions against the baseline conditions to confirm the offset credits being claimed in the greenhouse gas assertion (AESRD, 2014).

³ Quantification Protocol for Conservation Cropping, Alberta Environment and Water, April 2012. (Note that Alberta Environment and Water is the same department as AESRD.)

The “Report of the Auditor General of Alberta”, dated November 2011, indicates that the department of Environment needs to “provide clear guidance to facilities, verifiers, offset project developers and offset protocol developers to ensure they consistently follow the requirements in place to achieve Alberta’s emissions reduction targets. Without this, offsets used for compliance by large emitters may not be valid and Alberta’s emission reduction targets may not be achieved.” The October 2012 “Report of the Auditor General of Alberta” indicated that the required competencies (knowledge, skills and experiences) for regulated agrologists providing opinion on farming practices were not specified.

In response to the 2011 and 2012 audit results Alberta Agriculture and Rural Development (AARD) obtained input from experienced agricultural offset auditors and the resulting advice note (KPMG, 2011) identified “Field Agents” or professionals that may include regulated agrologists, as having the “potential to provide strength of evidence to support producer assertions of GHG emission reductions from agricultural management practices” (KPMG, 2011). The assertions from primary producers require supporting evidence that is either collected in the field or collected from associated information (e.g. sales receipts) that is related to each acre being claimed as an offset credit.

Part 3, Section 18 (1) of the SGER states that an individual is eligible to be a third party auditor, if the person is;

- (i) “registered as
 - (A) a professional engineer under the *Engineering, Geological and Geophysical Professions Act*, or
 - (B) a chartered accountant under the *Regulated Accounting Profession Act*,
 - (ii) a member of a profession that has substantially similar competence and practice requirements as a profession referred to in subclause (i)
 - (A) in a province or territory of Canada, or
 - (B) approved by the director, in a jurisdiction outside of Canada,
- (b) has technical knowledge of
- (i) specified gas emission quantification methodologies,
 - (ii) audit practices, and
 - (iii) any other matters considered relevant by the director, and
- (c) has any other qualifications that the director considers necessary.”

A goal of this PS is to enable regulated agrologists who have indicated that they are qualified in the GHG Assessment and Management Practice Area to fulfil the role of a third party auditor, as defined above in the SGER.

2.2 Roles for Regulated Agrologists

The supplemental report entitled “Report of the Auditor General of Alberta”, dated October 2012, states that the “Department [AESRD] allows a report signed by a regulated agrologist as corroborating evidence of farm management practices. The agrologist may work for the farm (owner/manager) or the project developer, or may be an independent party hired as a consultant. The protocol requires that agrologists have specific knowledge of farm cropping systems.” This report also indicates that in relation to the CCP “the protocol allows sign-off by professional agrologists to corroborate farm records for crop type, equipment used, amount of land disturbance, reseeding events and use of irrigation”. Confirming these practices would require not only knowledge of cropping systems but also relevant skills and experiences related to such systems. Some regulated agrologists may not have all of these competencies. AESRD did not identify the required competencies for agrologists providing professional opinion on farming practices or require project developers to maintain evidence validating the agrologists’ expertise. As this information was missing AARD initiated a contract with the Alberta Institute of Agrologists to develop the knowledge, skills and resulting practice standards for agrologists to provide an expert opinion and collect evidence to confirm farm management practices.

The “Technical Guidance for Offset Project Developers” (February 2013) indicates that an additional role for an agrologist could be as part of the verification team as they are “subject matter experts (e.g., professional agrologist; professional forester, etc.) needed to augment audit team skills and expertise”. The guide also mentions the importance of the ISO 14064-3 verification standard. Standards such as the “Standards for Assurance Engagements, Canadian Institute of Chartered Accountants (CICA) Handbook”, Assurance Section 5025, and the “International Standard on Assurance Engagements (ISAE) 3410 – Assurance Engagements on Greenhouse Gas Statements” are considered relevant to the PS. These standards are utilized to ensure that another verifier or auditor utilizing the same standards would reach the same conclusions.

This Practice Standard (PS) will assist registered members of the AIA in assessing their knowledge, skills and practice in the field related to the GHG Assessment and Management Practice Area. This PS will also assist registered members in focusing their CPD to expand their knowledge in identified deficiencies within this PA.

The Greenhouse Gas Assessment and Management Practice Standard must be applied in conjunction with the following documents;

- General Practice Standard for All Registered Members of the Alberta Institute of Agrologists (Alberta Institute of Agrologists, 2012)
- Code of Ethics (Alberta Institute of Agrologists, 2010)
- Guidelines to the Ethical Responsibilities of Agrologists (Alberta Institute of Agrologists, 2010)
- Continuing Professional Development Program (Alberta Institute of Agrologists, 2013)
- Climate Change and Emissions Management Amendment Act (GOA, 2007)
- Specified Gas Emitters Regulation (AESRD, 2012)
- Technical Guidance for Greenhouse Gas Verification at Reasonable Level Assurance (AESRD, 2013)
- Quantification Protocol for Conservation Cropping (AESRD, 2012)
- Quantification Protocol for Nitrous Oxide Emissions Reduction, (AESRD, 2010)
- Technical Seed Document for the Quantification Protocol for Conservation Cropping (AESRD, 2012)
- Offset Data Management Principles for Agriculture (le-ef.com Consulting Corp, 2014)

As these documents are periodically updated, the onus is on the regulated agrologist to routinely verify that they are utilizing the most current document.

2.3 Agriculture and Rural Development Contract #A651012304 Requirements

This report is prepared under contract to the Government of Alberta-Agriculture and Rural Development (Contract #A651012304). This contract specifies that the PAEC shall accomplish the following tasks:

“The work consists of two components, (1) document Practice Area Knowledge and Skill Requirement, and (2) develop the SOP. The SOP will provide a high level framework or template that is applicable to cropping systems - including conservation tillage, summerfallow reduction and nutrient (nitrogen fertilizer and manure) management. It is expected that this framework will also have commonalities with other agricultural systems, such as livestock and energy.

1) Document Practice Area Knowledge and Skill Requirement

- Collect relevant documentation for an overarching document, including Joint Practice Standard developed for Reclamation and Remediation
 - Establish Practice Area Expert Committee (PAEC, up to six experts)
 - Arrange all meetings, including an introductory face to face (travel is included in total budgeted)
 - Document discussions at all meetings
 - Work with PAEC to adapt existing standards and develop framework for SOP
 - Summarize background documentation and framework

2) Develop Standard of Practice

- Apply background material, input from PAEC and AIA staff and framework to develop a high level SOP for application of signoff to cropping systems. It is envisioned that this would address questions including (but not limited to):
 - numbers of years of experience required
 - types of experience are relevant
 - types of data collection and data management strategies are needed
 - whether senior partners in a company able to signoff for junior partners
 - what procedures are in place to address situations where potential or perceived conflicts of interest might arise.
 - concerns identified by Practice Area Expert Committee and/or other knowledgeable professionals experienced with this application
 - Include an appendix that relates to the Tillage System Management, as an example."

In response to the above contract the AIA developed the following documents:

1. "Overview of Practice Area Knowledge and Skill Requirement for Greenhouse Gas Verification and Management", dated March 29, 2012.
2. "Knowledge and Skill Requirements for Greenhouse Gas Assessment and Management Practice Area", dated July 13, 2012.
3. "Practice Standard for the Greenhouse Gas Assessment and Management Practice Area", dated March 15, 2013.

2.4 Agriculture and Rural Development Contract #14151 Requirements

This document is prepared under Contract #14151 and is supplementary to Contract #A65101234.

Results of audit findings by Alberta's Auditor General have caused Alberta Environment and Sustainable Resource Development (AESRD) to raise the level of assurance from "Limited" to "Reasonable". With this change the OAG also identified third party professionals, including regulated agrologists, as having the potential to provide evidence to support GHG emission reductions in agricultural protocols. To empower the regulated agrologist to be a credible source of agricultural practices and land management techniques that will meet the "Reasonable Assurance" level as set out by AESRD, the AIA proposes the following:

SCOPE OF WORK:

- 1) Amend the "Practice Standard for the Greenhouse Gas Assessment and Management Practice Area", dated March 15, 2013 with the inclusion of the following items;
 - a. Incorporate the relevant recommendations provided by Dr. Christine Schuh in the document entitled "The Assessment of the Practice Standard for the GHG Assessment and Management Practice Area prepared by the AIA" dated March 27, 2013.
 - b. Develop and expand the relationship between the GHG Assessment and Management PS and the AIA's General PS. Include items that address the difference between a process standard and include indicators that demonstrate technical competency in the PAg.
 - c. Explore the potential for PAg's to document evidence related to a specific point in time or to make inferences in the data capture based on their professional experience (e.g. similar to professionals in law, medicine or engineering).
 - d. Review and provide more clarity (potentially as a self-assessment) for the individual roles a PAg may encompass in the different GHG protocols.
 - e. Include a brief description and reference to data management, based on principles needed to address "Reasonable Assurance" levels. Specific documents to be reviewed include ESRD's Technical Guidance Documents ((i.) GHG Verification at a Reasonable Level Assurance and (ii.) Offset Project Developers) and Data Management information from Dr. Christine Schuh (if delivered by January 15, 2014).
- 2) Upon completion of Item 1, submit the revised draft document of "Practice Standard for the Greenhouse Gas Assessment and Management Practice Area" for review by regulated agrologists practicing within this PA and incorporate relevant comments.

3. Greenhouse Gas Assessment and Management Practice Area Expert Committee

The GHG Assessment and Management PAEC members consist of practicing members who are recognized as authorities within this PA by their peers. The members of the GHG Assessment and Management PAEC are known for having an excellent understanding of the knowledge, skill sets, behaviors and performance required to practice within this PA. Their authority comes from individual practice over many years of service. They are seen as leaders in this PA and have assumed a mentorship role for more junior practitioners.

The GHG Assessment and Management PAEC members were appointed by Alberta Agriculture and Rural Development. Many of the PAEC members were involved with the preparation of the GHG protocols available for use in Alberta.

The following protocols were reviewed in order to develop this PS: "Quantification Protocol for Conservation Cropping" (CCP), "Quantification Protocol for Nitrous Oxide Emissions Reduction" (NERP), "Quantification Protocol for Reducing Days on Feed for Beef Cattle" (DOF) and the "Quantification Protocol for Reducing the Age at Harvest of Beef Cattle" (RAH). Although these protocols were reviewed and discussed at length by the PAEC, this Practice Standard was developed to address management of cropping systems and includes an example using for the "Quantification Protocol for Conservation Cropping" (April 2012).

Practice Area Expert Committee Members were as follows:

- Tom Baumann, P.Eng. – CEO, ClimateCHECK
- Les Fuller, Ph.D., P.Ag. – Former Assistant Registrar, Alberta Institute of Agrologists
- Carlene Godwin, B.Sc., P.Ag. (Chair) – Director, Member Compliance, Alberta Institute of Agrologists
- John Hastie, M.Sc., P.Ag. – Senior Soil Scientist, Matrix Solutions Inc.
- Karen Haugen-Kozyra, P.Ag. – Senior Partner, The Prasino Group
- Dan Heaney, Ph.D., APA (NERP), CCA, P.Ag. – Principal, RandomCross Consulting
- Darlene Howat, M.Sc., P.Ag. – Former Professional Practice Director, Alberta Institute of Agrologists
- The late, Rob Janzen, Ph.D., P.Ag. – Vice President, ClimateCHECK
- Len Leskiw, M.Sc., P.Ag. – President, Paragon Soil and Environmental Consulting Inc.
- David Lloyd, M.Sc., P.Ag. – CEO/Registrar, Alberta Institute of Agrologist

This PAEC was formed to define the core knowledge areas and skills requirements and the development of the PS for the Greenhouse Gas Assessment and Management PA. These results are contained within Sections 4 and 5 for a detailed understanding of the tasks involved in this PA.

The Chair convened the PAEC for their first meeting on April 25, 2012 and described the deliverables and provided a Terms of Reference (please see Appendix 6) for discussion. The PAEC has met on the following dates: May 8, 2012, May 23, 2012, June 4, 2012, June 26, 2012 and July 9, 2012, September 24, 2012, October 23, 2012, November 11, 2012, December 10, 2012, January 14, 2013, January 22, 2013, January 28, 2013 and April 15, 2013 to prepare, discuss and review the development of this report. The meeting minutes can be reviewed in Appendix 7.

4.1 Process to develop a Practice Standard

A PS identifies and defines the knowledge, skills, and experience required to function professionally within a PA. The PS enables members to assess their qualifications and expertise in relation to the PA requirements and provide assurance to the public by having transparent requirements for competence.

The need for identifying and defining a PA that covered agrology practice related to GHG management was first identified in 2010. The PA was originally named "Greenhouse Gas Verification and Management" and officially listed as a PA of the agrology profession with the

AIA. To avoid confusion with the definition of “verification” within the *Specified Gas Emitter Regulation* (SGER), the term “verification” was removed from the PA and replaced with “assessment” which closely reflects the tasks accomplished in this PA.

The GHG Assessment and Management Practice Area “involves a number of scientific disciplines related to documenting and verifying sources and sinks of GHG from a variety of terrestrial systems and industrial sectors. Some activities include evaluating farm gate greenhouse gas sources and sinks; development of sampling plans to monitor and verify success of soil carbon-sequestration in agricultural and non-agricultural soils; evaluation of wetland sources and sinks; devising of management strategies to reduce greenhouse gas emissions” (Alberta Institute of Agrologists, 2013) .

Knowledge requirements are those technical and managerial disciplines that are foundational to the PA. It determines the wealth of knowledge practitioners need to draw from in order to be competent within the PA (i.e. it defines WHAT a member needs to know). The knowledge requirements include:

1. Core Knowledge Requirements: These scientific disciplines are **absolutely essential** to practice within the PA. Without this knowledge base the member should not be practicing within the PA. Acquiring the knowledge through formal education will be required before the member is permitted to practice within this PA. These knowledge areas are **not optional** but are mandatory for the practitioner within this particular PA.
2. Supplementary Scientific Disciplines: These knowledge disciplines are **strongly recommended** meaning that comprehensive functioning in the PA should be supplemented by these scientific disciplines. These supplementary scientific disciplines should be chosen by the agrologist based on the role that they fulfill and the specific SGER protocol that they are applying within their individual practice.

Application of scientific or technical knowledge requires particular skill sets which are identified under this PS. Skill sets answer the questions “how do you apply your knowledge and how do you perform certain functions or tasks within the PA”? Identification of skill sets address how tasks in the PS are completed (i.e. how to recognize no-till field conditions, how to determine field sizes, how to determine soil characteristics relevant to soil carbon sequestration, etc.). Skill sets are tied to the effective functioning within the PA.

4. Knowledge Requirements for the Greenhouse Gas Assessment and Management Practice Area

4.1 Required Core Knowledge Areas for the GHG Assessment and Management PA

The specification of the Required Core Knowledge Areas provides the assurance that members working in the GHG Assessment and Management PA are able to function professionally and appropriately, related to CCP and NERP. The Required Core Knowledge Areas are those areas which the PAEC has determined are essential to practice in this PA. A member must have four (4) out of the six (6) core knowledge areas in order to practice effectively in this PA. If the member does not demonstrate that they have achieved four (4) out of the six (6) Core Knowledge Areas they may not practice in this PA, except under the direct supervision of a qualified member.

The PAEC deliberated on many occasions as to what is required to complete the work for various protocols under the Specified Gas Emitters Regulation. Additional reviews of the tasks to complete the requirements of the "Quantification Protocol for Conservation Cropping" and the "Nitrous Oxide Emissions Reduction Protocol" (NERP) were initiated and evaluated by the PAEC. The results of these assessments are illustrated in Table 2 - Required Core Knowledge Areas for the GHG Assessment and Management Practice Area.

As the curriculum of past or present university programs may not be analogous or that applicants may have been educated outside of Canada, the PAEC recommends that no specific university program or course be designated as a standard as not all programs or courses are created equal. Members practicing in the GHG Assessment and Management PA may request substitutions for the Required Core Knowledge Area for review and consideration by the Registration Committee at any time.

Table 2 - Required core knowledge areas for the GHG Assessment and Management Practice Area for CCP and NERP.

Required Core Knowledge Area	Description
General Agronomy OR Cropping Systems	<ul style="list-style-type: none"> • Identification of crop species. • Understanding of cropping systems. • Knowledge of tillage systems and implements. • Knowledge of equipment types and shank distances. • Knowledge of crop residues (i.e. summer fallow vs. crop residue)
Soil Fertility OR Nutrient Management	<ul style="list-style-type: none"> • Fertilizer recommendations. • Manure application/management. • Residue management.
Agricultural GHG Emissions Management	<ul style="list-style-type: none"> • Legislation review. • Interpretations of appropriate legislation. • Understanding protocols under the SGER. • Understanding the Carbon Offset Market. • Understanding the role of the third party verifier.
Soil and Water Conservation	<ul style="list-style-type: none"> • Impacts to carbon conservation on the field, changes from previous baselines. • Erosion concerns.
Soil, Water, Landscape Relationships to Productivity and Environmental Risk	<ul style="list-style-type: none"> • Soil physics. • Soil-Water dynamics. • Soil material properties. • Water movement in landscapes. • Ecoregions of Alberta.
GHG Accounting, Quantification, and Verification	<ul style="list-style-type: none"> • General GHG accounting courses, emphasis on ISO 14064:2 Project-Based Accounting. • Specialized GHG courses for quantification and/or verification, emphasis on ISO 14064:3 Verification. • ISO 14065 and 14066 documents (as additional information, but no courses currently available). • Must take the Accredited Professional Advisor (APA) certification course if you are practicing under the NERP protocol.

4.2 Supplementary Scientific Disciplines for the GHG Assessment and Management PA

Supplementary scientific disciplines are areas of supplemental knowledge that are of benefit to the GHG Assessment and Management Practice Area for CCP and NERP. The supplementary scientific disciplines are not essential to the PA related to the SGER protocols as written today. These supplemental courses would enhance the member's competency in this PA and allow them to deliver additional value in their practice.

As the curriculum of past or present university programs may not be analogous or that applicants may have been educated outside of Canada, the PAEC recommends that no specific university program or course be designated as a standard as not all programs or courses are created equal. Members practicing in the GHG Assessment and Management PA may request substitutions for the Supplementary Scientific Disciplines for review and consideration by the Registration Committee at any time.

Table 3 – Supplementary scientific disciplines for the GHG Assessment and Management Practice Area, related to CCP and NERP.

Supplementary Scientific Disciplines	Description
Soil Genesis and Classification	<ul style="list-style-type: none"> • Soil forming factors. • Soil forming processes. • Soil profile description.
Soil and Terrain Mapping	<ul style="list-style-type: none"> • Soil landform concepts. • Maps and map units, mapping processes. • Application of imagery. • Fundamentals of mapping, field course
Water-landform relationships Ecological hierarchical classifications (Ecoregions of Alberta)	<ul style="list-style-type: none"> • Soil physics. • Soil-Water dynamics. • Soil material properties. • Water movement in landscapes. • Ecoregions of Alberta.
Imagery and Remote Sensing/GIS	<ul style="list-style-type: none"> • Introductory photo interpretation and remote sensing. • Fundamentals of GIS.

5. Skill Requirements for the Greenhouse Gas Assessment and Management Practice Standard

5.1 Description and Rationale of Required Skill Sets

Certain skill sets and capabilities are required to be proficient within a given PS. The PAEC reviewed the skills required in order to accomplish the tasks under SGER's cropping and nutrient management associated GHG protocols. Table 4 provides a descriptive list of the skills and capabilities required for practice in the GHG Assessment and Management PA as they pertain to the cropping GHG offset protocols particularly the "Quantification Protocol for Conservation Cropping" (CCP) and the "Nitrous Oxide Emissions Reduction Protocol" (NERP) that define competency at the entry level. Members interested in this area of practice are required to evaluate their skills and capabilities against Table 4. If deficiencies are discovered, they should then target their individual CPD programs to address those deficiencies and then utilize Table 4 to maintain or enhance their expertise within the PS.

Table 4 – Required Skill Sets for the GHG Assessment and Management Practice Standard

Required Skill Sets	Description
Legislation, Regulation and Associated Technical Guidance	<ul style="list-style-type: none"> • Interpretation of appropriate legislation (i.e. <i>Climate Change and Emissions Management Act</i>, SGER, etc.) of requirements in the following Technical Guidance Documents: <ul style="list-style-type: none"> ▪ Template: Offset Project Verification Report (no date) ▪ Technical Guidance for Offset Protocol Developers (February, 2013) • Technical Guidance for GHG Verification at a Reasonable Level of Assurance (January, 2013) • Understanding of the Templates provided for Offset Project Plans and Reports <ul style="list-style-type: none"> • Awareness of Supplemental Program Information found on http://esrd.alberta.ca/focus/alberta-and-climate-change/regulating-greenhouse-gas-emissions/alberta-based-offset-credit-system/offset-credit-system-protocols/default.aspx
Protocol Awareness	<ul style="list-style-type: none"> • Understand contents of and implementation requirements of the CCP and NERP protocols, and if necessary, other associated livestock protocols (http://environment.alberta.ca/02275.html) • Comprehension of the "Technical Seed Document for the Quantification Protocol for Conservation Cropping" and an understanding of the history and process used for development of the protocols. • Understand the roles of the third party verifier, project developer, aggregator, Accredited Professional Advisor (APA), and or other professional advisor/sign-off entity, producer or livestock operator, etc. for each protocol. • Awareness of APA certification process for NERP including eligibility criteria and registration process.
Compliance data collection and management	<ul style="list-style-type: none"> • Understand the requirements and standards for data, specifically "reasonable assurance" under the specific protocols in your practice. Understand the minimum standards required for historical baseline information and how they differ from the standards for project information. • Ongoing monitoring and confirmation. • Knowledge of ISO 14064-2 (Project Quantification, Monitoring and Reporting). • Knowledge of ISO 14064-3 (Validation and Verification of GHG assertions). • Certification of compliance data. • Knowledge of audit principles and techniques (QA/QC techniques). • Ability to understand sufficient and appropriate types of records required for each data point in the protocols for verification. • Knowledge of data management systems and related controls (i.e. records management, evidence strengths, retention, storage, FOIP, back-ups, etc.).
Work with a verification team	<ul style="list-style-type: none"> • Understand how to implement a verification strategy, verification plan and sample plan according to the particular protocol as part of the verification team. • Understanding of the application of the two models being utilized by project developers/aggregators (acting as an agent vs. direct purchase of offsets).

<p>Field Assessment Skills</p>	<ul style="list-style-type: none"> • Map reading and interpretation. • Land titles interpretation/coding knowledge (Aboriginal Affairs and Northern Development lands, provincial crown lands and private land ownership). • Understand lease terminology (for ownership of carbon credit purposes). • Site assessment basics such as location, soil sampling techniques, soil disturbance activities, crop type, present/absent, general ecosite information, etc. • Site assessment details including tillage practices, appropriate timing of field visits, etc. • Verify enrolled acreage utilizing spatial systems (survey posts, landmarks, airphotos, remote sensing, GPS, track files, etc.). • Understand the limits and credibility of the spatial and temporal data sources commonly used to document projects. • Comprehension of Canadian Ecological Framework and the use of Ecoregions and Ecozones in CCP and NERP respectively and understand how location related to emission coefficients (i.e. Dry Prairie vs. Parkland boundary). • Understand the sources and credibility of agroclimatic information used to determine allowable fall application dates for fertilizer under NERP. • Identification of GHG sources and sinks. • Irrigation component on field (systems, equipment, etc.). • Quantification (under NERP) for baselines and project conditions.
<p>Analyze and interpret field and laboratory data</p>	<ul style="list-style-type: none"> • Knowledge of agricultural cropping techniques. • Ability to interpret a soil test report, a tissue test report and verify nutrient balance calculations. • Ability to assess the appropriateness of beneficial management practices (BMP's). • Comprehension of Quality Assurance/Quality Control requirements (under NERP).
<p>Communications/Problem Solving</p>	<ul style="list-style-type: none"> • Interpersonal skills including conflict management. • Oral and written communication skills. • Knowledge of contracts (terms and conditions).
<p>Report writing</p>	<ul style="list-style-type: none"> • Appropriate for various audiences and/or objectives. • Describe limitations of map and interpretation details and applications. • Liability and associated government regulations.

6. Practice Standard for Greenhouse Gas Assessment and Management Practice Area

In order to practice independently and exercise professional sign-off within the GHG Assessment and Management Practice Area a regulated agrologist must clearly demonstrate the knowledge and skills described in Sections 4 and 5 of this document. In addition, the PAEC has specified that a regulated agrologist must have a minimum of 5 years of relevant work experience in agricultural cropping systems in order to practice within this PA based on a similar practice standard approved by AESRD in Alberta in 2007.

The intent of this PS is to be more reflective in the outcome of the activities a regulated agrologist may undertake rather than being prescriptive. This goal of outcome based performance is to be mindful of the different experience and knowledge base that individual regulated agrologists may encompass when performing these tasks or activities. Additionally, by utilizing this approach regulated agrologists and the public will have clear, complete, concise and consistent practice standards written in plain English that allow the regulated agrologist the flexibility to test innovation in the GHG Assessment and Management PS rather than following a rigorous step-by-step process.

This practice standard defines the expected conduct of regulated agrologists participating in the GHG Assessment and Management Practice Area. Each regulated agrologist must ensure that the following expectations are met as part of his/her professional practice within this PS. The following requirements must be met if the regulated agrologist is to participate within any of the GHG protocols established by AESRD or other government ministries. Failure to comply with these practice standards will be considered as constituting unprofessional conduct under the *Agrology Profession Act*.

A.) The regulated agrologist clearly understands his/her role within the GHG protocol.

- i.) The regulated agrologist identifies his/her role within the GHG project as defined by the particular protocol. The regulated agrologist must not step beyond the bounds of his/her role and must avoid conflict of interest, real or perceived. Generally, the role relates to who has engaged the services of the regulated agrologist. Although this can be a farmer, there are other entities who may engage regulated agrologists in the case of carbon offsets, as outlined in Table 5.

Table 5 – The three possible roles for a regulated agrologist relative to an offset project developer.

Role	Compiler	Expert	Verification Team Member
Description	The regulated agrologist has played an active role in collecting, calculating or reporting the emission reduction.	The regulated agrologist provides an expert opinion to the project proponent (as assistance in compiling the offset emission reduction) or the verification team (as evidence in the verification).	The regulated agrologist is part of the verification team and acts as their expert when objectively assessing the evidence.
Independence	Not independent	May or may not be independent	Independent. Same requirements that apply to the verification team.

B.) The regulated agrologist clearly understands the GHG protocol goals, objectives, applicability conditions and processes.

- i.) Any professional service offered by the regulated agrologist must be based on a thorough understanding of the particular GHG protocol and the nature of the project. The regulated agrologist has read and understood background documentation and legislation relevant to the service being provided and actively seeks out current information related to their practice.

C.) The regulated agrologist reviews and/or documents project data in a manner consistent with the GHG protocol.

- i.) The regulated agrologist understands the requirements for GHG data and records collection and review as stated in the GHG protocols and associated documentation. Review of data and records and professional reporting and sign-off statement must be consistent with the requirements of the protocol and associated documentation standards established by AESRD.

D.) The regulated agrologist keeps records of data and supporting evidence consistent with the GHG protocol.

- i.) The regulated agrologist has a written data management plan that meets the requirement of “reasonable assurance” as defined by AESRD and retains copies of records and data as required by the protocol and associated documentation. Any records that form the basis for providing a professional opinion are maintained in a comprehensive data management system with the appropriate security and back-up. (le-ef.com Consulting Corp, March 2014)

E.) The regulated agrologist documents the basis for his/her professional opinion.

The regulated agrologist maintains supporting evidence for his/her decisions that were provided within the sign-off statement or report. The decision-making process is clearly documented and the rationale for decisions is recorded such that the scientific logic behind the decision is evident.

Please note that confirmatory evidence collected by a regulated agrologist can be considered stronger evidence than non-independent farm records as agrologists have appropriate education and professional requirements and legal professional responsibilities to the data. Professional judgement of confirmatory evidence should be based on historical or scientific information gathered in the field and the extrapolations required to fill in the data gaps as necessary (le-ef.com Consulting Corp, March 2014).

7. Application of the Practice Standard from the “Quantification Protocol for Conservation Cropping”

7.1 Introduction

“Agricultural activities account for approximately 8 per cent of Alberta’s provincial greenhouse gas emissions (Environment Canada, 2010). Greenhouse gas emissions reductions from this sector are not regulated under the *Specified Gas Emitters Regulation*, providing the sector with a significant opportunity to generate offset credits for voluntary greenhouse gas emissions reductions from a variety of activities including improved soil sequestration opportunities covered by this protocol.

Shifting from conventional farming to conservation cropping can increase carbon sequestered in the soil. This results in reduced carbon dioxide (CO₂) emissions to the atmosphere and lower nitrous oxide (N₂O) emissions resulting from less soil disturbance. Fewer passes on a farm field reduces fossil fuel emissions from farm equipment further helping to lower greenhouse gas footprint for the farm.

This protocol specifically quantifies greenhouse gas emissions reductions from the following three activities:

- New carbon stored annually in agricultural soil;
- Lower nitrous oxide emissions from soils under no till management; and
- Associated emission reductions from reduced fossil fuel use from fewer passes per farm field.

Shifting from any type of fallow (chemfallow, tilled fallow or a combination of chemfallow and tilled fallow) to continuous cropping also increases carbon stored in the soil, further reducing the greenhouse gas emissions footprint of the farm.” (AESRD, 2012)

“The GHG data used in the calculations need to be substantiated by documentation – a combination of farm records, third party records and physical evidence gathered by the project developer to support the GHG claim. The Conservation Cropping Protocol provides explicit guidance on the types of records and evidence that need to be collected to substantiate that the GHG data underlying the claim is correct and accurate (personal comm. K. Haugen-Kozyra, 2012). Please note that it is necessary to have a documented Data Management System to claim offsets in Alberta and it is prudent practice to ensure that the records are available when necessary and have the integrity, confidentiality and privacy that the protocol requires (le-ef.com Consulting Corp, March 2014).

Due to the absence of the current PS at the time of publishing in 2012, the CCP currently limits requirements of regulated agrologists to: having technical knowledge in farm operations, may have familiarity with a farm enterprise and must have specific knowledge on farm cropping systems (AESRD, 2012). Under these requirements, a restricted role was identified as follows: “Professional Agrologists with relevant expertise can provide a third party check on the records and project documentation be collected to support no till and reduced summerfallow on a farm enterprise. Agrologists do not replace records requirements or third party verification, however they can enhance and support project implementation. Guidance on the role and expectations of Professional Agrologists has been provided in [the CCP] Table 8 and Table 9.” (AESRD, 2012) The enhancement and support of project implementation by regulated agrologists may take the form of a signed off statement or a signed-off report, depending on the requirements of the particular GHG protocol. In the context of this PS, the term “sign-off” is the required form of professional opinion as outlined in the CCP.

7.2 Applying the GHG Assessment and Management Practice Standard to the “Quantification Protocol for Conservation Cropping”

The following provides more specific direction to regulated agrologists working with the “Quantification Protocol for Conservation Cropping” (CCP) (AESRD, 2012). The practice standard indicators provide the basis for the review of a registered professionals practice within this PA. The regulated agrologist must ensure that the practice standard indicators have been met in order to be deemed compliant with the standards of practice for the PA.

A.) Understanding the Role of the Regulated Agrologist within the “Quantification Protocol for Conservation Cropping”

The role of the regulated agrologist is described within the “Quantification Protocol for Conservation Cropping” (AESRD, 2012). Regulated agrologists with knowledge and experience with farming operations are recognized as a source of information and support for project development, implementation and ongoing management. It is essential that the regulated agrologist understands his/her role and abides by the requirements of that role as described in the CCP and the standards described within this PS. Currently, this PS demonstrates the role of the regulated agrologist in the CCP, however this role may change as the CCP evolves to integrate the expertise and knowledge offered by the regulated agrologists in this PA.

The role of the regulated agrologist is further described within the CCP as follows: “They [regulated agrologists] can provide additional support for project implementation; however sign-off by a regulated agrologist cannot be considered a substitute for farm records or third party verification. Project developers may elect to have a regulated agrologist sign off on their opinion regarding practices being claimed for each field included in the project. This sign-off provides a secondary source or corroborating evidence of the farm management practices. Sign-off by a regulated agrologist does not replace record keeping requirements, but rather, can provide an added level of due diligence on the emission reduction claims. All parties (agrologist, farm operator, and project developer) are required to maintain copies of records needed to support the greenhouse gas assertion.” (AESRD, 2012)

The regulated agrologist must understand that the current protocol considers his/her sign-off to be a professional opinion that provides a “secondary source” of corroborating existing evidence of farm management practices. The regulated agrologist at this point in time is **not** recognized as a “third party verifier” within the CCP. However, the SGER indicates that recognizing regulated agrologists as third party verifiers (e.g. engineers and accountants who are registered under their respective Professional Acts) may be considered if they have technical knowledge of quantification methodologies, audit practices and any other matters considered relevant or qualifications considered necessary as noted on p. 15 of this PS. Confirmatory evidence collected by a regulated agrologist can be considered stronger evidence than non-independent farm records as agrologists have appropriate education and professional requirements and have legal professional responsibilities to the data. Professional judgment of confirmatory evidence should be based on historical or scientific information gathered in the field and the extrapolations required to fill the data gaps as necessary (le-ef.com Consulting Corp, March 2014).

Regulated Agrologists may act in one of three ways with respect to CCP:

- a.) Primary Consultant to Farmer: A regulated agrologist may act as a Compiler by providing professional services to the farmer to ensure that CCP data records are collected, retained and kept current for review by a project developer or by a third party verifier.
- b.) Source of Secondary Corroborating Evidence: A regulated agrologist may act as an Expert by signing off on their opinion regarding a farm operation’s practices for the purpose of providing a secondary evidence to a project developer
- c) Member of a Verification Team: A regulated agrologist may support a third party verifier or government auditor to objectively assess on-farm or other evidence regarding the validity of the records for the purposes of a GHG assertion. This would not be a substitute for third party verification. Again, professional judgment by a regulated agrologist of confirmatory evidence should be based on historical or scientific information gathered in the field and the extrapolations required to fill the data gaps as necessary (le-ef.com Consulting Corp, 2014).

If the regulated agrologist intends to work for more than one party (e.g. farmer, project developer, verifier) then full disclosure must be made to all parties involved. Written consent from all parties must also be received by the regulated agrologist before work may proceed.

Practice Standard Indicators:

- a.) The regulated agrologist clearly understands his/her role within the CCP and distinguishes between the provision of primary services to the farm operator vs. the provision of a secondary evidence based on their opinion to a project developer or third party verifier regarding record validity for GHG assertion purposes.
- b.) When acting as a source of secondary source of evidence based on documentation of their opinion, the regulated agrologist understands that his/her professional opinion does not replace the need for other forms of records, such as primary documentation by the farmer or project developer or other sources (e.g. equipment receipts).
- c.) The regulated agrologist avoids conflict of interest by not providing professional service to the farmer or project developer and subsequently providing professional service to a third party verifier regarding the validity of the primary documentation offered by the farmer or project developer on the same GHG quantification project.
- d.) The regulated agrologist discloses any historical services provided to the farmer or project developer prior to contracting his/her services as a source of corroborating evidence to a third-party verifier.

B.) The regulated agrologist demonstrates a thorough understanding of the “Quantification Protocol for Conservation Cropping”

A project developer or third party verifier (e.g. professional engineer or chartered accountant or others qualified under SGER to conduct verifications) may contract a regulated agrologist to review baseline and project documentation, GHG calculations and provide corroborating evidence regarding the validity of farm records for a GHG assertion.

A regulated agrologist acting as a source of corroborating evidence must follow a consistent and well-documented review process. This process shall be based on a thorough understanding of the objectives of the Conservation Cropping Protocol and the specific project objectives.

Practice Standard Indicators:

- a.) The regulated agrologist uses a consistent and thorough process for review of project documentation, GHG calculations and possible site visits for field/farm protocol requirement assessments (if part of a verification team) and/or subsequent provision of a professional opinion as corroborating evidence.
- b.) The record review process must be described in a document that clearly outlines the process to be utilized and available to the client upon request.
- c.) The record review process must be based on a thorough understanding of the CCP.

C.) The regulated agrologist reviews and/or documents project data and records in a manner consistent with the “Quantification Protocol for Conservation Cropping”

It is the responsibility of a regulated agrologist who is providing a secondary opinion to understand what records are acceptable for a GHG assertion as described by the CCP. The CCP outlines the types of records and data that may be collected and retained by the farmer or project developer (see the most current CCP document). As described in the “Offset Data Management Principles for Agriculture” (le-ef.com Consulting Corp, March 2014), data management is a key risk management activity in order to promote clean verifications submitted to AESRD to a “reasonable level of assurance”. Two significant components to which regulated agrologists must be aware is the linkage between the record measurement or data availability and its report within the offset and the appropriate controls applied related to maintain the integrity of the data (le-ef.com Consulting Corp, March 2014).

In addition to the two components above it is also recommended that regulated agrologists ensure that the following are examined in conjunction with his/her collected data to ensure that the data and data management systems have integrity (le-ef.com Consulting Corp, March 2014), including, but not limited to:

- Identify the key risk areas that may apply and ensure that there are sufficient controls in the data management system.
- Ensure that the controls been designed appropriately.
- Ensure that the data management system generates high quality evidence.
- Ensure the data management system and the associated controls appropriately manage risk while taking into consideration the relative effect of the data on the assertion.
- Ensure that the data management system also addresses changes to static data.

For more detailed information on the above activities, it is recommended that the regulated agrologist thoroughly understand the "Offset Data Management Principles for Agriculture" developed by le-ef.com Consulting Corp (March 2014).

"At a high level, in order for a field to be eligible in a Conservation Cropping Project, each field must meet a minimum set of requirements (Figure 3). These requirements can be used as part of a project developer's due diligence to screen eligibility of a farm's field to participate in the Offset Project" (personal comm. K. Haugen-Kozyra, 2012). The items in Figure 3 illustrated by black text indicate that the information can be provided by a regulated agrologist as corroborating evidence.



Figure 3. Information required by a CCP offset to be eligible (personal comm. K. Haugen-Kozyra, 2012).

A project developer or third party verifier may contract a regulated agrologist to review and collect farm records and provide a report of the validity of the records for the purposes of a GHG assertion. The items in ***bold italics*** below may include a signed-off report by a regulated agrologist as corroborating evidence as identified within the CCP as written today, it is the responsibility of the regulated agrologist to verify that these items are current in the relevant protocol. All other items are the responsibility of the project

developer and third party verifier based on the CCP. Guidance on the role and expectations of Professional Agrologists has been provided in [the CCP] Table 8 and Table 9." (AESRD, 2012).

The data requirements as outlined in the CCP include the following:

- ownership of the farm field
- right to transact on offset credits
- field size and location being claimed
- *ecozone protocol area*
- *existence of an annual crop or first year of seeding of a perennial crop*
- *occurrence of soil disturbance on each farm field being claimed*
- *seeding/fertilizer specifications being used each year*
- *reseeding events if applicable*
- *use of irrigation in the dry prairie ecozone, if applicable*

Additional evidence for summerfallow reduction projects include:

- *location of fields in the dry prairie ecozone being included in the baseline and project conditions*
- *the crop years used for the baseline*
- *the crop years used if a non-consecutive baseline is used*
- eligibility of fields during the project condition

Practice Standard Indicators:

- a.) The regulated agrologist ensures that the following considerations are addressed during his/her review of the primary records.
 - i.) Does a record exist? If not, can the regulated agrologist create a document in conjunction with a site visit to provide as secondary evidence with their professional opinion?
 - ii.) Does the record meet the requirements as indicated in Tables 8 & 9 of the CCP? (Refer to the most current CCP document.)
 - iii.) If 'i' and 'ii' are true then the record can be utilized as primary evidence for the GHG assertion.
- b.) The regulated agrologist maintains documentation including copies of the records needed to support his/her professional opinion.

D.) The regulated agrologist keeps records of data and supporting evidence consistent with the "Quantification Protocol for Conservation Cropping"

Copies of records reviewed and supporting data used to provide corroborating evidence must be retained by the regulated agrologist. This ensures that the information used to support the professional opinion of the regulated agrologist can be retrieved if necessary to evaluate the scientific basis and rationale for the opinion.

Practice Standard Indicators:

- a.) The regulated agrologist has a written data management plan and retains copies of records and supporting data used as the basis for the opinion expressed in his/her sign-off report.
- b.) The regulated agrologist retains copies of records and supporting data in a data management system with back-up to prevent loss of records.
- c.) The regulated agrologist ensures that private or confidential information is secured against unauthorized access.

- d.) The regulated agrologist retains copies of record and supporting data until seven (7) years after the end of the crediting period for the GHG quantification project associated with the records and data.

E.) The regulated agrologist documents the basis for his/her professional opinion

The regulated agrologist shall document the scientific logic and rationale for any professional opinion so that the client and public may understand the basis for his/her decisions and recommendations.

The regulated agrologist must remember that the professional opinion may be reviewed by parties with limited agronomic understanding, therefore his/her decision processes must be clearly documented.

Practice Standard Indicators:

- a.) The regulated agrologist provides rationale and supporting evidence for his/her decision regarding record compliance with the CCP.
- b.) For each CCP data requirement the following considerations have been addressed by the regulated agrologist while rendering a decision or opinion:
 - i.) Has the process for record review been clearly documented and articulated?
 - ii.) What information associated with a particular record provided the basis for a decision?
 - iii.) Has the rationale for the decision been clearly articulated?

8. Recommendations from GHG Assessment and Management PAEC

Of all professions within Alberta, regulated members in the GHG Assessment and Management PA are at the forefront of understanding agricultural practices and land management techniques. In general, regulated members are not trained with ISO auditing principles. If regulated members obtain training in ISO 16064-3 audit principles then the combination of training and his/her agricultural expertise would make him/her an excellent candidate to act as a third party verifier as identified in some SGER protocols. Currently, a regulated agrologist may sign documentation related to corroborating evidence relevant for the “Quantification Protocol for Conservation Cropping” (CCP) as well as development and implementation of the 4R Plan for the “Quantification Protocol for Nitrous Oxide Emissions Reduction” (NERP).

A summary of the requirements that a regulated agrologist working in the GHG Assessment and Management PA must meet is outlined in Table 5 and further described in detail in this document.

Table 5 – Summary of requirements to practice under the GHG Assessment and Management PA.

Requirement	Mandatory or Recommended	AIA Enforcement
Required Core Knowledge Area	Mandatory as per Table 2	Registration Committee reviews transcripts upon initial entrance to the PA.
Supplementary Scientific Disciplines	Recommended as per Table 3	Upon request of the regulated agrologist.
Required Skill Sets	Mandatory as per Table 4	Not Applicable as it is the responsibility of the regulated agrologist under the GPS. Practice reviews in the future may accomplish this task.
5 years of relevant work experience	Mandatory as per Section 6 of this PS.	Registration Committee review relevant work experience and relevant references.
Continuing Professional Development	Mandatory as per the GPS.	Annually before a Permit to Practice is issued to the regulated agrologists.

Additionally, a regulated agrologist may sign-off, on specific portions, as related to the particular GHG protocol they are working under. This may entail sign-off related to corroborating evidence relevant for CCP as well as development and implementation of the 4R Plan for NERP.

GHG protocols do not explicitly identify regulated agrologist agrologists as third party verifiers, however, SGER (Section 18(1)(a)(ii)) allows for other qualified professionals to act in this role. It is recommended that AESRD consider AIA’s regulated members who are qualified in the GHG Assessment and Management Practice Area by meeting the requirements in this PS and also meet the requirements stated in the SGER as a valid third party verifiers and to act as a valuable member of the verification teams for agricultural protocols.

9. References

Agrology Profession Act, 2007

Agrology Profession Regulation, 2007

Canadian Ecological Framework

Canadian Standard on Assurance Engagements (CSAE) 3410 – Assurance Engagements on Greenhouse Gas Statements (Canadian Institute of Chartered Accountants, 2012)

Climate Change and Emissions Management Act, Government of Alberta (2003/2009)

Competencies for Remediation and Reclamation Advisory Committee: Recommendations Report (AENV, 2006)

General Practice Standard for All Registered Members of the Alberta Institute of Agrologists (Alberta Institute of Agrologists, 2012)
Guidelines to the Ethical Responsibilities of Agrologists (Alberta Institute of Agrologists, 2010)

International Standard on Assurance Engagements (ISAE) 3410 – Assurance Engagements on Greenhouse Gas Statements

ISO 14064-3: Validation and Verification of GHG assertions

Offset Data Management Principles for Agriculture, Version 4.0 (le-ef.com Consulting Corp, March 2014)

Practice Area Descriptions, Alberta Institute of Agrologists (November 2010)

Professional Responsibilities in Completion and Assurance of Reclamation and Remediation Work in Alberta: Joint Practice Standard v1.0. Alberta Institute of Agrologists, Alberta Society of Professional Biologists, Association of the Chemical Profession of Alberta, Association of Professional Engineers, Geologists and Geophysicists of Alberta, College of Alberta Professional Foresters, and College of Alberta Professional Forest Technologists, 2007

Quantification Protocol for Conservation Cropping, AESRD, April 2012

Report of the Auditor General of Alberta, dated November 2011

Report of the Auditor General of Alberta, dated October 2012

Scoping Study of Assurance Standards to Verify Agricultural Greenhouse Gas Offset Projects, KPMG Advisory, May 13, 2011

Specified Gas Emitter Regulation (SGER), AESRD (2007/2012)

Standards for Assurance Engagements, Canadian Institute of Chartered Accountants (CICA) Handbook – Assurance Section 5025

Technical Guidance for Completing Specified Gas Compliance Reports, AESRD, December 2012

Technical Guidance for GHG Verification at a Reasonable Level Assurance, Version 1.0, AESRD, January 2013

Technical Guidance for Offset Project Developers, Version 4.0, AESRD, February 2013

Technical Seed Document for the Quantification Protocol for Conservation Cropping (April, 2012)

The Practice of Agrology in the Agricultural (Cropping) Carbon Offset Marketplace", Farmers' Advocate Office, February 2012

Appendix 1

Definitions and Acronyms

DEFINITIONS:

Aggregator: An entity acting as the project developer of aggregated projects.

Baseline: A reference case against which the performance of the project is measured.

Carbon Dioxide Equivalent (CO₂e): Is the 100-year global warming potential average of a unit of greenhouse gas (e.g. methane) compared to an equivalent unit of carbon dioxide (reference gas).

Climate Change and Emissions Management Act: Legislation in Alberta passes in 2002 allowing Alberta Environment and Sustainable Resource Development to manage greenhouse gas emissions in the province.

Corroborating: To make more certain or to verify, authenticate or validate a particular document.

Greenhouse Gas Assertion: A document that identifies the greenhouse gas emission reductions/removals and offset credits being claimed by the project over a defined period of time.

Level of Assurance: Identifies the amount of work required to reach a stated level of comfort with an offset project.

Offset credit: Is a tradable credit issued per tonne of greenhouse gas emissions reductions/removals expressed as CO₂e.

Offset Project: An activity implemented by a Project Developer in accordance with a government approved protocol that results in greenhouse gas emission reductions or removals.

Offset Project Report: Is a report prepared by the Project Developer prior to third party verification that describes how the project was implemented relative to the Offset Project Plan and appropriate quantification protocol.

Practice Area: An area of expertise that requires specialized knowledge, skills and capabilities (i.e. overall competencies) that are somewhat unique to the Practice Area.

Practice Permit: A practice permit issued to a regulated member under Part 2 of the *Agrology Profession Act*.

Practice Standard: Documents the commonly accepted practice for the practice area and describes the standard against which competence in a practice area is to be assessed. It identifies work tasks, activities and standards that are accepted as standard practice thereby providing a measure of competence for members.

Project Developer: A person who implements an offset project in accordance with a government-approved protocol.

Quantification Protocol: Is a government-approved methodology that outlines appropriate baseline conditions, eligible sources and sinks, and emission reductions calculations for a specific emission reduction activity.

Reasonable Assurance: Is a high level of assurance, or positive assurance. Assurance can be provided at either limited (review or negative) or reasonable (audit or positive) assurance levels. Many of the requirements in limited and reasonable level of assurance are the same; however, the nature, level, and extent of the procedures differs. The recently approved Canadian Standard on Assurance Engagements (CSAE) 3410 provides a more explicit comparison between the two levels of assurance and should be consulted for a more detailed discussion on the differences between the two levels of assurance (Canadian Institute of Chartered Accountants, 2012).

Regulated agrologists: Any Agrologist Technologist In Training (ATT), Agrologist in Training (AIT), Registered Technologists in Agrology (RTAg) or Professional Agrologists (PAg) in good standing with the Alberta Institute of Agrologists.

Regulated Facility: Is a facility located in Alberta that emits over 100,000 tonnes CO₂e per year. The regulated facility may purchase offset credits for compliance under the *Specified Gas Emitters Regulation*.

Required Core Knowledge: An area of knowledge that is absolutely necessary, either on its own or in conjunction with other required courses to support the knowledge and understanding of a more complex system or concept. For example, a number of courses are required to gain knowledge of water and landscape relationships.

Required skill or experience: A skill or experience that is absolutely necessary, either on its own or in conjunction with other required skills or experience to build competency in a practice area.

Registration: A mandatory process for all persons practicing agrology under the *Agrology Profession Act*, and when registered, person becomes a regulated member.

Supplemental course: Refers to specific courses that may be outside the core required elements, but which are useful adjuncts for a proper understanding of the practice area. They include both fundamental and applied courses.

Sequestration: The process of storing carbon in a reservoir to prevent its release into the atmosphere.

Sink: Any process, activity or mechanism that removes greenhouse gas from the atmosphere.

Source: Any process or activity that releases greenhouse gases into the atmosphere.

Third party verifier: Is a person or organization that meets the requirements of a third party auditor stated in section 18 of the *Specified Gas Emitters Regulation*.

Validation: An optional process that is used to assess a project condition including quantification methodologies before the project is implemented.

Verification: Is an independent third party review of a project to assess project conditions against the baseline conditions to confirm the offset credits being claimed in the greenhouse gas assertion.

ACRONYMS:

AANDC = Aboriginal Affairs and Northern Development Canada

AARD = Alberta Agriculture and Rural Development

AESRD = Alberta Environment and Sustainable Resource Development

AIA = Alberta Institute of Agrologists

AIT = Agrologist in Training

APA = Accredited Professional Advisor

ATT = Agrology Technologist in Training

BMP's = Beneficial Management Practices

CPD = Continuing Professional Development

FOIP = Freedom of Information and Privacy Act

GHGMI = Greenhouse Gas Management Institute

GPS = General Practice Standard

PA = Practice Area

PAG = Professional Agrologist

PAEC = Practice Area Expert Committee

PS = Practice Standard

NERP = Nitrous Oxide Emission Reduction Protocol

QA/QC = Quality Assurance/Quality Control

Appendix 2

Alberta Institute of Agrologists – General Practice Standard

General Practice Standard for All Registered Members of the Alberta Institute of Agrologists

The General Practice Standard applies to all registered members of the Alberta Institute of Agrologists. The purpose of the document is to describe the duties and responsibilities that are incumbent upon each member of the profession. It is the responsibility of each registered member to conduct themselves in accordance with these standards. Registered members will be measured against these standards by the Institute, the public, employers, clients and colleagues. The Standard describes the values of the Institute and the profession, and the expectation for each registered member.

Professional Responsibility

Each registered member of the Alberta Institute of Agrologists (AIA) is required to uphold the standards and reputation of the agrology profession and professional principles.

Indicators

The registered member has a duty to protect the public and to conduct his or her work with an appropriate standard of care.

Standard of care

Standard of care is the legal duty to exercise the watchfulness, attention, caution and prudence that a reasonable professional in the same circumstances would exercise. If a professional's actions do not meet this standard the professional may be found negligent or to have committed unprofessional conduct.

The registered member is personally responsible and accountable for ensuring that his or her agrology practice and conduct meet the requirements of the practice area(s), practice standards, current legislation, regulations and policy.

The registered member will practice with honesty, integrity and respect, and comply with the AIA's Code of Ethics.

The registered member will sign or co-sign a report only if he or she is willing to accept full responsibility for the contents of the report.

The registered member may delegate portions of the work to competent practitioners under the registered member's direct supervision. The registered member will accept responsibility for that work and provide additional quality assurance/quality control to determine the sufficiency of that work. Registered members will not sign any document for which they will not take full responsibility for the contents of the document.

The registered member will hold the public interest paramount and endeavour to put service above gain and excellence above quantity.

Competency

The registered member will practice only in an area(s) where the member has demonstrated competence.

Indicators

The registered member will only practice unsupervised in the practice area(s) where the member's education, skills, and experience fulfill the practice area qualifications and the registered member believes he or she is competent. If a registered member's education, skills, and experience do not meet the requirements of the practice area, the member will practice *only* under the direct supervision of a qualified, registered professional who is competent to do the work and who will give appropriate direction to the registered member.

The registered member, if called upon by the profession, a judicial review or a court-ordered request, must be able to clearly demonstrate the knowledge and skill sets gained to enable them to practice in any practice area(s) in which the member deems himself or herself competent to practice.

The registered member will undertake continuing professional development (CPD) with the majority of the CPD hours directly relevant to his or her practice area(s). The registered member commits to reporting his or her CPD activities on the member profile as activities are completed.

The registered member will continually update his or her scientific and standard industry practice knowledge related to the member's practice area(s).

The registered member will demonstrate critical thinking when planning, implementing and evaluating all aspects of the work and making any recommendations as a professional.

The registered member is able to show his or her reasoning in reaching decisions through accurate and clearly written documentation.

The registered member will advise the AIA of any changes to his or her practice area(s), particularly when a new practice area is chosen. The registered member will specify the knowledge and skills that have been acquired to support work in the new practice area.

Provision of Service to the Public, a Client or an Employer

The registered member will promote the qualified, competent and ethical professional role and accountability of agrologists to the public, other professionals, and themselves.

Indicators

The registered member will prepare accurate, concise and clearly written reports and correspondence that are appropriate for the intended audience.

The registered member will communicate clearly and respectfully with a variety of people, including his or her employer, colleagues, clients, members of the public and regulators.

The registered member will advise the client if the work is outside of his or her practice area(s) and if the member will be unable to fulfil the terms of reference for the work.

The registered member will make a referral to seek advice, and enter into collaborations with other professionals in situations which require expertise that extend beyond the member's competence.

The registered member will avoid situations where a conflict of interest exists or where the duties and loyalty owed by a member to one party likely will be, is, has been, or perceived to be, in conflict with the duties or loyalties the member owes to another party.

The registered member will extend public knowledge of their area of expertise whether it is in agriculture, the environment, food sciences or life sciences, and promote factual and accurate statements on matters regarding these areas.

Stewardship

The registered member will advocate and practice good stewardship of all agricultural and environmental resources based on sound scientific principles.

Indicators

A registered member will consider monetary issues, social values, rational application of sound science, lesson of valid experiences, economic impacts to the geographic region, and impacts on future generations when conducting his or her work.

A registered member will inform the client or employer of any action planned or undertaken by the client or employer that he or she believes is detrimental to good stewardship or in breach of known legislation, regulations or policies.

Safety

The registered member understands his or her obligation for promoting public and worker safety and considers the health of the environment, health of the consumer, industrial safety, construction safety and the general operational safety of projects.

Indicators

A registered member will demonstrate concern for the immediate and long-term direct effects of agricultural and environmental practices on the safety of workers by being aware of, and evaluating risks.

A registered member will balance the claims of producers and needs and wants of a consuming public against the potentially competing claims for safety of the environment and the interests of individuals and businesses affected by their proximity to agricultural operations. The registered member is aware that the public expects and demands a safe supply of food, not only for current use but also for future generations.

Appendix 3

Alberta Institute of Agrologists – Code of Ethics

Alberta Institute of Agrologists, Code of Ethics

The Profession of Agrology demands integrity, competence and objectivity in the conduct of its regulated members while fulfilling their professional responsibilities to the public, the employer or client, the profession and other regulated members.

Guidelines to the Ethical Responsibilities of Agrologists

The purpose of the following guideline is to clarify the intent of the code of Ethics and the understanding of the nature of the professional obligations that arise out of that document. Throughout, it is recognized that membership is a right granted by the public to the regulated member (member) to practice Agrology in such a way that the public interest is served. It is also understood that, just as the individual member has an obligation to conduct business in an ethical and competent manner, colleagues and the Institute share the moral responsibility of protecting their members and the field of agrology against any unfounded and unjust criticisms.

1. Among the regulated member's professional obligations to the public are the responsibilities:

a) to practice only in those fields where the member's training, ability, and experience make him/her professionally qualified.

- The public has given a right to the Professional with the trust and expectation that those activities are undertaken with competence.
- A member will not make misleading statements regarding his/her qualifications.
- A member will actively pursue technical upgrading in order to remain competent in his/her field of expertise. A member will make referrals to, seek advice from, and enter into partnerships with other professionals in situations which require expertise that extend beyond the individual regulated member's competence.

b) to express a professional opinion only when it is founded on adequate knowledge and experience, and where the member has an understanding of the situation and context against which this opinion is being offered.

- Members must clearly distinguish among facts, assumptions and opinions in their preparation of reports and professional statements. Professional opinions should be clearly stated and should include clear indications of the constraints within which opinion holds, and the relevant qualifying circumstances, facts and assumptions.
- Members should exercise care that work they conduct cannot in any way be seen to support or make possible any morally suspect or illegal purposes. In the extreme, this caution might cause a member to refrain from association with enterprises or individuals whose objectives and probity are subject to questions.
- Members who act as expert witnesses and provide opinion evidence for the purpose of litigation should not take a partisan position. They must provide evidence as impartial experts and must not do so as advocates of their client or employer. While acting as an expert witness, a member's role is to assist the judge/jury/panel with technical matters which are beyond the expertise of the tribunal.

c) to advocate and practice good stewardship of agricultural and environmental resources based on sound scientific principle(s).

- Stewardship requires making complex choices based on a variety of relevant but not necessarily compatible factors. Good stewards must consider, but not necessarily be limited to: monetary matters, social values, the rational application of sound science, the lessons of valid experience, impacts on the economic health of the community at large, and the impacts on future generations. Because of the position of public trust, a member's duty is to uphold professional principles above and beyond the demands of employment.
- Conflict may arise between a member's duty to uphold professional principles and the duty to serve the needs of an employer or a client. Members must distinguish between the role they play as members and the role management plays. Managers have prerogatives and privilege for making decisions based on a wider range of constraints than those that might be appropriate for a member. The member must not confuse the role of providing others with information upon which to base a decision with the role of being responsible for making the decision him or herself.

- If a member believes there is a serious conflict between the requirements of employment and a member's professional principles, a member should inform and/or consult appropriate persons about the conflict. Members may seek advice and support for the position from the Institute.

d) to extend public knowledge of agriculture and the environment and to promote truthful and accurate statements on sustainable agricultural systems and environmental matters.

- Members should strive to develop appropriate involvement with schools, agencies, and organizations insofar as such outreach activities can help ensure the dissemination and discovery of sound and appropriate agricultural and environmental knowledge. Members should attempt to correct misleading or erroneous statements on agricultural matters whenever and wherever such statements are encountered.

e) to have proper regard for the safety of others in all work.

- Members must understand their obligation for promoting safety. They should consider the impact the exercise of their professional duties will have upon the health of the environment, industrial safety, the health of the consumer, construction safety, and the general operational safety of completed projects. Members must demonstrate concern for the immediate and longterm direct effects of agricultural practices on the safety of workers by being aware of and evaluating risks.
- The public expects and demands a safe supply of food and a safe environment, not only for current but also for future generations. Members must balance the claims of producers and consuming public against the potentially competing claims for safety of the environment, and the interests of individuals and businesses affected by their proximity to agricultural operations.

2. A member's responsibility to the client or employer is:

a) to act conscientiously and diligently in providing professional services.

- Members should endeavour to put service above gain and excellence above quantity. If a member becomes aware of errors or omissions in his/her work, he/she must report the same to his/her client or employer, and immediately work to remedy such errors or omissions.

b) except as required by law, to maintain the confidentiality of client and employer information unless given the explicit consent of the client or employer.

- A member should consider all information received from a client or employer as confidential unless such information is in the public domain. Information obtained during and specific to a professional contract situation is confidential and must not be disclosed to others or used by the members outside that contracted situation without the consent of the client or employer. However, technical expertise gained by a member through work may be used in subsequent projects without consent from other parties.

c) to obtain a clear understanding of the client's or employer's objectives.

- Members must clearly understand the objectives of the client or employer. Members must make inquiries regarding such objectives to ensure that professional services are provided in the context of complete and accurate information. It is recommended that all oral communication that is material to the delivery of professional services be confirmed in writing.

d) to inform the client or employer of any action planned or undertaken by the client or employer that a member believes is detrimental to good stewardship or in breach of known laws or regulations.

- It is a member's duty to advise a client or employer of the consequence of questionable actions and inform the client or employer of the facts that lead to the member's belief that the action is detrimental to good stewardship.

e) to refuse any assignment that creates a conflict of interest.

- A conflict of interest exists where the duties and loyalty owed by a member to one party are, or are likely to become, hostile to the duties or loyalties the member owes to another party.
- A member should not accept an assignment in which he/she has a personal or business interest unless that interest is disclosed and approved by the client or employer.
- Where a member is in a position of providing professional services to more than one party with different interests in the same or related matter, the member must explain the significance of acting for more than one party to each of the affected client(s) or employer(s) (the Parties) and obtain the written consent of the Parties to continue working for more than one party. If any of the parties fail to give their consent, the member must then determine whether it is possible to act on behalf of a subset of the Parties without conflict. If conflict cannot be eliminated by acting only on behalf of some of the Parties, then the member should advise all the Parties that he/she cannot continue to act for any of them in the matter that generates the conflict of interest.
- Members must also advise the Parties that no information received in connection with the common matter from one can be treated as confidential so far as any of the other parties are concerned.

f) to not accept compensation from more than one employer or client for the same work, without the consent of all.

- Members need to distinguish between the data or product, which becomes the property of the client; and the process or technical experience, which remains the property of the member.

3. The member's responsibility to the profession is:

a) to inspire confidence in Agrology by maintaining high standards in conduct and work.

- A member must keep in mind that the work of a member is continuously open for public scrutiny and it is the responsibility of each individual to build and maintain a positive image of the field and the profession. Not only must a member perform his/her duties of employment to a high level of excellence, but the conduct of that member must also be of high standard.

b) to support activities for the advancement of the profession.

- Members have an obligation to participate in the activities of the Provincial Institute (i.e., meetings, elections, holding office, mentoring) as the individual member's situation and opportunities allow.
- Members need to be constantly aware they are members and should, by their conduct, provide a positive image of the profession. Each must be prepared to personally promote Agrology in personal contacts and communication, and to participate in specific promotional initiatives organized by the professional organization.

c) where a member believes another individual may be guilty of infamous or unprofessional conduct, negligence or breach of the regulated member Act or bylaws:

i) to raise the matter with that individual, and

ii) if not resolved or if otherwise deemed necessary, to inform the Registrar of the Provincial Institute of Agrologists in writing.

- A member should ensure that the facts and understanding of the misconduct are correct. Consultation with a colleague or Registrar is encouraged if it may help clarify the issue. Members should make every effort to raise and resolve the issue in a candid and professional manner. Members should note that only in exceptional circumstances is it inappropriate to raise such a matter with the other member if done courteously and politely.

d) to state clearly on whose behalf professional statements or opinions are made.

- A professional opinion or statement prepared by a member is for a specific situation and set of circumstances. The content of a professional opinion should include the context in which it is made.

e) to sign and seal only those plans, reports, and other documents for which the members are professionally responsible and which were prepared by or under the direction of the member.

- Members who affix their seal and/or signature assume responsibility for and understand the document. The responsible professional must have exercised sufficient control and association with the document so he/she can sign and seal the document based on personal knowledge.
- Members will not associate themselves with documents, reports or statements that misrepresent, distort or omit material facts. Members should familiarize themselves with information that details the procedures and protocols that are associated with the use and practice of sealing professional works.

4. A member's professional responsibility to other members is:

a) to abstain from undignified or misrepresentative public communication with or about members.

- Conduct between members should be characterized by respect, courtesy, honesty, and good faith. Direct and honest criticism between professionals is acceptable and professional debate is encouraged when characterized by fairness and propriety.
- Members should be courteous when criticizing the work of another member and be as careful with a colleague's reputation as they would their own.
- An individual member will not make statements or representation on behalf of the Institute without prior authorization.

b) to give credit for professional work to whom credit is due.

- Members should always acknowledge the work and contributions of others when directly using that work in whole or in part. Members should clearly understand and appreciate that the unpaid use of marketable processes and technology developed by another member could jeopardize that other member's livelihood.
- Members will follow the rules and law of copyright. Members will secure releases for any data, process(es) and publication(s) obtained from written or electronic sources.

c) to share knowledge and experience with other members.

- Each member has a duty to new members and to the future of the Institute to be available as a mentor for new members.
- Individual members should offer and seek out constructive professional discussion and debates with colleagues to maintain a vibrant and progressive profession.

Revised December, 2010

Appendix 4

Information Sources

INFORMATION SOURCES:

4R Nutrient Stewardship Website - The Fertilizer Institute - <http://www.nutrientstewardship.com>

Accredited Professional Advisor Nitrous Oxide Emissions Reduction Protocol Training through CFI's Grozone - <http://growzone.cfi.ca/>

Agricultural Research and Extension Council of Alberta - www.areca.ab.ca

Alberta Agriculture and Rural Development; Tillage Offset Credit Update, November 15, 2011 - [http://www1.agric.gov.ab.ca/\\$Department/deptdocs.nsf/all/cl11618/\\$FILE/Information_Nov2011.pdf](http://www1.agric.gov.ab.ca/$Department/deptdocs.nsf/all/cl11618/$FILE/Information_Nov2011.pdf)

Alberta Environment and Sustainable Resource Development, Greenhouse Gas Reporting Program - <http://www.environment.alberta.ca/02166.html>

Alberta Environment and Sustainable Resource Development; "Template: Offset Project Verification Report, Alberta Offset System" - <http://environment.gov.ab.ca/info/library/8333.pdf>

Alberta Environment and Sustainable Resource Development; Offset Credit Systems Protocols - <http://environment.alberta.ca/02275.html>

Alberta Environment and Sustainable Resource Development; Technical Guidance for Offset Project Developers, Version 4.0 - <http://environment.gov.ab.ca/info/library/8525.pdf>

Alberta Environment and Sustainable Resource Development; Technical Guidance for Greenhouse Gas Verification at Reasonable Level Assurance - <http://environment.gov.ab.ca/info/library/8802.pdf>

Canadian Fertilizer Institute; Nitrous Oxide Emission Reduction Protocol - <http://www.cfi.ca/nitrousoxideemissionreductionprotocol/>

Canola Council - <http://www.canola-council.org/>

Canola Growers Manual: http://www.canolacouncil.org/canola_growers_manual.aspx

Climate Change and Emissions Management Act, Specified Gas Emitters Regulation - http://www.qp.alberta.ca/574.cfm?page=2007_139.cfm&leg_type=regs&isbncln=9780779758791

ClimateCHECK- <http://www.climate-check.com/featured/>

Environment and Sustainable Resource Development – Offset Credit System Protocols: <http://esrd.alberta.ca/focus/alberta-and-climate-change/regulating-greenhouse-gas-emissions/alberta-based-offset-credit-system/offset-credit-system-protocols/default.aspx>

National Ecological Framework for Canada – <http://sis.agr.gc.ca/cansis/nsdb/ecostrat/intro.html>

Specified Gas Emitters Regulation; Quantification Protocol for Conservation Cropping, April 2012 – <http://environment.alberta.ca/03994.html>

Saskatchewan Pulse Production Manual – <http://saskpulse.com/media/pdfs/ppm-entire-manual.pdf>

Winter Wheat Production Manual – http://www.usask.ca/agriculture/plantsci/winter_cereals/

Henry, J. L. , 2003, Henry's Handbook of Soil and Water. Published by Henry Perspectives, 143 Tucker Crescent, Saskatoon, Saskatchewan

Appendix 5

Greenhouse Gas Assessment and Management Practice Area Expert Committee

Terms of Reference

TERMS OF REFERENCE

Practice Area Expert Committee – Greenhouse Gas Assessment and Management

Last Revised: September 24, 2012

Scope:

Individual Practice Areas (PA) demand specialized knowledge, skill sets and capabilities. There is a need to identify and understand the knowledge, skill sets and capabilities required within a PA and to fully define and implement agrology PAs. This will enable members to assess their qualifications and expertise in relation to PA requirements. In addition, they provide a means to assure the public that members are aware of PA requirements and are practicing in a competent manner. To develop PA for Greenhouse Gas (GHG) Assessment and Management, a PA Expert Committee has been identified and appointed by the AIA.

This Practice Area Expert Committee (PAEC) consists of practicing members who are recognized as authorities on GHG Assessment and Management by their peers. The members of the PAEC are known for having an excellent understanding of the knowledge, skill sets, behaviors and performance required to practice within this PA. Their authority comes from individual practice over many years of service. They are seen as leaders in this PA and often assume a mentorship role for more junior practitioners.

Members:

For this PA, the AIA was supplied the names of the following members from Alberta Agriculture and Rural Development, who have been appointed by the AIA. Additionally, the AIA may receive recommendations/nominations to appoint additional members.

- Carlene Godwin, P.Ag. – Chair
- John Hastie, M.Sc., P.Ag.
- Karen Haugen-Kozyra, P.Ag.
- Rob Janzen, Ph.D., P.Ag.
- Dan Heaney, Ph.D., P.Ag., APA(NERP)
- Len Leskiw, M.Sc., P.Ag.
- Tom Baumann, P.Eng.
- Darlene Howat, M.Sc., P.Ag.
- Les Fuller, Ph.D., P.Ag.
- David Lloyd, M.Sc., P.Ag.

Members of this PAEC have a responsibility to conduct themselves in a manner that does not compromise the ability of the committee to accomplish its goal. It is expected that members will:

- 1) Actively participate in all PAEC meetings, including e-mail discussions, as well as providing constructive communication and to treat other members in a respectful and supportive manner.
- 2) Perform their duties and responsibilities on the PAEC in such a manner that public confidence and trust in their expertise, honesty, integrity, fairness, and good faith is conserved and enhanced.
- 3) Not gain an improper advantage through information derived from their association with the PAEC.
- 4) Respect the confidentiality of the PAEC and not provide information received through their role as members which are not available to the general public, unless prior written authorization is given for its release.

In addition to all the responsibilities of a member, the chair is responsible for the following:

- 1) Overseeing and chairing meetings, including drafting the meeting agenda;
- 2) Coordinating the work of the PAEC;
- 3) Facilitating discussion among members before preparing advice or recommendations; and
- 4) Ensuring that all members agree with, or note their disagreement with, the recommendations.

Objective: To detail the knowledge and skill requirements and develop a Practice Standard for the GHG Assessment and Management Practice Area.

Deliverables:

- 1) Develop and prepare a detailed Practice Area Knowledge and Skills Requirement Report, based on:
 - a) Collection of relevant documentation in order to detail the knowledge and skills requirements for the GHG Assessment and Management Practice Area.
 - b) Adaptation of existing standards and development of a framework to form a Practice Standard (PS).
 - c) The report will also include a summary of the meeting minutes, all background documentation and any framework options.

- 2) Develop and prepare a Practice Standard Report that includes:
 - a) Relevant documentation, with input from PAEC and AIA staff to develop a high level PS.
 - b) Specific documentation for the PS in relation to the “Quantification Protocol for Conservation Cropping” (April 2012) and the “Quantification Protocol for Agricultural Nitrous Oxide Emissions Reductions” (October 2010).
 - c) Number of years of experience required.
 - d) Types of relevant experience.
 - e) Types of data collection and management strategies required.
 - f) Sign-off capabilities.
 - g) How conflicts of interest may be addressed.
 - h) Additional concerns identified by the PAEC.

Appendix 6

Greenhouse Gas Assessment and Management Practice Area Expert Committee Meeting Minutes

Available upon request by contacting Carlene Godwin at cgodwin@aia.ab.ca