CCP 403 - Greenhouse Gas Validation and Verification

COURSE DESCRIPTION

This course will cover the principles and process of greenhouse gas (GHG) validation and verification for both GHG inventories and GHG emission reduction reports. Students will be become very familiar with the ISO standard and the implementation of the standard within both regulatory and voluntary GHG programs. By the end of the course, students should be competent planning and conducting GHG validations and verifications including preparing all necessary documentation and evaluation of evidence. This course will be beneficial for people intending to conduct GHG validations and verifications as well as people who are preparing a GHG inventory or emission reduction project that will be validated or verified.

COURSE OBJECTIVES

The objectives of this course are to:

- Introduce the concepts of GHG validation and verification at the organization (inventory) and project (emission reduction) levels
- Present and practice the process of conducting GHG validations and verifications that adheres to the ISO standard
- Introduce the documentation and record requirements of the ISO standard and various GHG programs

COURSE OUTCOMES

By the end of this course, the student should be able to:

- Explain the difference between GHG validations and verification and the difference between the requirements of the ISO standard and GHG programs
- Define the scope of validations and verifications, including the level of assurance, materiality, intended user, responsible party, and discrepancies
- Explain the validation and verification process including validation and verification planning, validation and verification risk assessment, sampling methodologies, and validation and verification procedures
- Evaluate a GHG assertion and supporting evidence, including evaluating GHG systems and controls
- Produce the necessary documentation to support a GHG verification
- Understand the record retention requirements for a GHG verification and the process to handle facts determined after a verification is complete

COURSE MATERIALS

Required Course Reading

ISO Standard 14064 Part 3: Specification with Guidance for the Validation and Verification of Greenhouse Gas Assertions*****

Questions and Answers on Greenhouse Gas Reporting (O.Reg. 452/09) – Ontario Ministry of Environment, March 2014

Technical Guidance for Completing Greenhouse Gas Verification at a Reasonable Level of Assurance, Version 1.0 January 2014 – Alberta Environment and Sustainable Resource Development

Reporting Regulation Guidance Document: Verification, Version 2.1 October 2012 – British Columbia Ministry of Environment

Recommended Reading

ISO Standard 14064 Part 1: Specification with Guidance at the Organization Level for Quantification and of Greenhouse Gas Emissions and Removals*****

ISO Standard 14064 Part 2: Specification with Guidance at the Project Level for Quantification, Monitoring and Reporting of Greenhouse Gas Emission Reductions or Removal Enhancements*****

*** The ISO suite of GHG standards is available to students free of charge through the U of T library system.**

ASSIGNMENTS, GRADES AND ASSESSMENT

The coursework will include two case studies with questions, one take-home mid-term exam and a final take-home exam. Additionally, students will be expected to participate in a weekly discussion, facilitated through the University of Toronto Portal and two live conference calls, which will be organized at a time that is convenient for all students.

The case studies will describe examples of emission quantification plans and emission reports that require validation and verification. Each case study will include several questions related to the coursework that has been completed to that point in the course.

- The first case study will include questions related to GHG validation and verification scope definition, level of assurance, materiality and validation and verification approach (focused on validation and verification risk assessment).
- The second case study will include questions related to verification sampling methodologies, assessment of greenhouse gas information and controls and the evaluation of discrepancies.

The short 24 hour take-home mid-term exam will evaluate the students' understanding of course materials and reading covered in Modules 1 – 5 and will consist of ten multiple choice questions and three short answer questions.

The final 24 hour take-home exam will evaluate the students' understanding of all course materials and reading. This exam will consist of 20 multiple choice questions and one case study with five short answer questions.

Overall assessment

The course evaluation will be applied as follows:

- Participation in the Portal and live discussions: 35%
- Case study assignments: 20% (10% each)
- Mid-term take-home exam: 15%
- Final take-home exam: 30%

This course requires maintenance of a 70% or greater in the course work for continuation in the course. There is an expectation for a high level of quality in the work produced by the student. For evaluation purposes, work will be graded under the following criteria:

Distance Education Certificate Program Grade Scale

Letter Grade Scale	Numerical Scale of Marks
A +	90-100%
A	85-89%
A -	80-84%
B+	77-79%
B	73-76%
B-	70-72%
FZ	0-69%

STUDENT OBLIGATIONS

a) Students are expected to participate in the weekly discussion forums. A grading rubric reflecting the quantity and quality of participation in the discussion forum will be posted before the class commences.
b) Students are expected to meet deadlines for written assignments. The assignments will have specific due dates.

MODULES

The course includes ten modules.

MODULE 1 – Introduction

In this first module, students will introduce themselves and their background in greenhouse gas quantification, reporting and validation/verification.

The introduction will provide information distinguishing the differences and relationships between the ISO 14064 series, 14065 and 14066. Additionally, the concept of the ISO standard and implementation of the ISO standard within regulatory and voluntary GHG programs (such as cap-and-trade systems) will be introduced.

MODULE 2 – Scope, Definitions and Principles

The definition of verification scope will be discussed in this module. Definitions of the various parties related to GHG verification will be presented and the difference between GHG validation and verification will be discussed. Finally, the ISO 14064-3 principles of independence, ethical conduct, fair presentation, due professional care and specific requirements such as competence will be described and supplemented with assigned reading.

MODULE 3 – GHG Validation and Verification Process

The process for conducting GHG validations and verifications will be described based upon the ISO standard with specific examples from several GHG programs. The concepts of validation/verification objectives, criteria, scope and materiality will be introduced.

MODULE 4 – Approach: Risk Assessment

ISO 14064-3 is a risk-based approach to conducting GHG validations and verifications and as such, this module will be entirely focused on conducting a validation or verification risk assessment. Inherent risk, control risks, detection risk and verification risk will be defined. Several examples of these risks will be provided through a case study.

MODULE 5 – Approach: Validation Plans, Verification Plans and Sampling Plans

The ISO 14064-3 and several GHG program requirements for Validation Plans, Verification Plans and Sampling Plans will be discussed. Sampling methodologies that are commonly used in validations and verifications will be described with examples. Concepts from Modules 1 – 4 will be summarized in this module as these plans form the documentation requirements for each of the concepts previously discussed.

***** The first live discussion will be organized following Module 5. This discussion will include a summary of information covered through the first five modules through a series of facilitated questions. Students will also have an opportunity to pose questions of their own to the other students and the course instructor.

***** The 24 hour take-home mid-term exam will be scheduled on a date following the first live discussion.

MODULE 6 – Assessment of GHG Systems and Controls

This module will pick-up on the concepts of risk assessment presented in Module 4 with a discussion on developing appropriate validation and verification procedures to address the risks identified through risk assessment. Different types of validation and verification evidence, such as documentation, observation, inquiry, analytical procedures and re-performance will be presented with examples. The difference between substantive data testing and controls testing will also be discussed.

MODULE 7 – Evaluation of the GHG Assertion

In this module, the concepts of sufficiency and appropriateness will be introduced as a means for evaluating if the GHG data and information supports the GHG assertion. The evaluation of discrepancies will be discussed and several examples of both qualitative and quantitative discrepancies will be presented.

MODULE 8 – Project GHG Accounting and Reporting – Reporting
(Wednesday, March 25 – Tuesday, March 31)

In this module, we will discuss the two reports associated with GHG projects, along with their associated assurance engagements: the GHG Project Plan (or project document), along with validation; and the GHG Report, along with verification.

MODULE 9 – Validation and Verification Statements and Records

The documentation and record requirements included in ISO 14064-3 and various GHG programs will be described, including record retention requirements. The process for dealing with facts discovered after the conclusion of a validation or verification will be discussed.

MODULE 10 – Course Wrap-up and Case Study

An extensive case study will be presented to students, which includes all concepts covered in the course.

***** The second live discussion will be organized following Module 10. This discussion will include a review of the final case study through a series of facilitated questions. Students will also have an opportunity to pose questions of their own to the other students and the course instructor.