Bonavista Acid Gas Injection Project at South Rosevear

ARC Resources Ltd.

Verification Report

February 27, 2014

ICF Consulting Canada, Inc.
2600 – 144 Fourth Avenue SW
Calgary, AB T2P 3N4

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Statement of Verification

February 27, 2014

Director, Climate Change Secretariat
Alberta Environment and Sustainable Resource Development
12th Floor, Baker Centre
10025 – 106 Street
Edmonton, Alberta T5J 1G4

Introduction

ARC Resources Ltd. ("**ARC**") engaged ICF Consulting Canada, Inc. ("**ICF**") to review their GHG Assertion – *Alberta Offset System Greenhouse Gas Assertion of Emissions Reduction Credits* and supporting evidence, covering the period January 1, 2012 through to May 31, 2013 ("**GHG Assertion**"). The GHG Assertion, dated February 26, 2014 specifies a claim for 202,002 tonnes CO_2e over the aforementioned period, which resulted from an Acid Gas Injection offset project based on the Quantification Protocol for Acid Gas Injection, May 2008, version 1 ("**Protocol**"). The claim is comprised of the following vintages of credits:

Vintage Year	Claim (tonnes CO_2e)
2012	146,803
2013	55,199

The Responsible Party, ARC, is responsible for the preparation and presentation of the information within the GHG Assertion. Our responsibility is to express our opinion as to whether the GHG Assertion is materially correct, in accordance with Alberta Environment and Sustainable Resource Development's approved quantification methodology Protocol for this project; the *Specified Gas Emitters Regulation* (Alta. Reg.139, 2007) ("**Regulation**"), and the associated guidance documents.

Scope

We completed our review in accordance with the ISO 14064 Part 3: *Greenhouse Gases: Specification with guidance for the validation and verification of greenhouse gas assertions* (ISO, 2006). As such, we planned and performed our work in order to provide positive, but not absolute assurance with respect to the GHG Assertion. Our review criteria were based on the Protocol; the Regulation, and the associated guidance documents. We reviewed the Offset Project Plan dated January 2012, GHG Assertion; and associated documentation. We developed the verification procedures based on the results of a risk assessment that we conducted during the planning stage. The verification procedures are defined in the Verification Plan and the details of any data sampling that was conducted are provided in the Sampling Plan (both plans are appended to the Verification Report). We believe our work provides a reasonable basis for our conclusion.

Conclusion

No unresolved immaterial misstatements remain in the assertion which as detailed in the Verification Report.

Based on our review, it is our opinion to a reasonable level of assurance that the GHG emissions reductions contained in the GHG Assertion are materially correct and presented fairly in accordance with the relevant criteria.

Aaron Schroeder, P.Eng.
Professional Engineer, Alberta (75566)
Lead Verifier and Designated Signing Authority
ICF Consulting Canada, Inc.
Calgary, Alberta

Duncan Rotherham
Managing Director
ICF Consulting Canada, Inc.
Toronto, Ontario

1 Verification Summary

Lead Verifier:	Aaron Schroeder, P.Eng.
Associate Verifiers:	Jennifer Suke, P.Eng., Kate Nesbitt
Internal Peer Reviewer:	Chris Caners, P.Eng.
Designated Signing Authority:	Aaron Schroeder, P. Eng.
Verification Timeframe:	November 2013 to February 2014
Site Visit Date:	January 7, 2014
Objective of the verification:	Reasonable assurance on GHG Assertion for Emissions Reductions Credits
Assurance being provided to:	Alberta Environment and Sustainable Resource Development
Standard being verified to:	ISO 14064-3:2006 Specification with guidance for the validation and verification of greenhouse gas assertions
Verification criteria employed:	Climate Change and Emissions Management Act Specified Gas Emitters Regulation (Alberta Regulation 139/2007) Technical Guidance for Offset Project Developers, Version 4.0, February 2013 Technical Guidance for Greenhouse Gas Verification at Reasonable Level Assurance, Version 1.0, January 2013
Quantification Protocol:	Quantification Protocol for Acid Gas Injection, version 1, May 2008
Verification scope – Gases:	Carbon Dioxide, Methane, Nitrous Oxide
Project Title:	Bonavista Acid Gas Injection Project at South Rosevear
Location:	South Rosevear Gas Plant (LSD 16-11-54-15 W5) Acid Gas Injection Well (LSD 8-11-54-15)
Project Start Date:	March 5, 2007

Credit Start Date:	March 5, 2007
Credit Duration Period:	March 5, 2007 to March 4, 2015
Expected Lifetime of Project:	This project is expected to continue for as long as is technically and economically feasible.
Project Report Temporal Period:	January 1, 2012 to May 31, 2013
Actual Emissions Reductions/ Removals Achieved:	January 1, 2012 through December 31, 2012: 146,803 tCO_2e January 1, 2013 through May 31, 2013: 55,199 tCO_2e
Other Environmental Attributes:	None
Project Registration:	Not Applicable
Project Activity:	The Project has been found to meet all the eligibility criteria for the Alberta Offset System: 1. Occurs in Alberta (Project is located in Alberta); 2. Results from actions not otherwise required by law and beyond business as usual and sector common practices (the acid gas injection system implementation was beyond business as usually and initiated voluntarily); 3. Result from actions taken on or after January 1, 2002 (Project was initiated in 2005); 4. Occur on or after January 1, 2002 (Project start date March 2007); 5. Be real, demonstrable, quantifiable, and verifiable using replicable means (Project and project emission reductions have been verified using verification procedures described within this report); 6. Have clearly established ownership (ownership has been verified through the agreements identified in the OPR); and 7. Be counted once for compliance purposes (emissions reductions are claimed only under the Alberta Offset System)
Main Contact (Verifier)	ICF International Aaron Schroeder Senior Manager Suite 2600 144 – 4th Ave SW Calgary, Alberta T2P 3N4 403.450.7522 Aaron.Schroeder@icfi.com
Main Contact (Reporting Company)	ARC Resources Ltd. Jackson Hegland Coordinator, Environmental Strategies 1200, 308 – 4th Ave SW

	Calgary, Alberta T2P 0H7 403.503.8759 JHegland@arcresources.com
Main Contact (Quantification Consultant)	Blue Source Canada ULC Tooraj Moulai Engineer, Carbon Services 700, 717 – 7th Ave SW Calgary, Alberta T2P 0Z3 403.269.3024 Tooraj@bluesourcecan.com

2 Project Information

ARC Resources Ltd., ("**ARC**") has developed the necessary documentation detailing project activities to support their claim for emissions reductions to be registered on the Alberta Offset Registry under Alberta's Specified Gas Emitters Regulation. ARC has engaged ICF Consulting Canada, Inc. ("**ICF**") to provide a third-party verification of the emissions reductions asserted by ARC related to the project activities discussed herein.

The quantification of the emissions reductions associated with the project is defined by Alberta Environment and Sustainable Resource Development's ("**ESRD**") Quantification Protocol for Acid Gas Injection, May 2008, version 1 ("**the Protocol**"). The Project Report describes the emissions reductions claim ("**GHG Assertion**") made by ARC related to this project.

The Bonavista Acid Gas Injection Project at South Rosevear ("**the Project**") covered by this verification engagement involves the creation of 2012 and 2013 vintage emissions reductions achieved through the permanent geological sequestration of CO_2 in the acid gas stream. The baseline condition for the Project is operation of the pre-existing sulfur recovery unit ("**SRU**") based on a multi-stage Claus process. The Project is located in South Rosevear, Alberta.

Bonavista Energy Corporation is the operator of the South Rosevear Gas Plant. ARC has been authorized by Bonavista Energy Corporation to act in the capacity of the Project Developer for this project for the period January 1, 2012 through May 31, 2013.

This is the first year in which ICF has been engaged by ARC for verification services pertaining to this Project. ICF has previously provided verification services to Suncor Energy Oil for the Project on one occasion, encompassing offset credits for March 5, 2007 to December 31, 2009 vintage.

This document describes the terms and scope of this verification. It serves to communicate the findings of the verification.

3 Verification Procedures

The scope of the verification was defined during the verification planning stage and is detailed in the Verification Plan, which is appended to this document. The Verification Plan also describes ICF's verification process that was executed through the course of the verification, and identifies the specific verification procedures that were planned and executed through the process.

The verification was completed according to Plan, with the exception of the duration of the verification which was a month longer than originally planned due to data availability and revisions to the GHG Emissions Calculator. The final verification schedule was as follows:

Procedure	Date
Verification Kick-Off Meeting	November 26, 2013
Verification Procedures Conducted	November 2013 to January 2014
Site Visit	January 7, 2014
Internal Peer Review	February 25, 2014
Final Verification Report Issued	February 27, 2014

3.1 Site Visit

The site visit was conducted by Jennifer Suke and Kate Nesbitt on January 7, 2014.

The site visit was a key step in planning and executing the verification. During the course of the site tour, ICF interviewed key site operations personnel regarding the operations and data management for the Project.

Bonavista staff interviewed included:

- Craig Hoffman, Plant Foreman
- Lonnie Saken, Field Clerk

The site visit included a review of all greenhouse gas ("**GHG**") emissions sources and sinks in the Project to identify and categorize each one as well as a review of process flow diagrams followed by physical observation of the Project. Subsequently, a review of metering and data management processes was discussed and observed on site, including a review of meter calibration/validation procedures.

3.2 Summary of Project Changes

Major GHG emissions sources and sinks have been identified by the Responsible Party and are detailed in the Offset Project Plan. The quantification methodologies outlined in the Protocol have been used to calculate GHG emissions sources and sinks. Simulation outputs of the multi-stage Claus process and related tail gas incineration, based on site-specific project data were applied. Calculated site-specific emission factors were also used. There have been several changes to the offset project and baseline quantification methodology since the offset project start date including:

- An updated method of calculating the fuel gas volumes in the baseline which now includes the volume of acid gas incinerated under emissions for SS B6a which is in accordance with the Protocol
- Adjustment of the tail gas volume from the SRU to account for the change in molar flow within the SRU through application of a modeled tail gas to acid gas ratio
- Emissions from electricity have been included for the acid gas compressors

The uncertainty associated with the quantification methodologies applied was evaluated during Protocol development. The Project meets the data collection and project specific calculation requirements of the Protocol and therefore, the uncertainty associated with the quantification and resulting assertion meets ESRD requirements.

3.3 Program Applicability Criteria

The Project was assessed against the following program applicability criteria listed on the Protocol, which includes the eligibility criteria specified on ESRD guidance documents. This is described as a verification procedure under section 7 of the Verification Plan:

Protocol applicability criteria include:

- The sequestration project results in removal of emissions that would otherwise have been released to the atmosphere as indicated by an affirmation from the project developer and project schematics;
- Where the entities/operation are separate and distinct, the emission reduced are captured under the protocol and will be reported as being emitted at the source facility such that the emission reductions are not double counted;

- The Acid Gas injection scheme has obtained approval from the Energy Resources Conservation Board (ERCB) and meets the requirements outlined under Directive 051: Injection and Disposal Wells – Well Classifications, Completions, Logging and Testing Requirements;
- Metering of injected gas volumes takes place as close to the injection point as is reasonable to address the potential for fugitive emissions as demonstrated by project schematics;
- The sequestration project involves the installation of an acid gas injection project at one of the following;
    - An existing sour natural gas processing facility which commenced operations prior to July 1, 2007, which may either have an operational sulphur recovery unit (i.e. Multi-Stage Claus or Liquid Redox) or may directly incinerate the acid gas stream;
    - Any new natural gas processing facility constructed after July 1, 2007 with total facility GHGs output in the first year of operation, inclusive of any CO2 that has been captured and sequestered, less than the identified coverage threshold on direct emissions as defined by the *Specified Gas Emitter Regulation.* Therefore, acid gas injection projects applying this protocol at natural gas processing facilities commissioned after July 1, 2007 must also have total baseline emissions, calculated as per Table 2.4 of this protocol, less than the identified coverage threshold for direct emissions as defined by the *Specified Gas Emitters Regulation.*
- The consolidation or comingling of acid gas streams from multiple emitting facilities during the projects crediting period must be fully accounted for to ensure that each individual emitting facility is eligible to apply this protocol based on the above criteria. The metering and measurement systems implemented for the acid gas injection project activity should allow for disaggregation of the total baseline and project emissions back to the original emitting facilities;
- The quantification of reductions achieved by the project is based on actual measurement and monitoring (except where indicated in the protocol) as indicated by the proper application of this protocol; and
- The project must meet the requirements for offset eligibility as specified in the applicable regulation and guidance documents for the Alberta Offset System.

Offset program eligibility criteria include:

- Occur in Alberta;
- Result from actions not otherwise required by law and be beyond business as
- usual and sector common practices;
- Result from actions taken on or after January 1, 2002;
- Occur on or after January 1, 2002;
- Be real, demonstrable, quantifiable, and verifiable;
- Have clearly established ownership; and
- Be counted once for compliance purposes.

3.4 Verification Strategy

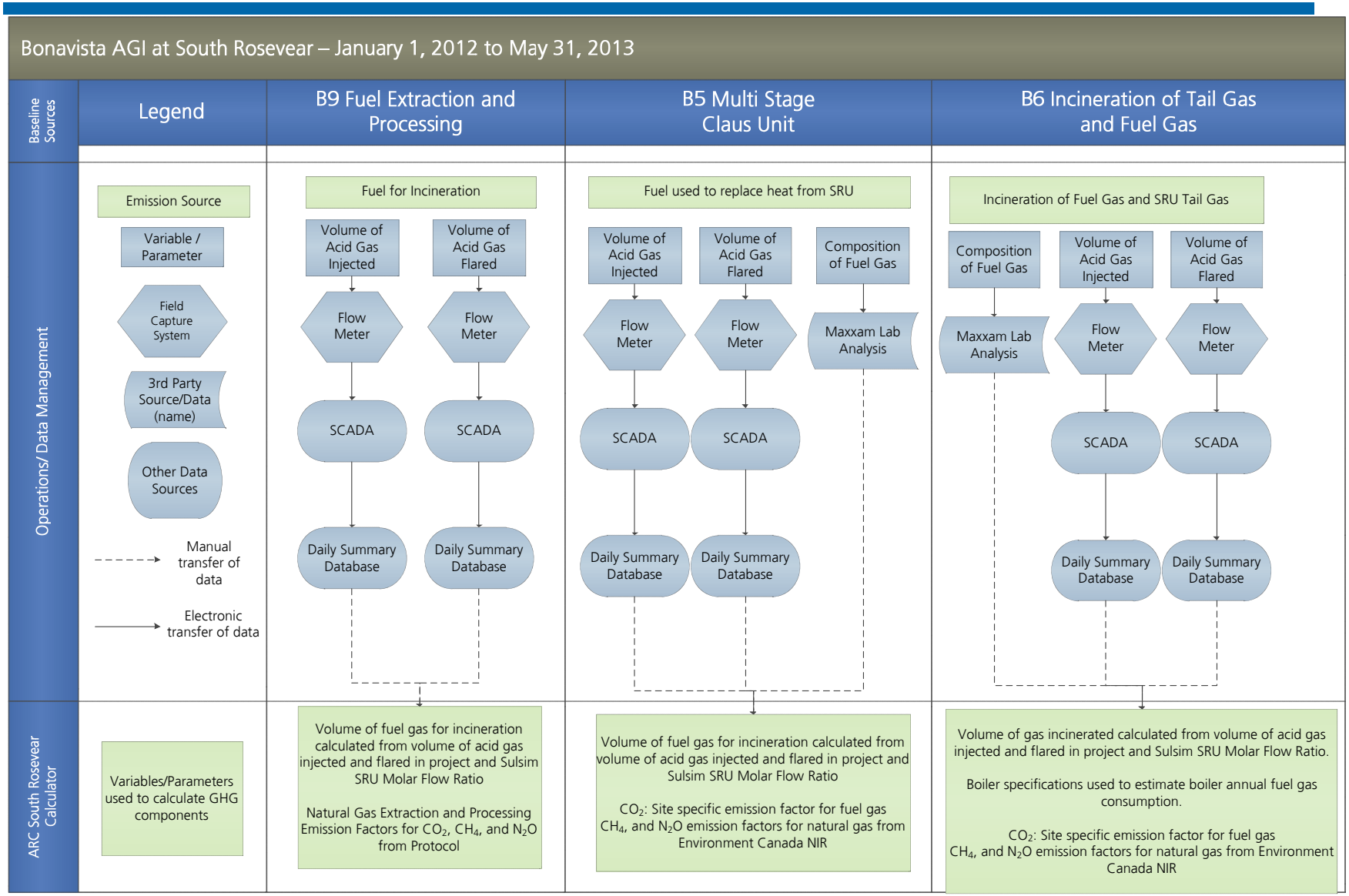
The Verification Strategy applied to this verification was a predominantly substantive approach. The Verification Team designed and executed verification procedures that focused on review of original metered and measured data.

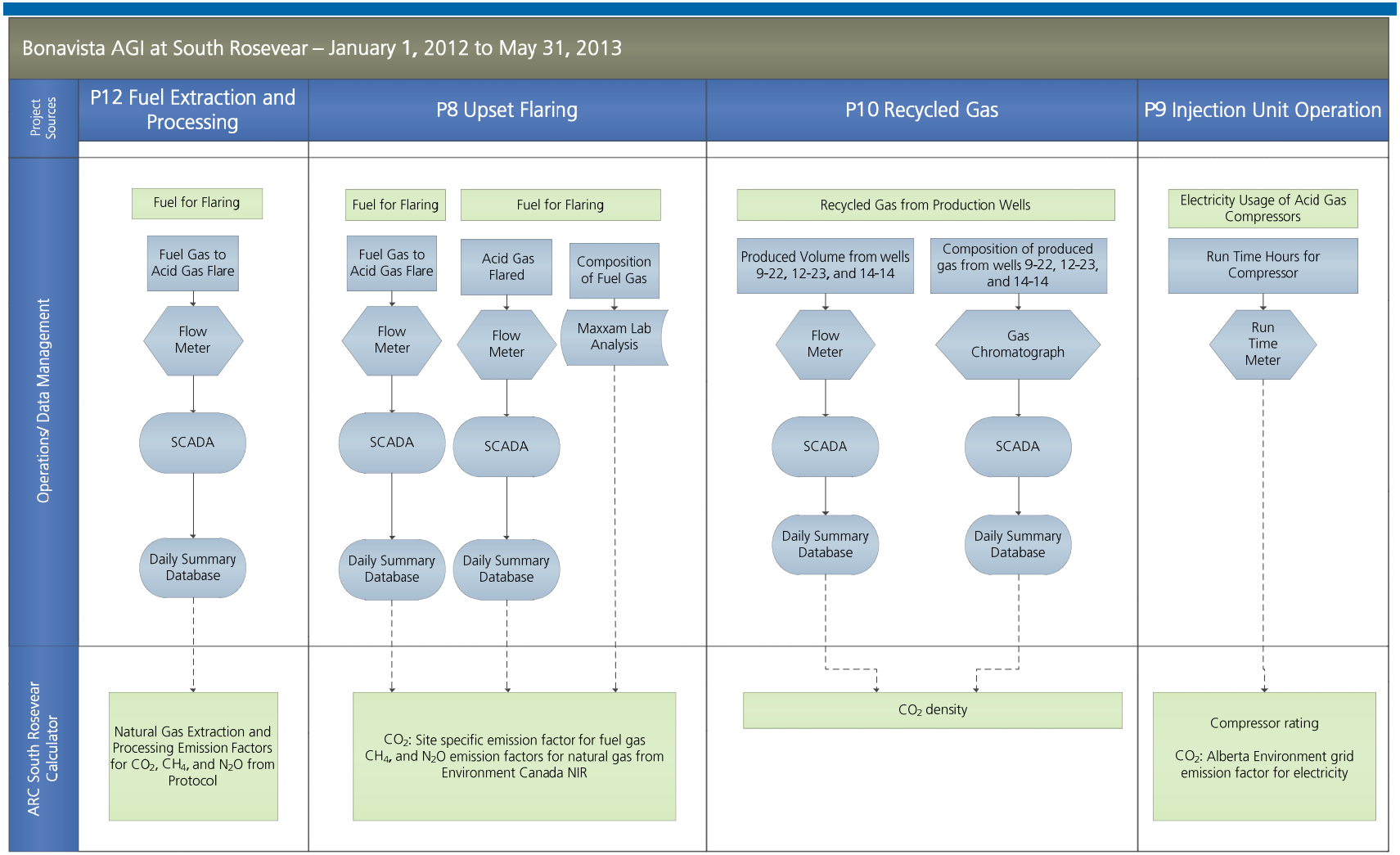
The Responsible Party relies on controls such as the calibration of metering equipment for the quantification of emissions. ICF relied on these controls and as such, tested the operational effectiveness of these controls

as well as the data processed by these controls. Details of the verification procedures employed to conduct these tests are provided in the Verification Plan.

3.5 Data Management and Control System Review

The Verification Team developed a thorough knowledge of the data management and control systems utilized in the Project through the review of the Offset Project Plan, observations during the site visit, and interviews with key Project personnel. The data flow diagram shown on the following pages outlines the flow of Project data and the custody of control.


Bonavista AGI at South Rosevear – January 1, 2012 to May 31, 2013
Baseline Sources
Legend
B9 Fuel Extraction and Processing
B5 Multi Stage Claus Unit
B6 Incineration of Tail Gas and Fuel Gas
Operations/ Data Management
Emission Source
Variable / Parameter
Field Capture System
3rd Party Source/Data (name)
Other Data Sources
Manual transfer of data
Electronic transfer of data
Fuel for Incineration
Volume of Acid Gas Injected
Volume of Acid Gas Flared
Flow Meter
Flow Meter
SCADA
SCADA
Daily Summary Database
Daily Summary Database
Fuel used to replace heat from SRU
Volume of Acid Gas Injected
Volume of Acid Gas Flared
Composition of Fuel Gas
Flow Meter
Flow Meter
Maxxam Lab Analysis
SCADA
SCADA
Daily Summary Database
Daily Summary Database
Incineration of Fuel Gas and SRU Tail Gas
Composition of Fuel Gas
Volume of Acid Gas Injected
Volume of Acid Gas Flared
Maxxam Lab Analysis
Flow Meter
Flow Meter
SCADA
SCADA
Daily Summary Database
Daily Summary Database
ARC South Rosevear Calculator
Variables/Parameters used to calculate GHG components
Volume of fuel gas for incineration calculated from volume of acid gas injected and flared in project and Sulsim SRU Molar Flow Ratio
Natural Gas Extraction and Processing Emission Factors for CO2, CH4, and N2O from Protocol
Volume of fuel gas for incineration calculated from volume of acid gas injected and flared in project and Sulsim SRU Molar Flow Ratio
CO2: Site specific emission factor for fuel gas
CH4, and N2O emission factors for natural gas from Environment Canada NIR
Volume of gas incinerated calculated from volume of acid gas injected and flared in project and Sulsim SRU Molar Flow Ratio.
Boiler specifications used to estimate boiler annual fuel gas consumption.
CO2: Site specific emission factor for fuel gas
CH4, and N2O emission factors for natural gas from Environment Canada NIR


Bonavista AGI at South Rosevear – January 1, 2012 to May 31, 2013
Project Sources
P12 Fuel Extraction and Processing
P8 Upset Flaring
P10 Recycled Gas
P9 Injection Unit Operation
Operations/ Data Management
Fuel for Flaring
Fuel Gas to Acid Gas Flare
Flow Meter
SCADA
Daily Summary Database
Fuel for Flaring
Fuel Gas to Acid Gas Flare
Flow Meter
SCADA
Daily Summary Database
Fuel for Flaring
Acid Gas Flared
Flow Meter
SCADA
Daily Summary Database
Composition of Fuel Gas
Maxxam Lab Analysis
Recycled Gas from Production Wells
Produced Volume from wells 9-22, 12-23, and 14-14
Flow Meter
SCADA
Daily Summary Database
Composition of produced gas from wells 9-22, 12-23, and 14-14
Gas Chromatograph
SCADA
Daily Summary Database
Electricity Usage of Acid Gas Compressors
Run Time Hours for Compressor
Run Time Meter
ARC South Rosevear Calculator
Natural Gas Extraction and Processing Emission Factors for CO2, CH4, and N2O from Protocol
CO2: Site specific emission factor for fuel gas CH4, and N2O emission factors for natural gas from Environment Canada NIR
CO2 density
Compressor rating
CO2: Alberta Environment grid emission factor for electricity

4 Verification Findings

4.1 Misstatements

The misstatement section, below, includes an approximated value of the asserted quantity affected by each misstatement, described as a percentage of the total assertion. These values should be relied upon only for determining if misstatements breach the materiality threshold and not for any other purpose.

Procedure	Misstatement Title	Final Status
B1: Documentation of Boundaries – Offset Project Plan and Offset Project Report	N/A	No misstatements.
B2: Demonstration of Applicability	N/A	No misstatements.
O1: Confirmation of Contractual Relationships	N/A	No misstatements
D1: Data Collection and Quality Controls	N/A	No misstatements
D2: Substantiating Evidence	N/A	No misstatements
C1: Appropriate and Consistent Calculation Methodology	N/A	No misstatements
C2: Re-Performance of Calculation	N/A	No misstatements
A1: Final GHG Assertion	N/A	No misstatements

4.2 Materiality

No misstatements were identified in the GHG Assertion.

4.3 Other Findings

Through the course of the verification, the data management systems and controls employed in the quantification of emissions reductions for the Project were reviewed, as detailed in the Verification Plan procedures. These systems were found to be effective in the calculation of the GHG Assertion.

The Alberta Environment Amending Approval, Approval No. 1353-02-01 was provided, demonstrating that the approval for the South Rosevear Sour Gas Processing Plant (Approval No. 1353-02-00) was amended, and construction of the acid gas injection facilities and resulting effluent streams were approved. A signed version was not available, however the Consent to Transfer Approval No. 1353-02-00 was provided, which is the EPEA Approval Transfer to Bonavista, and was signed by the Director.

Sales gas composition analysis reports from Maxxam Laboratories included historical analyses completed within the Project period. It was noted that a number of the reported historical compositions appeared to be amended from the original analysis reports. The most current reports, inclusive of historical analyses, were deemed most accurate and were applied in the Emissions Calculator Workbook. The difference in the gas

compositions for the instance identified was less than half a percent of the total methane composition and therefore was evaluated to be negligible to the overall assertion.

Additionally, it was noted by ICF that for several months no sales gas composition analysis report was available and for other months multiple reports were available, but only one report per month was applied in the calculator. A more complete approach would include consistent sales gas analysis and all reports available considered in the quantification process.

4.4 Confirmations

The information outlined in *Table 26: Information Confirmed during the Verification* of the ESRD's Technical Guidance for Greenhouse Gas Verification at Reasonable Level Assurance (version 1.0, January 2013) was reviewed for the Project. No misstatements were found.

5 Verification Team

Since 1969, ICF International has been serving major corporations, all levels of government, and multilateral institutions. Globally, approximately 500 of our 4,500 employees are dedicated climate change specialists, with experience advising public and private-sector clients. ICF International has earned a reputation in the field of climate change consulting for its analytical rigour, in-depth expertise, and technical integrity through scores of GHG emissions-related assignments over the past two decades.

Over the past ten years, ICF Consulting Canada, Inc., a fully owned subsidiary of ICF International, has established a GHG Verification Body and carried out hundreds of facility-level GHG verifications and verifications of emissions reductions projects. The Verification Body has developed the necessary internal controls to ensure qualified and competent staffing uphold the principles of the relevant standard while quality control processes are utilized to assure data integrity is maintained and safeguarded. ICF's clients choose ICF for its strong brand, technical expertise, and rigorous methodological approach.

The Verification Team assigned to this verification consists of experienced GHG verifiers with relevant technical expertise.

Lead Verifier

Aaron Schroeder is a Professional Engineer in the Province of Alberta and holds a B.Sc. in Engineering from the University of Saskatchewan. He has completed supplementary training in ISO 14064 as well as Auditing and Assurance Engagements through the University of Toronto, School of Continuing Studies. Further, Aaron has presented ICF's internal ISO 14064 training several times over the past two years. Aaron has acted as Lead Verifier for nearly 100 third-party assurance engagements over multiple compliance periods under Alberta's Specified Gas Emitters Regulation and British Columbia's Greenhouse Gas (Cap and Trade) Act Reporting Regulation. The facility compliance reports have included bitumen extraction facilities in Alberta's oil sands, oil and gas extraction and processing plants across Western Canada, coal and natural gas fired electricity generating facilities, cogeneration facilities, petrochemical facilities, refineries, upgraders and natural gas pipelines. Emission reduction project verifications have included acid gas injection, enhanced oil recovery, wind electricity generation, energy efficiency, landfill gas capture and utilization and conservation cropping/tillage management projects. Additionally, Aaron has led the validation team that has provided assurance that ethanol and biodiesel facilities were designed to produce renewable fuels within the guidelines of Alberta's Renewable Fuel Standard Regulation.

Associate Verifiers

Jennifer Suke is an Associate in ICF's Energy and Carbon Markets division in the Calgary office. Jennifer has over 5 years of experience quantifying GHG emissions for international landfills under the Clean Development Mechanism (CDM), as well as landfills in Ontario, and British Columbia. Her vast experience also includes landfill gas to energy utilization projects and landfill gas management. Jennifer holds an M.Sc.in Sustainable Energy Development from the University of Calgary and a B.Eng. in Environmental Engineering from the University of Guelph. She has completed supplementary verification training, receiving an ICF certificate of training for ISO 14064, has current H2S Alive training, and is a Professional Engineer in the Province of Alberta.

Associate Verifier – Kate Nesbitt

Kate Nesbitt is an Associate in ICF's Energy and Carbon Markets division in the Calgary office. Kate has worked on regulatory compliance GHG verifications for gas processing plants, oil and gas upstream operations and power generation facilities under the *Specified Gas Emitters Regulation* in the province of Alberta and the British Columbia *Greenhouse Gas Reduction (Cap and Trade) Act*. Additionally, Kate has worked on verifications of emissions reductions for wind energy and conservation cropping projects. Kate holds a B.Sc.in Environmental Science from the University of Lethbridge and a M.Sc. in Environmental Sustainability from the University of Edinburgh. She has completed training in ISO 14064, and holds current First Aid/CPR.

Internal Peer Reviewer

Chris Caners is a Professional Engineer in the Province of Ontario, and holds a Master of Science in Engineering from Queen's University, as well as a Bachelor of Applied Science from the University of Toronto. He has completed supplementary verification training, receiving a certificate of training for ISO 14064. Chris has acted as the Lead Verifier for numerous facilities under Alberta's Specified Gas Emitters Regulation, and British Columbia's Greenhouse Gas Reporting Regulation, including natural gas linear facility operations, natural gas compressor stations, cogeneration plants, and SAGD facilities. Chris has also led third-party assurance and reassurance engagements for several offset projects under the Alberta Offset System, including wastewater treatment, wind electricity generation, aerobic composting, acid gas injection, and energy efficiency.

Statement of Qualifications

As the Lead Verifier, Designated Signing Authority and a Professional Engineer registered in the province of Alberta, I, Aaron Schroeder meet or exceed the required qualifications described in Section 18 of the *Specified Gas Emitters Regulation*, including the training requirements under ISO 14064.

The information contained within this document and this statement of qualifications, is complete and correctly represents the qualifications of ICF and the members of the Verification Team described herein. Dated this twenty-seventh day of February, 2014.

Aaron Schroeder, P.Eng.
Professional Engineer, Alberta (75566)
Lead Verifier and Designated Signing Authority
ICF Consulting Canada, Inc.
Calgary, Alberta

Duncan Rotherham
Managing Director
ICF Consulting Canada, Inc.
Toronto, Ontario

Appendices

Verification Plan

Sampling Plan

Conflict of Interest Statement

Verification Plan

ARC Resources Ltd., Bonavista Acid Gas Injection Project at South Rosevear

1 Introduction

This document provides details on the verification scope and process that is planned to conduct a reasonable level verification of the 2012 and 2013 Alberta Offset System Greenhouse Gas Assertion Emission Reduction Credits (the "**GHG Assertion**") for the ARC Resources Ltd. Bonavista Acid Gas Injection Project at South Rosevear, (the "**Project**"). An overview of operations at the Project will be provided in the Verification Report.

A Verification Risk Assessment was conducted during the verification planning stage; the results will be provided in Section 6 of the Verification Plan. These results were used to inform the development of the verification procedures outlined in Section 7 of the Verification Plan. Additionally, the results of the Risk Assessment informed the development of the Sampling Plan, which will be included in the Verification Report.

The Verification and Sampling Plans will be updated through the course of the verification as additional information becomes available.

The verification conclusion will be documented in the Verification Statement and the verification findings will be further described in the Verification Report. The Verification and Sampling Plans will be appended to the Verification Report to provide information related to the verification scope and process.

2 Verification Scope

2.1 Objective

The primary objective of this verification engagement is to provide assurance to Alberta Environment and Sustainable Resource Development ("**ESRD**") that the GHG Assertion is reliable, and of sufficient quality.

2.2 Parties and Users

The person or organization that has overall control and responsibility for the GHG Project, as defined in Section 2.13 of ISO 14064-2:2006, is the "**Project Proponent**". For this verification, ARC Resources Ltd. ("**ARC**") is the Project Proponent, acting as the project developer of the South Rosevear Gas Plant on behalf of the operator, Bonavista Petroleum.

The person or persons responsible for the provision of the GHG Assertion and the supporting information, as defined in Section 2.24 of ISO 14064-3:2006, is the "**Responsible Party**". For this verification, ARC is the Responsible Party.

ICF Consulting Canada, Inc., the "**Verifier**" or "**ICF**", has been engaged to provide a third-party verification of the GHG Assertion. The Lead Verifier and Associate Verifier compose the ICF "**Verification Team**".

The "**Intended User**" is defined in Section 2.22 of ISO 14064-2:2006 as the individual or organization identified by those reporting GHG-related information that relies on that information to make decisions. ESRD is the Intended User of the information contained within the Verification Statement.

2.3 Scope

The verification will be conducted in accordance with *ISO 14064-3: Specification with guidance for the validation and verification of greenhouse gas assertions.*

The Verification and Sampling Plans were developed based on the relevant criteria described in the following:

- *Specified Gas Emitters Regulation, Alberta. Reg.139/2007*
- *Acid Gas Injection Quantification Protocol, version 1, May 2008*
- *Technical Guidance for Offset Project Developers, v.4, February 2013*
- *Bonavista Acid Gas Injection at South Rosevear Project Plan, January 2012*
- *Technical Guidance for Greenhouse Gas Verification at Reasonable Level Assurance, Version 1.0, January 2013*

The following table defines the scope elements specified for the Project.

Scope Element	ISO 14064-3 Definition	Project Specific
Boundary	The Project boundary, including legal, financial, operational and geographic boundaries	Bonavista Acid Gas Injection at South Rosevear, located at the South Rosevear Gas Plant LSD 16-11-54-15 W5 and includes Acid Gas Injection Well site LSD 8-11-54-15 W5
Infrastructure and Activities	The physical infrastructure, activities, technologies and processes associated with the Project	Capture and sequestration of the acid gas stream that previously was processed by a Sulphur Recovery Unit (SRU). Eliminated need to incinerate tail gas from SRU.
GHG Sources	GHG sources to be included	• Fuel Extraction and Processing • Multi-Stage Claus Unit • Incineration • Flaring • Recycled Gas • Injection Unit Operation
Products	The end products and by-products of the Facility processes	• None
GHG Types	Types of GHGs to be included	• Carbon Dioxide (CO_2) • Methane (CH_4) • Nitrous Oxide (N_2O)
Reporting Period	Vintage of credits to be included	January 1, 2012 – May 31, 2013

2.4 Materiality

During the course of the verification, individual errors, omissions or misrepresentations (collectively referred to as misstatements) or the aggregate of these misstatements will be evaluated qualitatively and quantitatively.

Materiality defines the level at which misstatements in the GHG Assertion or any underlying supporting information precludes the issuance of a reasonable level of assurance.

The Lead Verifier is responsible for applying professional judgment to determine if *qualitative* misstatements could adversely affect the GHG Assertion and subsequently influence the decisions of the Intended User, in which case, the misstatements are deemed to be material.

Quantitative misstatements will be calculated individually to determine the impact of the misstatement as a percentage of the GHG Assertion.

All misstatements that are outstanding at the conclusion of the verification are documented in the Verification Report and classified on an individual basis as either material or immaterial.

Materiality Threshold

The materiality threshold is defined as 5% of the total reported emissions reductions in the GHG Assertion. Individual misstatements and the aggregate of individual misstatements will be analyzed to determine if the materiality threshold has been breached.

Tolerable Error Threshold

Tolerable error dictates the level of rigor applied to the verification at the emissions source level. Tolerable error for this verification will be set at half of materiality (2.5%) of the total GHG Assertion.

2.5 Principles

ISO 14064 defines six principles that should be upheld in the development of the GHG Assertion. These principles are intended to ensure a fair representation and a credible and balanced account of GHG-related information. The verification procedures developed and executed during the course of this verification will present evidence such that each of these principles is satisfied.

Relevance

Appropriate data sources are used to quantify, monitor, or estimate emissions sources. Appropriate minimum thresholds are used to justify the exclusion or the aggregation of minor GHG sources or the number of data points monitored.

Completeness

All emissions sources relevant to the Project are included within an identified source category.

Consistency

Uniform calculations are employed between reporting periods. Emissions calculations for each emissions source are calculated uniformly. If more accurate procedures and methodologies become available, documentation should be provided to justify the changes and show that all other principles are upheld.

Accuracy

Measurements and estimates are presented, without bias as far as is practical. Where sufficient accuracy is not possible or practical, measurements and estimates are used while maintaining the principles of conservativeness and transparency.

Transparency

Information is presented in an open, clear, factual, neutral and coherent manner that facilitates independent review. All assumptions are stated clearly and explicitly and all calculation methodologies and background material are clearly referenced.

Conservativeness

Appropriate parameters affecting the Project's emissions sources are utilized in the calculation of the GHG Assertion. When parameters or data sources are highly uncertain, the choice of parameter or data source utilized results in an underestimation of the GHG Assertion. Note that any error, underestimation or overestimation, would be evaluated as a potential material error.

2.6 Limitation of Liability

Due to the complex nature of the operations within the Project and the inherent limitations of the verification procedures employed, it is possible that fraud, error, or non-compliance with laws, regulations, and relevant criteria may occur and not be detected.

3 Verification Team

The qualifications of the Verification Team and Internal Peer Reviewer are provided in the Statement of Qualifications.

Lead Verifier, Aaron Schroeder, P.Eng.

The Lead Verifier is responsible for all activities conducted within the verification, including overseeing the development of the Verification and Sampling Plans and the execution of the verification procedures. The Lead Verifier is the lead author of the Verification Report and executes the Verification Statement at the conclusion of the engagement.

Associate Verifiers, Jennifer Suke, P.Eng. and Kate Nesbitt

The Associate Verifier works under the direction of the Lead Verifier to conduct the verification procedures.

Internal Peer Reviewer[1], Chris Caners, P.Eng.

The Internal Peer Reviewer is not a member of the Verification Team and does not participate in the verification until the draft Verification Report and draft Verification Statement have been prepared. The Internal Peer Reviewer conducts an internal assessment of the verification to ensure the verification procedures have been completed, the results of the verification have been thoroughly documented, any issues or misstatements have been investigated and the verification evidence is sufficient to reach the verification conclusion described in the Verification Statement.

[1] Note: the Internal Peer Reviewer is not a member of the Verification Team, but is listed here keep the list of personnel involved in the engagement in one place.

4 Verification Process

The ICF approach for conducting verification of a GHG Assertion follows the tasks outlined in the following diagram. Although these tasks are generally completed sequentially, the order may be modified according to circumstances such as scheduling and data availability.

Pre-Engagement	Approach	Execution of Verification	Completion
1. Selection of Lead Verifier 2. Initiate Conflict of Interest Procedure 3. Pre-Engagement Planning and Proposal Development 4. Contract Execution 5. Assess GHG Program & Revise VMS as Required 6. Initiate Verification Tracking	7. Selection of Verification Team 8. Communication with Project Proponent 9. Kick-off Meeting 10. Verification Risk Assessment 11. Draft Verification and Sampling Plan	12. Site Visit(s) 13. Conduct Verification Procedures 14. Issue Clarification & Data Request 15. Revise & Finalize Verification and Sampling Plan 16. Address and Evaluate Outstanding Issues	17. Evaluate Evidence 18. Hold Verification Findings Meeting (if necessary) 19. Draft Verification Report & Statement 20. Internal Peer Review 21. Completion of COI Form 22. Independent Review of Impartiality 23. Issue Verification Report & Statement 24. Close Verification File 25. Develop and Issue Management Memo(s)

4.1 Pre-Engagement

Prior to submitting a proposal to conduct this verification, the following pre-planning steps were taken:

- The results of any previous business engagements or verifications with the Project Proponent were reviewed to determine if any previous unresolved conflicts may preclude ICF from engaging in the verification;
- The Project Proponent's motivation for completing the verification was established; and
- A Conflict of Interest procedure was initiated that documents whether any perceived or real conflicts were found when considering threats due to:
  - Advocacy
  - Financial Interest
  - Familiarity/Sympathy
  - Intimidation
  - Self-Review
  - Incentives

Following the acceptance of the proposal and signing of a contract for services, the Verification Team was selected. The Verification Team for this engagement is comprised of the individuals identified in Section 3.

4.2 Approach

An extensive knowledge of the Project Proponent's business, the relevant industry, and the details of the Project itself are required to conduct a thorough verification that can lead to a conclusion. The initial information collected about the Project Proponent and the Project formed the basis of the preliminary draft Verification Plan. The development of the final Verification Plan is an iterative process; that is, the process will be completed several times through the course of the verification and the resulting plan will be updated as new information became available.

There are three types of risk associated with the GHG Assertion defined in ISO 14064-3:

- Inherent Risk
- Control Risk
- Detection Risk

The process of designing the Verification Plan began with the development of Verification Risk Assessment for both the Project as well as the Project Proponent. The steps in this process included:

- Reviewing the GHG Assertion, and the methodologies employed by the Project;
- Reviewing information on the industry and the specific Project under review;
- Assessing the likelihood that a material misstatement might exist in the GHG Assertion, if no controls were used to prevent misstatements in the GHG Assertion (i.e. inherent risk);
- Assessing the control environment and the corporate governance process (i.e. control risk); and
- Reviewing each emissions source identified in the Project, and evaluating the contribution of each source to the GHG Assertion and the associated potential material misstatement for each.

The results of the Verification Risk Assessment inform the development of the verification procedures, which will be documented in Section 7 of the Verification Plan. A summary of the Verification Risk Assessment will be provided in Section 6 of the Verification Plan. The draft Verification Plan will be provided to the Project Proponent before proceeding with the verification.

4.3 Execution of Verification

With draft Verification and Sampling Plans in place, the verification procedures will be executed. This process involves collecting evidence, testing internal controls, conducting substantive testing, and developing a review file. Over the course of the verification, the draft Verification and Sampling Plans may change; the final Verification and Sampling Plans provided in the Verification Report reflect the verification parameters and procedures that were actually executed.

Site Visit

The site visit will be conducted by Jennifer Suke and Kate Nesbitt in January 2014.

The site visit will be a key step in the planning and execution of the verification. During the course of the site tour, ICF will interview key site operations personnel regarding the operations and data management for the Project.

Bonavista staff to be interviewed on-site include:

- Site operations staff
- Instrumentation technician

During the site visit all GHG emissions sources for the Project will be reviewed to ensure appropriate identification and categorization. A review of process flow and metering diagrams will be followed by physical observation of the Project.

Health and Safety Requirements

H_2S Alive training, fire retardant outwear, and basic level personal protective equipment are required on site.

Collecting Evidence and Review of Documentation

Sufficiency and appropriateness are two interrelated concepts that are fundamental to the collection of verification evidence. The decision as to whether an adequate quantity (sufficiency) of evidence has been obtained is influenced by its quality (appropriateness).

Through the execution of the verification procedures described in Section 7 of the final Verification Plan, the Verification Team will review three key forms of evidence including physical, documentary and testimonial:

- Management documentation: policies, programs, and procedures related to the collection, safeguarding, and management of the data supporting the GHG Assertion;
- Records: records comprise time-sensitive data, correspondence, and files including the Offset Project Plan, quantification calculation worksheet(s), Petrinex records, electricity invoices, lab sampling results, and calibration reports;
- Interviews: the interviews will provide information regarding operations and data management and will provide evidence to support the sufficiency of data controls; and
- Computer systems: data systems and software used to capture and manage the GHG-related data and to calculate the GHG Assertion.

Testing and Assessment of Internal Controls

The Verification Team will develop a sufficient understanding of the GHG information system and internal controls to determine whether the overall data management system is sound and if it supports the GHG Assertion. This assessment will seek to identify any weakness or gaps in the controls that pose a significant risk of not preventing or correcting problems with the quality of the data and examining it for sources of potential errors, omissions, and misrepresentations. It will incorporate an examination of three aspects of the Project Proponent's internal controls: (1) the control environment, (2) the data systems, and (3) the control and maintenance procedures.

Assessment of Data

Substantive testing procedures will be used to assess the reasonability and validity of the GHG Assertion. Both quantitative and qualitative analysis will be performed to achieve the desired level of assurance. The verification procedures are described in Section 7 of the final Verification Plan as separate tables for each process or activity involved in the quantification and reporting of the GHG Assertion. The verification procedures include verification activities designed to:

- Review the Project boundary, including a review of the completeness of emissions sources identified;
- Review the Project data sources to ensure the GHG Assertion is calculated based on metered or estimated data that meets the requirements of the Quantification Protocol for Acid Gas Injection, version 1, May 2008;
- Re-calculate the GHG Assertion, which demonstrates transparency and accuracy; and
- Review the GHG Assertion to ensure the emissions reductions calculated by the Project Proponent have been accurately reported.

Clarification and Data Request

To facilitate information flow between the Verification Team and the Project Proponent, a consolidated request for additional information will be developed through the course of the verification and issued to the Project Proponent. This "Clarification and Data Request" will be used to document information requests and summarize the responses. It will also be used to document the Verification Team's assessment of each response.

Developing a Review File

A review file (the "**File**") comprised of documents, records, working papers and other evidence collected and created during the course of the review that support the review conclusions will be developed for this verification. This evidence stored in hard copy and/or electronic format will serve to provide support for the verification conclusion, provide evidence that the verification was conducted in accordance with the criteria set forth in this document, and aid the Verifier in conducting current and future reviews.

The File will include:

- The GHG Assertion and supporting documentation, as submitted to ESRD;
- Decisions on the level of materiality and the results of the Verification Risk Assessment;
- Documentation on the Project Proponent's internal controls;
- Descriptions of the controls assessment work and results;
- Documentation of the substantive testing procedures that were carried out and the results;
- Documentation of the confirmations outlined in Table 26 of ESRD's *Technical Guidance for GHG Verification at Reasonable Level Assurance*, v4.0, February 2013;
- Copies of any correspondence with the Project Proponent or other parties relevant to the review;
- The Verification Team's working papers;
- The Clarification and Data Request with documented responses from the Project Proponent; and
- Client data (copies of relevant records, spreadsheets, and other data files).

The File is the property of ICF and access to it is normally restricted to the Verifier and the Project Proponent. ICF will retain and safeguard the file for a minimum of seven years.

4.4 Completion

This engagement will be formally closed after the verification has been executed and the Verification Report has been finalized.

Preparing the Verification Report

The purpose of the Verification Report is to document the verification findings. All misstatements are described and compared to the materiality threshold individually and in aggregate. The Verification Statement, which presents ICF's verification conclusion, is included in the Verification Report.

Internal Peer Review Process

Prior to releasing the Verification Report and Verification Statement, an internal review process is conducted by the Internal Peer Reviewer. This process ensures that:

- All steps identified as being required to complete the verification were completed;
- Any identified material or immaterial misstatements identified have been either:
    - corrected by the Project Proponent and reflected in the GHG Assertion; or

  - documented in the Verification Report, if misstatements persist at the conclusion of the verification.
- All required documentation detailing the verification process has been prepared, delivered, and retained.

Closing the Engagement

The verification engagement will be closed out upon delivery of the final Verification Report.

5 Verification Schedule

The following schedule is planned for the verification (subject to change with agreement between the Verifier and the Project Proponent).

Description	Scheduled Date
Verification Kick-Off Meeting	November 26, 2013
Draft Verification Plan to Project Proponent	January 2, 2014
Site Visit	January 7, 2014
Initial Clarification & Data Request	January 15, 2014
Draft Verification Statement and Report	January 22, 2014
Final Verification Statement and Report	January 28, 2014

6 Verification Risk Assessment

The process for completing a Verification Risk Assessment was described in Section 4.2. The following table describes the *inherent* and *control* risks analyzed by the Verification Team and the corresponding verification procedure(s) outlined in Section 7 of this document that have been designed to address these risks.

Description of Inherent Risks	Inherent Risk Evaluation	Description of Control Risks	Control Risk Evaluation	Verification Procedure(s)
Transcription error – manual entry of data into calculator	High	N/A – ICF not relying on responsible party's controls	N/A	D1.5, D2.1, and D2.2
Transparency of data sources used in calculations	High	N/A – ICF not relying on responsible party's controls	N/A	C1.1
Conservativeness of assumptions applied in calculations	Medium	N/A – ICF not relying on responsible party's controls	N/A	C1.1
Meter accuracy	Medium	Meter calibration not to date or failed	Medium	D1.7
Meter not specific for acid gas injection well, reported volume of gas injected may not be complete	High	N/A – ICF not relying on responsible party's controls	N/A	B1.5 and D1.3
Normal operational changes at the Project may lead to significant changes in emissions during the reporting period.	Medium	N/A – ICF not relying on responsible party's controls	N/A	B1.3 and B1.5
Completeness or Consistency of GHG inventory documentation	Medium	N/A – ICF not relying on responsible party's controls	N/A	B1.1, B1.2, and B1.4
Negligible emission sources may not meet the definition and threshold for "negligible" or may have changed in magnitude from previous reporting periods.	Low	N/A – ICF not relying on responsible party's controls	N/A	B1.5
Methodologies and calculations for reporting may have changed from previous periods	Medium	N/A – ICF not relying on responsible party's controls	N/A	C1.2
Data used to quantify emissions is consolidated from several systems.	Medium	N/A – ICF not relying on responsible party's controls	N/A	D1.6 and C1.1
Quantification of emissions within the GHG program requires the use of specific accepted methodologies.	Medium	N/A – ICF not relying on responsible party's controls	N/A	C1.1

Description of Inherent Risks	Inherent Risk Evaluation	Description of Control Risks	Control Risk Evaluation	Verification Procedure(s)
Accepted quantification methodologies may not be correctly implemented.	Medium	N/A – ICF not relying on responsible party's controls	N/A	C1.1
Quantification of emissions may contain arithmetic errors	Low	N/A – ICF not relying on responsible party's controls	N/A	C2.1
Information may be missing from the GHG Assertion.	Low	N/A – ICF not relying on responsible party's controls	N/A	A1.1
Information may be incorrectly transcribed into the final GHG Assertion	Low	N/A – ICF not relying on responsible party's controls	N/A	A1.2 and A1.3
There has been inconsistency in personnel responsible for environmental reporting within the Responsible Party over the past year or since the baseline period.	Medium	N/A – ICF not relying on responsible party's controls	N/A	A1.2
Data is entered into a centralized data management system manually, which poses a risk of transcription error.	Medium	N/A – ICF not relying on responsible party's controls	N/A	D2.1 and D2.2
The Project employs complex processes, relies on numerous measurement points, and/or complicated quantification procedures.	Medium	N/A – ICF not relying on responsible party's controls	N/A	C2.1 and C1.1

The *detection risk* is a measure of the risk that the verification procedures will fail to detect material misstatements, should such misstatements exist. The verification procedures will be developed to address inherent and control risks, while ensuring the level of detection risk is sufficiently low to reach a verification conclusion at a reasonable level of assurance.

The results of the Verification Risk Assessment will be utilized by the Verification Team to develop the verification procedures, which are outlined in Section 7 of this document.

7 Verification Procedures

Summary of Procedures:

Project Boundaries and Definition

B1: Documentation of Boundaries – Offset Project Plan and Offset Project Report

B2: Demonstration of Applicability

Ownership

O1: Confirmation of Contractual Relationships

Data Sources and Supporting Data

D1: Data Collection and Quality Controls

D2: Substantiating Evidence

Calculation

C1: Appropriate and Consistent Calculation Methodology

C2: Re-Performance of Calculation

Assertion

A1: Final GHG Assertion

Procedure Definition Table Explained

Z1 – Example Procedure Title	
Introduction: This introduction serves to explain the reason the Verification Team is undertaking the procedures described below. For instance, the inclusion of all emissions sources ensures that that quantification of the total direct emission satisfies the principle of completeness.	
Type of Evidence	The Type of Evidence can usually be grouped as: Physical Examination, Confirmation, Documentation, Observation, Inquiries of the Client, Re-performance, or Analytical Procedures.
Data Sources	The *Data Sources* describes the form in which the evidence is presumed or is known to be available to the verification team. Specific Documents or Assigned Positions, for example.
Objective (specific principles)	The objective serves to focus the procedure as pursuant to one or more of the audit principles of: *Relevance, Completeness, Consistency, Accuracy, Transparency, or Conservativeness*.
Specific Activities	• In bullet form; • The *Specific Activities* are outlined here.

Project Boundaries and Definition

B1 – Documentation of Boundaries – Offset Project Plan and Offset Project Report	
Introduction: This procedure evaluates the boundaries defined by the Project Proponent against the requirements of the GHG Programme. The Offset Project Plan must outline how the Project Proponent is implementing the quantification methodology described in the Protocol. Specifically, each emissions source and sink listed in the Protocol as relevant to be included in the emissions reduction calculation must be considered in the Project unless the use of a flexibility mechanism specifically permits its exclusion. Additionally, any sources or sinks not contemplated by the Protocol that are relevant to the project must be considered.	
Type of Evidence	Documentation, Observation, Inquiries of the Client, Physical Examination
Data Sources	Bonavista Acid Gas Injection at South Rosevear Project Plan, January 2012 ("**OPP**"), Offset Project Report dated February 20, 2014 ("**OPR**"), Project Process Flow Diagrams, GHG Assertion, Project Operations Personnel, Bonavista/ARC Personnel
Objective (specific principles)	*Completeness, Consistency, Relevance*
Specific Activities	1. Compare each emissions source and sink listed in the OPP to those listed in the Protocol considering all equipment and activities; 2. Compare OPP, OPR, GHG Assertion against the corresponding ESRD templates, as applicable; 3. Interview Project operations personnel regarding changes to equipment inventory or changes in operation that have occurred in the time period covered by the GHG Assertion; 4. Evaluate the appropriateness and quantification of negligible emissions sources – venting of gas at injection well; 5. Through the site visit and understanding of the Project, evaluate any emissions sources or sinks that are not considered by the Protocol.

B2 – Demonstration of Applicability	
Introduction: The Protocol describes the specific applicability criteria that must be satisfied to utilize the Quantification Protocol. The Project Proponent must provide evidence that clearly demonstrates applicability as described.	
Type of Evidence	Documentation, Confirmation
Data Sources	OPP and Supporting Documentation
Objective (specific principles)	*Completeness, Relevance*
Specific Activities	1. Review OPP for evidence of applicability for each requirement described by the Protocol; 2. Interview key Project personnel regarding the application of applicability criteria.

Ownership

O1 – Confirmation of Contractual Relationship – Proponent and Project Partners	
Introduction: The ownership of the emissions reductions must be demonstrated. The intent of this procedure is not to provide a legal opinion on ownership, but to establish that a contractual relationship exists between the Project Proponent and any other parties who may have an ownership interest in the emissions reductions through ownership of land, equipment or resources related to the Project.	
Type of Evidence	Documentation, Inquiries of the Client
Data Sources	OPP, GHG Assertion, ERCB Approval No. 10738 and Transfer Approval No. 1353-02-00
Objective (specific principles)	*Completeness, Relevance, Transparency*
Specific Activities	1. Review of documents proving the ownership of the assets creating the emissions reductions; 2. Review of documents proving the approval of project activities; 3. Review of contracts binding Project Proponent to other project partners; 4. Ensure temporal coverage of current assertion in project contracts.

Data Sources and Supporting Data

D1 – Data Collection and Quality Controls	
Introduction: This procedure is intended to systematically review the Project Proponent's internal procedures and controls that are used to calculate the GHG Assertion.	
Type of Evidence	Documentation, Confirmation, Observation, Inquiries of the Client, Analytical Procedures
Data Sources	OPR, Project Operations Personnel, Data Storage System (PROD VIEW), Meter calibration reports, Blue Source workbooks: 'ARC South Rosevear Calculator 2012_v6.0_2014_01_15' and 'ARC South Rosevear Calculator 2013_v6.0_2014_01_15', Gas Facility Balance Reports
Objective (specific principles)	*Accuracy, Transparency, Conservativeness*
Specific Activities	1. Develop a data life cycle diagram, or data map for each major GHG emissions source/sink and confirm with Project operations and GHG reporting personnel; 2. Observe or interview Project operations personnel regarding the operation of data transfer systems during site tour, including manual data entry procedures and associated controls; 3. Interview Project personnel responsible for quantifying emissions reductions regarding data metering and validation, data storage, data security, and any manual data entry or transcription; 4. Review calculator and OPR regarding data sources, transcription and data security; 5. Compare raw data records against data in Electronic Calculator for consistency; 6. Compare emission sources on the current Electronic Calculator with those in previous years; 7. Observe meter verification (calibration) tags during site tour. Review calibration reports.

D2 – Substantiating Evidence	
Introduction: During the Risk Assessment, the inherent and/or controls risk associated with the primary supporting evidence for specific components of the GHG Assertion was determined to be high enough to require additional substantiating evidence. The specific activities in this verification procedure are specifically customized to focus on substantiating evidence related to those specific components identified in the verification Risk Assessment.	
Type of Evidence	Confirmation
Data Sources	Petrinex production records, AGAT and Maxxam Gas Analysis Reports
Objective (specific principles)	*Accuracy, Conservativeness*
Specific Activities	1. Compare production data against data in Petrinex 2. Compare composition data against lab reports

Calculation

C1 – Appropriate and Consistent Calculation Methodology	
Introduction: The specific quantification methodology utilized in the Project must be clearly defined in the Offset Project Plan. This procedure is intended to systematically analyzing the methodology employed against the Protocol requirements. It specifically examines the quantification formulae and any estimation methodologies employed.	
Type of Evidence	Documentation, Inquiries of the Client
Data Sources	GHG Emissions Calculator, OPP, Offset Project Plan: Suncor South Rosevear Acid Gas Injection Project, April 2010 ("**OPP 2010**"), and Supporting Data
Objective (specific principles)	*Consistency, Accuracy, Transparency*
Specific Activities	1. Review quantification formulae and estimation calculations prescribed by the Protocol against those described in the OPP and utilized in the GHG Emissions Calculator for each GHG emissions source/sink; 2. Compare the quantification methodologies utilized for the current vintage credits against those used in previous vintage credits; 3. Compare emission factors used in calculations against reference documents cited in Protocol, OPP and OPP 2010.

C2 – Re-Performance of Calculation	
Introduction: In order to ensure the accuracy of the GHG Assertion, this procedure re-performs the calculation independent from the calculations performed by the Project Proponent.	
Type of Evidence	OPR, Emissions Calculator Workbook: 'ARC South Rosevear Calculator 2012_v3.0_2014_01_27' and 'ARC South Rosevear Calculator 2013_v3.0_2014_01_28'
Data Sources	OPR, Original Project, Second-Party or Third-Party Activity Data
Objective (specific principles)	*Accuracy, Conservativeness, Transparency*
Specific Activities	1. Calculate emissions reduction claim from original, second-party or third-party data.

Assertion

A1 – Final GHG Assertion	
Introduction: This procedure is intended as a final review of the GHG Assertion and OPR to ensure all required information is complete. This procedure in intended to review the transfer of data from the GHG Emissions Calculator into the GHG Assertion.	
Type of Evidence	Documentation, Confirmation
Data Sources	GHG Assertion dated February 26, 2014, OPR, GHG Emissions Calculator
Objective (specific principles)	*Completeness, Accuracy, Transparency*
Specific Activities	1. Review GHG Assertion against guidance documents for completeness; 2. Compare calculated values to those in the GHG Assertion for transcription accuracy; 3. Review asserted emissions reductions shown in OPR and GHG Assertion compared to values calculated in the GHG Emissions Calculator.

Sampling Plan

ARC Resources Ltd., Bonavista AGI at South Rosevear

The following sampling plan defines the methodology used to select data to be tested under verification procedures D1 and D2 only. All other procedures do not include sampling, as described in Section 7 of the Verification Plan.

Emission Source Category	Relative Size of Emission Source Category	Data Source (Type of Evidence)	Sample Size/Amount (Indicate if qualitative in nature)
B9 – Fuel Extraction and Processing	5.7% of baseline and project emissions	Volume of acid gas flared - Gas Facility Balance Reports	All monthly acid gas flared volumes within reporting period
		Volume of acid gas injected - Gas Facility Balance Reports	All monthly injection volumes within reporting period
		Boiler efficiency – CAPP (2003)	All (one) efficiency rating
		Molar Flow Ratio – Sulsim SRU Simulation Report	All monthly molar output values and all monthly molar input values within reporting period.
B5b – Multi-Stage Claus Unit	76.5% of baseline and project emissions	Boiler efficiency – CAPP (2003)	All (one) efficiency rating
		Composition of on-site fuel gas (used to calculate site specific emission factor) - Maxxam and AGAT lab analytical reports	All lab analytical reports within reporting period (17 reports – sampled monthly)
B6 – Incineration	5.8% of baseline and project emissions	Volume of acid gas injected - Gas Facility Balance Reports	All monthly injection volumes within reporting period
		Volume of acid gas flared - Gas Facility Balance Reports	All monthly acid gas flared volumes within reporting period
		Composition of on-site fuel gas (used to calculate site specific emission factor) - Maxxam and AGAT lab analytical reports	All lab analytical reports within reporting period (17 reports – sampled monthly)
		Molar Flow Ratio – Sulsim SRU Simulation Report	All monthly molar output values and all monthly molar input values within reporting period
P12 – Fuel Extraction and Processing	<1% of baseline and project emissions	Volume of fuel gas flared – Gas Facility Balance Reports	All monthly volumes
		Composition of on-site fuel gas (used to calculate site specific emission factor) - Maxxam and AGAT lab analytical reports	All lab analytical reports within reporting period (17 reports – sampled monthly)
P8a – Project	<1% of baseline	Volume of acid gas flared - Gas Facility Balance Reports	All monthly acid gas flared volumes within reporting period

Emission Source Category	Relative Size of Emission Source Category	Data Source (Type of Evidence)	Sample Size/Amount (Indicate if qualitative in nature)
Emissions from Upset Flaring	and project emissions	Volume of fuel gas used to flare acid gas - Gas Facility Balance Reports	All monthly buyback flare volumes within reporting period
		Composition of acid gas injected - Maxxam lab analytical reports	All lab analytical reports within reporting period
		Composition of on-site fuel gas - Maxxam and AGAT lab analytical reports	All monthly lab analytical reports within reporting period
P10 – Recycle Gas	7.3% of baseline and project emissions	Volume of gas produced from production wells – Single Well Reports	All Monthly Gas volumes for each production well within reporting period
		Gas composition (% CO_2) of production wells - SCADA gas composition plot reports	All monthly SCADA gas composition plot reports provided for each well
P9 – Injection Unit Operation	4.4% of baseline and project emissions	Operating hours of compressors – Bonavista records	All operating hour logs within reporting period

Conflict of Interest Checklist

Question	Yes	No
1. Can the verifying organization or the Verification Team members directly benefit from a financial interest in the Project Developer or the Project Developer's Project?		X
For example: • *Owning shares of the Project Developer;* • *Having a close business relationship with the Project Developer;* • *Contingent fees relating to the results of the engagement;* • *Potential employment with the Project Developer; or* • *Undue concern about the possibility of losing the verification or other fees from the Project Developer.*		
2. Can the verifying organization or Verification Team members be in a position of assessing their own work?		X
For example: • *Provided GHG consultation services to the project;* • *Provided validation for the project;* • *If providing non-GHG work for the company, consideration needs to be given as to how potential and perceived conflicts of interest can be managed;* • *A member of the verification team was previously employed with the company.*		
3. Does the verifying organization or a member of the Verification Team, or a person in the chain of command for the verification, promote or be perceived to promote, a Project Developer's position or opinion to the point that objectivity may, or may be perceived to be, compromised?		X
For example: • *Dealing in, or being a promoter of, GHG credits on behalf of a Project Developer; or* • *Acting as an advocate on behalf of the Project Developer in litigation or in resolving disputes with third parties.*		
4. Is one or more of the Verification Team too sympathetic to the Project Developer's interests by virtue of a close relationship with a Project Developer, its directors, officer or employees?		X
For example: • *A person on the Verification Team has a close personal relationship with a person who is in a senior GHG compilation role at the Project Developer; or* • *The Verification Team or a person of influence on the Verification Team has accepted significant gifts or hospitality from the Project Developer.*		
5. Is a member of the Verification Team or a person in the chain of command deterred from acting objectively and exercising professional skepticism by threats, actual or perceived, from the directors, officers or employees of the Project Developer?		X
For example: • *The threat of being replaced as a third party verifier due to a disagreement with the application of a GHG quantification protocol;* • *Fees from the Project Developer represent a large percentage of the overall revenues of the verifying organization;* • *The application of pressure to inappropriately reduce the extent of work performed in order to reduce or limit fees; or* • *Threats of litigation from the Project Developer.*		

The declaration made in this statement is correct and truly represents ICF Consulting Canada, Inc. and the members of the Verification Team. Dated this twenty-seventh day of February, 2014.

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