

VALIDATION REPORT

DEMPSEY RIDGE WIND PROJECT



Conestoga-Rovers & Associates Limited
651 Colby Drive
Waterloo, Ontario, Canada N2V 1C2

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Version	3

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Prepared By	Conestoga-Rovers & Associates Limited
Contact	651 Colby Drive, Waterloo, Ontario, Canada N2V 1C2, (519) 884-0510
Approved By	Gordon Reusing, M.A.Sc., P.Eng. (Lead Auditor and Technical Expert) Deacon Liddy, P.Eng., MBA (Independent Financial Reviewer) Tej Gidda, Ph.D., P.Eng. (Independent Technical Reviewer)
Work Carried Out By	Brent Boss, P.Eng. (Assistant Auditor/Lead Auditor Under-Training) Adam Loney, P.Eng. (Validation Team Member)

Summary:

Dempsey Ridge Wind Project, LLC. (Project Proponent) commissioned Conestoga-Rovers & Associates Limited (CRA) to perform the validation of the Dempsey Ridge Wind Project (Project Activity) located near Cheyenne, Oklahoma, U.S.A.

The Project Activity consists of the installation and operation of 66 Gamesa G90/2000-IEC II A, 2.0 MW turbines for a total rated nameplate capacity of 132 MW. The turbines are located over an area of approximately 7,500 acres of rural and agricultural/grazing lands. Electricity generated by the turbines is upgraded from a 34.5 kilovolt (kV) collection line rating to a 230 kV rating at the Project Activity's substation and then transferred via approximately 15 miles of transmission line to the Sweetwater Substation where the electricity is then delivered to the Southwest Power Pool (SPP) grid. The Project Activity's intent is to generate electricity from renewable sources and therefore displace electricity that otherwise would have been produced for or distributed to the SPP grid in the absence of the Project Activity.

The Project Proponent utilized the United Nations Framework Convention on Climate Change (UNFCCC) Clean Development Mechanism (CDM) methodology entitled: "Consolidated baseline methodology for grid connected electricity generation from renewable sources (ACM0002), Version 12.1.0" which is valid from September 17, 2010 onwards to the current time frame. Likewise, requests for registration are accepted as per the CDM guidance at the current time. This methodology has been accepted for use by the VCS.

The scope of this validation is such that CRA, as an independent third party recognized as a Validation and Verification Body by the VCS (Registration Number 027) is responsible for reviewing the VCS Project Document (VCS PD) including the monitoring plan, baseline assessment, and any supporting documentation. CRA utilized a risk based analysis against the relevant requirements of both the interpretation from the CDM and of VCS Program Guide Version 3.0 and VCS Standard Version 3.1 as applicable.

As part of the validation process, CRA reviewed the completeness, conservativeness, and accuracy of the underlying evidence for the assumptions and claims made, and data sources used. The results of this investigation were then, together with the results of the review of other areas, combined to form the necessary input for the validation report and opinion.

The validation report and associated annexes document a total of ten (10) findings which include:

- Three (3) Corrective Action Requests (CARs)
- Seven (7) Clarification Requests (CLs)
- Zero (0) Forward Action Requests (FARs)

Upon review of the documentation and explanations provided by the Project Proponent, all findings were closed out in a clear and transparent manner.

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1 INTRODUCTION

1.1 Objective

Dempsey Ridge Wind Farm, LLC (Project Proponent) commissioned Conestoga-Rovers & Associates Limited (CRA) to complete an independent third party validation for the proposed Verified Carbon Standard (VCS) project entitled:

- Dempsey Ridge Wind Project located in Oklahoma, U.S.A. (Project Activity)

CRA completed the validation pursuant to the relevant requirements of the VCS guidance (VCS Program Guide, Version 3.0, and VCS Standard, Version 3.1) as well as translational guidance from the United Nations Framework Convention on Climate Change (UNFCCC) Clean Development Mechanism (CDM). As detailed in Section 5.1 of the VCS Standard Version 3.1, *"validation is the independent assessment of the project by a validation/verification body that determines whether the project complies with the VCS rules"*. The objective of CRA on behalf of the VCS is to ensure that only Project Activities that meet the established criteria are registered. Specifically, the criteria states that the registered Project Activity will result in emission reductions that are:

- Relevant
- Complete
- Consistent
- Accurate
- Transparent
- Conservative

In the validation of this VCS project, CRA used a risk-based validation approach to focus and determine the detailed scope of the validation. The VCS and likewise the CDM are rules-based mechanisms, and CRA has ensured that the rules for requesting registration as a proposed VCS Project Activity are complied with, in accordance with the VCS Program Guide Version 3.0, and the VCS Standard Version 3.1.

The key risks associated with the project design, baseline, monitoring plan, emission reduction estimates, environmental impacts, and stakeholder comments are elements that are critical for meeting VCS criteria for achieving real, measurable, permanent, additional, independently audited, unique, transparent, and conservative greenhouse gas (GHG) reductions.

1.2 Scope and Criteria

The Project Proponent commissioned CRA to perform the independent third party validation of the Project Activity which is located near Cheyenne, Oklahoma, U.S.A.

CRA, utilizing a risk-based approach as part of the validation process, reviewed the completeness, conservativeness, and accuracy of the underlying evidence for the assumptions

and claims made, and data sources used. The results of this investigation then, together with the results of the review of other areas, gave the necessary input for the validation opinion which is completed pursuant to guidance provided within the VCS Program Guide Version 3.0, and the VCS Standard Version 3.1.

1.3 Level of Assurance

CRA has conducted the validation activities and has prepared this report to a reasonable level of assurance with a maximum allowable materiality threshold of 5 percent as outlined in Section 5.3.1 of the VCS Standard, Version 3.1.

1.4 Summary Description of the Project

The Project Activity consists of the installation and operation of 66 Gamesa G90/2000-IEC II A, 2.0 MW turbines for a total rated nameplate capacity of 132 MW. The turbines are located over an area of approximately 7,500 acres of rural and agricultural/grazing lands near Cheyenne, Oklahoma, U.S.A. Electricity generated by the turbines is upgraded from a 34.5 kilovolts (kV) collection line rating to a 230 kV rating at the Project Activity's substation and then transferred via approximately 15 miles of transmission line to the Sweetwater Substation where the electricity is then delivered to the Southwest Power Pool (SPP) grid. The Project Activity's intent is to generate electricity from renewable sources and therefore displace electricity that otherwise would have been produced for or distributed to the SPP grid in the absence of the Project Activity.

2 VALIDATION PROCESS

2.1 Method and Criteria

The validation of baseline studies and monitoring plans for the Project Activity included a risk-based assessment of the following, as applicable to the Project Activity:

- Accuracy of baseline emissions
- Uncertainty of external data sources used
- Coverage of leakage in the baseline scenario
- Baseline emission assumptions
- Accuracy of emission calculations in the monitoring plan

The VCS PD supplied by the Project Proponent was used as the primary basis for the validation. The VCS PD was assessed for completeness by CRA and was, at the conclusion of the validation process, deemed comprehensive enough to give an accurate picture of the project and its baseline. Documentation was approved by the Project Proponent for its completeness before it was presented to CRA for validation.

The VCS PD also provided CRA with sufficient information regarding the technical features of the Project Activity, and other relevant information about the Project Activity that was required to complete the validation activity.

The document review established to what degree the presented VCS PD, including the baseline study and the monitoring plan, met the established validation criteria.

CRA's document review during the validation process was comprised of an evaluation of the following:

- The documentation is complete and comprehensive and follows the structure and criteria given in the VCS PD template
- The baseline and monitoring methodologies are justified and appropriate for the specific Project Activity
- The assumptions for the baseline are conservative and appropriate
- The description of the baseline development has considered technological, political, socio-demographic, environmental, and legal trends of relevance to the Project Activity
- Additionality of the Project Activity is sufficiently demonstrated in the VCS PD
- All aspects related to direct and indirect emissions, including leakage, are captured, if applicable in the VCS PD
- The calculation of GHG emission reductions is appropriate and uses conservative assumptions for estimating emission reductions

- Local stakeholder consultation has been carried out, as applicable, and comments are taken into account in the VCS PD and overall project design
- The technical features of the Project Activity, as well as other information about the Project Activity, have been sufficiently addressed
- The monitoring plan clearly identifies the frequency of, and responsibility and authority for, monitoring, measurement and data recording activities, and sufficiently describes quality control/quality assurance/management control procedures.

The main components of the CRA validation process conducted were as follows:

- Document Review
- Preparation of Assessment List and Completion of a Site Visit
- Validation Assessment and Issuance of Action/Clarification Requests
- Response to Action/Clarification Requests
- Draft Validation Report Issuance
- Technical Review and Validation Opinion
- Final Validation Report Issuance

The validation protocol checklist completed by CRA is provided in Annex B of this Validation Report.

2.2 Validation Team

The following presents the members of the CRA Project Team assembled for the validation of the proposed VCS Project Activity:

CRA Project Team Position

Lead Auditor/Technical Expert
 Assistant Auditor/Lead Auditor Under-Training
 Validation Team Member
 Independent Financial Reviewer
 Independent Technical Reviewer

CRA Project Team Member

Gordon Reusing, M.A.Sc., P.Eng.
 Brent Boss, P.Eng.
 Adam Loney, P.Eng.
 Deacon Liddy, P.Eng., MBA
 Tej Gidda, Ph.D., P.Eng.

Curricula vitae for each of the CRA Project Team Members have been provided as Annex C of this report.

2.3 Document Review

The VCS validation process relies heavily upon documentation review. The primary document for review is the VCS PD. The Project Proponent provided CRA with the VCS PD and revised VCS PDs as detailed below:

Document Date	Date Issued to CRA	Version Number	Methodology
August 11, 2011	August 11, 2011	nr.1	ACM0002 Ver. 12.1.0
October 27, 2011	October 27, 2011	nr.2	ACM0002 Ver. 12.1.0
November 11, 2011	November 11, 2011	nr.3	ACM0002 Ver. 12.1.0

Each of the above submissions was reviewed by CRA. As part of the validation process, additional documentation supplemental to the VCS PD was requested and reviewed by CRA. This supplemental information included the following documents:

Issued to CRA Date	Type of Document
August 31, 2011	<u>Response toCAR#1 (Issued During Site Visit):</u> • Dempsey Ridge Construction Schedule (Updated August 1, 2011) • Dempsey Ridge Turbine Supply Agreement Dated December 10, 2010 • Dempsey Ridge Wind Farm Transmission Line Layout Map • Dempsey Ridge Wind Farm Current Wind Farm Layout Map • Phase 1 Environmental Site Assessment Update Report (HDR), Dated August 12, 2011 • US Department of Energy Form EIA-860 Monthly (Electric Generator Report), dated July 2011 • Wind Energy Agreement with Land Owners, Dated April 1, 2009 • Daily Report on Turbine Construction Status from Acciona, Dated August 30, 2011
October 27, 2011	<u>Response toCL#1:</u> • Interconnection Agreement with Southwest Power Pool, Dated May 26, 2009 • Transmission Easement Agreement between Sears and Dempsey Ridge Wind Farm, LLC, Dated January 16, 2009 • Real Estate Purchase Option Agreement between Smiths and Dempsey Ridge Wind Farm, LLC, Dated January 29, 2010 • Wind Energy Easement Agreement between E.K. Sanve and Dempsey Ridge Wind Farm, LLC, Dated March 12, 2009 <u>Response toCL#2:</u> • Request for Payment Form from Acciona along with Form of Request for Payment (Exhibit B), Dated July 1, 2011

October 27, 2011	<u>Response toCL#3:</u> • DNV Wind Report, Dated August 13, 2010 • Email from Iker Chocarro of Acciona presenting Transmission Loss Factors provided from AEP, Dated October 10, 2011 • Gamesa G90 brochure of technical specifications • VCS Carbon Emissions Offset Analysis spreadsheet, Dated November 11, 2011
	<u>Response toCL#4:</u> • Oklahoma Department of Transportation Utility Permit No. 05-1284 (overhead transmission line permit), Dated May 24, 2011 • Oklahoma Department of Transportation Utility Permit No. 05-1289 (overhead transmission line permit), Dated July 20, 2011
	<u>Response toCL#5:</u> • Acciona Purchase Order for transformer/Project Substation materials, Dated October 21, 2010 • Sensitivity Analysis spreadsheet
	<u>Response toCL#7:</u> • Dempsey Ridge Public notification of Project Activity brochure
November 23, 2011	• Network Upgrades Agreement to support Investment Analysis, Dated March 4, 2011
December 14, 2011	• Power Reference Case Electricity & Fuel Price Outlook Midwest Region, Spring 2010, prepared by Ventyx • Calculation Spreadsheet for Benchmark Index Value

2.4 Interviews

CRA completed a Site Visit for the validation on August 31, 2011. During this portion of the validation process, CRA was able to interview a series of project stakeholders regarding various aspects of the Project Activity. Mr. Brent Boss of CRA completed the site visit and Mr. Gordon Reusing of CRA provided remote technical assistance to Mr. Boss both before and during the Site Visit. The following Project Stakeholders were interviewed by CRA:

<i>Name of Interviewee</i>	<i>Position and Company</i>	<i>Details of Items Discussed</i>
John Rhoades	Construction Site Manager - Acciona Energy North America	Assisted in conducting Site Visit tour. Discussed technical details of the Project Activity implementation and operation.
Mark Flickinger	Construction Site Manager - Acciona Energy North America	Represented the Project Proponent on the Site as well as discussions regarding permits and environmental licences

<i>Name of Interviewee</i>	<i>Position and Company</i>	<i>Details of Items Discussed</i>
Chris Strong	Site Project Manager - Acciona Energy North America	Represented the Project Proponent on the Site. Discussions on Project Activity implementation
Chris Vickery	VCS Works – Acciona Energy North America	Assisted in conducting Site Visit tour. Discussed all VCS PD related details.

2.5 Site Inspections

The validation process is primarily a document review process. The completion of a Site Inspection provided the CRA Project Team with an added level of assurance that the information provided within documentation from the Project Proponent is complete and accurate as it relates to the Project Activity. As stated above, CRA completed a Site Inspection for the validation on August 31, 2011. Aside from interviewing project stakeholders as per Section 2.3 of this report, the CRA Project Team reviewed the implementation status of the Project Activity. During the Site Inspection the CRA Project Team noted that there were a total of 49 installed turbines with a total of 66 to be installed to reach the maximum capacity of the Project Activity. None of the turbines were currently operational and the commissioning schedule was discussed as per conversations with the Interviewee's stated above. CRA also noted that sufficient land agreements were in place to accommodate the 66 wind turbines and were able to visit a number of the properties in which the land agreements were presented during the Site Inspection. Finally, the CRA Project Team was able to confirm the type of technology to be employed in the Project Activity and the monitoring plan principles matched what was stated in the VCS PD.

2.6 Resolution of Any Material Discrepancy

No material discrepancies were observed by CRA in the validation of the Project Activity

3 VALIDATION FINDINGS

The Project Activity was assessed by the CRA Project Team versus the Approved Large-Scale Methodology ACM0002 "Consolidated baseline and monitoring methodology for grid-connected electricity generation from renewable sources" Version 12.1.0, as well as the associated most up-to-date methodological tools, and relevant VCS guidance documentation.

The validation findings were categorized as either a Corrective Action Request (CAR), Forward Action Request (FAR), or as a Clarification Request (CL).

The CRA Project Team raised CARs in this Assessment if:

- The Project Proponent had made mistakes in assumptions or in the project documentation that directly influenced the project results
- The VCS requirements deemed relevant for validation of a Project Activity with certain characteristics were not met
- There is a risk that the project would not be registered by the VCS or that emission reductions cannot be monitored, calculated, verified, and/or certified
- The Project Proponent has made mistakes that will influence the ability of the Project Activity to achieve relevant, complete, consistent, accurate, transparent, and conservative emission reductions
- The VCS requirements have not been met

FARs were issued to highlight issues related to project implementation that require review during the first verification of the Project Activity. FARs will not relate to the VCS requirements for registration and thus do not require any formal response from the Project Proponent.

CLs were issued to the Project Proponent if the CRA Project Team determined that the information provided by the Project Proponent is insufficient, unclear or not transparent enough to establish whether the applicable requirements are met.

Each CAR, FAR, and CL raised by CRA was presented in individual tables within the findings assessment. The Project Proponent was required to complete the appropriate responses and to provide, where necessary, documentation as evidence of their assumptions and/or responses.

A summary of the final results of the findings assessments is presented as follows:

<i>Finding Category</i>	<i>Number of Findings</i>
CAR	3
CL	7
FAR	<u>0</u>
TOTAL	10

3.1 Internal Quality Control

Upon completion of the validation assessment, and recommendation by the CRA Project Team, all proposed Project Activity related materials were sent to the Independent Technical Reviewer. The Independent Technical Reviewer checked that the proper procedures have been followed and that all of the conclusions made by the CRA Project Team are just. Ultimately, the Independent Technical Reviewer and Independent Financial Reviewer both issued approval notices to the CRA Project Team based on their review. During review the Independent Technical Reviewer, Independent Financial Reviewer, and the CRA Project Team were able to raise additional findings at which point the Project Proponent must sufficiently address each of the additional findings should they occur.

All documents provided to CRA by the Project Proponent are filed according to the date received and the source of the information. All documentation is placed in a private, secure filing system with restricted access to safeguard confidentiality.

The Sections below will provide the details of the individual findings and the responses from the Project Proponent pertaining to each of the findings.

3.2 Project Design

The following sections provide details regarding the findings raised by CRA in regards to the VCS PD during the Validation process and the conclusions based on the review of documents and/or explanations provided by the Project Proponent.

3.2.1 *Project Scope, Type, Technologies and Measures Implemented, and Eligibility of the Project*

The Dempsey Ridge Wind Farm project is a wind project that is classified as a Zero emissions – grid connected electricity generation from renewable sources project with a capacity greater than 15 MW (i.e., a large-scale project as defined by the CDM). The sectoral scope in which the Project Activity falls is under "Energy Industries (renewable / non-renewable sources)" - Sectoral Scope 1 of the CDM. This Sectoral Scope is approved for use by the VCS.

Within the selected CDM methodology entitled: "Consolidated baseline methodology for grid connected electricity generation from renewable sources (ACM0002), Version 12.1.0", the Project Activity is deemed to be an eligible project as the Project Activity is the installation of a new wind power plant where no renewable power plant was operated prior to the implementation of the Project Activity, as defined by the Applicability Criteria of the methodology. Furthermore CRA has not found any evidence that the Project Activity has applied for or been rejected under any other GHG program through the review of the currently registered projects under the VCS, Climate Action Reserve, Chicago Climate Exchange, and The Climate Registry. This fact is also clearly stated within the VCS PD.

The Project Activity consists of a total of 66 Gamesa G90/2000-IEC II A turbines over a total area of approximately 7,500 acres. During the Site visit conducted by CRA as part of the Validation

process, it was observed that the stated turbine models had been installed as per the VCS PD. At the time of the Site Visit a total of 49 turbines that were observed to be fully erected, however non-operational. Power generated by the turbines is transported via underground transmission lines to the Project Activity's sub-station, where it is upgraded from a 34.5 kV to a 230 kV. Leaving the sub-station the produced electricity is transported via overhead transmission lines to the point of interconnection at the Sweetwater substation. The Sweetwater substation is owned and operated by AEP West, which is an electric utility that is a member of the Southwest Power Pool. While the Project Proponent will monitor their electrical outputs to the grid, ultimately the electricity provided/ consumed from the grid by the Project Activity will be monitored by AEP West and invoiced by SPP. The technologies and measures implemented for this Project Activity are consistent with the requirements of the CDM methodology and the VCS.

3.2.2 Project Proponent

The original VCS PD (Version nr.1) stated in Section 1.3 that "Dempsey Ridge Wind Farm, LLC is the Project Proponent". This statement was followed by a table with contact information regarding the Project Proponent. CRA noted in Version 1 of the Findings Assessment that the Organization identified in the table did not match the Project Proponent listed in the text above the table. As a result of this discrepancy CRA raised CAR#1. The details of the CAR are provided below:

Date:	19/09/2011		Raised by:	Gordon Reusing/Brent Boss		
Type:	CAR	Number:	#1		Reference:	1.3
Lead Auditor Comment:						
The Project Proponent section within the PD states that Dempsey Ridge Wind Farm, LLC is the Project Proponent; however, the table below this statement provides that Acciona Energy North America is the Organization/Proponent.						
The Project Proponent is asked to fully clarify in this section which company is the actual Project Proponent. If there is a legal joint venture or should one company be owned by the other a simple paragraph stating this relationship will suffice.						
Project Proponent Response:				Date: 27/10/2011		
Dempsey Ridge Wind Farm, LLC is the Project Proponent. As stated in Section 1.1 of the PDD, Dempsey Ridge Wind Farm, LLC is the 100% owner of the wind farm and Acciona Wind Energy USA LLC is the 100% owner of Dempsey Ridge Wind Farm, LLC.						
Documentation Provided by Project Proponent:						
Version 2 of the PDD is provided with edits reflecting the fact that Dempsey Ridge Wind Farm, LLC is the Project Proponent.						
Information Verified by Lead Auditor:						
CRA has reviewed the revised version of the VCS PD (Version nr. 2) in accompaniment with the responses to the Findings Assessment provided by the Project Proponent.						

Reasoning for Acceptance and Close Out:	Date: 11/11/2011
Based on the information review by the CRA Project Team, it is now evident and transparent within the VCS PD what the exact ownership structure between Dempsey Ridge Wind Farm LLC, and Acciona Wind Energy USA, LLC is (i.e. that Dempsey Ridge Wind Farm, LLC is 100 percent owned by Acciona Wind Energy USA, LLC).	
<u>CAR#1 is Closed Out.</u>	
Acceptance and Close out by Lead Auditor:	Date: 11/11/2011

3.2.3 Project Start Date

The VCS Standard, Version 3.1 defines the project start date as the "date on which the project began generating GHG emission reductions or removals". For this Project Activity, the date on which GHG emission reductions will begin to be generated corresponds to the date on which the wind turbines begin operation. During the Site visit CRA noted that the anticipated Project Start Date is the date on which Gamesa (turbine supplier) will complete the commissioning services as per the turbine supply agreement between Gamesa and Dempsey Ridge Wind Farm, LLC. In order to sufficiently assess the validity of the projected start date, CRA raised CL#2 in order to request additional documentation to support the stated start date. The details of the CL are provided below:

Date:	19/09/2011	Raised by:	Gordon Reusing/Brent Boss		
Type:	CL	Number:	#2	Reference:	1.5/1.6
Lead Auditor Comment:					
The Project Proponent states that "the Project Start Date is the turbine supply agreement dated December 10, 2010." And subsequently states in the following section that the start date for the first crediting period is "expected to be December 15, 2011".					
CRA is requesting that the Project Proponent provide the completed turbine supply agreement in addition to documentation that will support the commencement of delivery of equipment to the turbine sites as well as documentation stating what expected date that commissioning will commence on and the duration of the commissioning prior to the start of the crediting period.					
Project Proponent Response:				Date: 27/10/2011	
The requested information is provided.					
Documentation Provided by Project Proponent:					
Turbine Supply Agreement Construction Report from August 30, 2011 Schedule Mortenson Form of Request for Payment – June 2011					

Information Verified by Lead Auditor:	
During the Site Visit, the CRA Project Team requested and was able to view the Turbine Supply Agreement, dated December 10, 2010, the construction schedule (at the time was current to August 1, 2011) and the Construction Report that was updated on August 31, 2011. Following the Site Visit the Project Proponent sent the Mortenson (site contractor) Invoice Cover Sheet for work completed in May 2011. The Mortenson Invoice Cover Sheet presented the project completion status for all phases. At the time of the invoice the primary activities completed were the establishment of crane pads, and a smaller portion of transmission line mobilization. Further, the Schedule provided by the Project Proponent shows that the substantial completion date is December 7, 2011. According to Article 7 of the Turbine Supply Agreement, Gamesa (turbine supplier) will within 8 days of the date of substantial completion provide approval for start of operations of the turbine. Hence the December 15, 2011 Project Start Date is applicable.	
Reasoning Acceptance and Close Out:	Date: 11/11/2011
Based on the information reviewed by the CRA Project Team, a clear construction timeline from turbine base construction through commissioning has been properly evidenced as per CRA's Findings Assessment clarification request.	
<u>CL#2 is Closed Out.</u>	
Acceptance and Close out by Lead Auditor:	Date: 11/11/2011

3.2.4 Project Crediting Period

The VCS Standard, Version 3.1 states that the "project crediting period shall be a maximum of ten years which may be renewed at most twice". The Project Proponent has stated in Section 1.6 of the VCS PD that a renewable crediting period of ten years with the first crediting period commencing on December 15, 2011 and concluding on December 14, 2021 will be utilized for this Project Activity. As such the stated crediting period within the VCS PD is in line with the VCS Standard, Version 3.1.

3.2.5 Scale and Estimation of GHG Emission Reductions or Removals

Following the resolution of the CARs and CLs issued as per the Findings Assessment, CRA has confirmed that the Project Activity is estimated to achieve a consistent 312,658 tonnes of CO₂e per year over a ten-year crediting period. As per the VCS Standard, Version 3.1, a Project Activity that is estimated to reduce less than or equal to 1,000,000 tonnes of CO₂e per year is classified as a Project.

Section 1.7 of the VCS PD clearly states this classification with a summary table containing the annual estimated emission reductions over the crediting period.

3.2.6 Project Activities

The description of the Project Activity provided in the VCS PD by the Project Proponent is thorough and accurate and consistent with what was observed by the CRA Project Team during the Site Visit. The table provided within Section 1.8 of the VCS PD provides a significant level of detail regarding the turbine technology to be employed at the Project Activity. The initial implementation status of the Project Activities was observed by the CRA Project Team during the Site Visit and was consistent with the details provided in the VCS PD.

3.2.7 *Project Location*

The Project Activity is located on several rural properties within Roger Mills County and Beckham County which are located in the State of Oklahoma, United States of America. Specifically, all turbines, underground transmission lines, the Project Activity substation and a portion (approximately 9.9 miles) of overhead transmission lines are located within Rogers Mills County. The approximately 5.2 miles of remaining overhead transmission line and the Sweetwater Substation are located within neighbouring Beckham County.

The VCS Standard, Version 3.1 states that the "project location for non-AFOLU projects shall be specified by a single geodetic coordinate". The Project Proponent has specified the following single geodetic coordinate for the Project Activity:

Latitude: 35.5°N

Longitude: -99.48°W

CRA reviewed these coordinates as well as the implementation of the Project Activity during the Site Visit and has confirmed that the Project Proponent has met the requirements of the VCS Standard, Version 3.1.

3.2.8 *Compliance with Applicable Laws, Statutes and Other Regulatory Frameworks*

The Project Proponent provided a comprehensive list of the applicable laws, statues and other regulatory frameworks within Section 1.11 of the VCS PD. The list of Agencies for which applicable permits were assessed by the Project Proponent in the VCS PD includes:

- Oklahoma Department of Environmental Quality
- Oklahoma Department of Transportation
- Roger Mills County
- Beckham County
- Environmental Protection Agency (EPA)
- Oklahoma Department of Wildlife Conservation/United States Fish and Wildlife Service
- Federal Aviation Administration (FAA)
- U.S. Army Corps of Engineers

The VCS Standard, Version 3.1 states that the VCS PD Project Description must include the *"Identification and demonstration of compliance with relevant laws, statutes and other regulatory frameworks, an indication of whether the project has been registered or rejected under any other GHG program and provision of information relevant to the demonstration of compliance with VCS requirements with respect to such."*

While the VCS PD identified the relevant permits as either required/non-required as well as the completion status of each permit/approval, CRA raised CL#4 to in order to sufficiently assess the completeness (i.e., demonstration) in respect to the requirements of the VCS. The details of the CL are presented below:

Date:	19/09/2011	Raised by:	Gordon Reusing/Brent Boss		
Type:	CL	Number:	#4	Reference:	1.11/1.12.1
Lead Auditor Comment:					
The Project Proponent has provided details regarding the various environmental permits and their status required for the Project Activity in Section 1.11. Additionally, in Section 1.12.1 the Project Proponent has stated that the Dempsey Ridge Wind Project is established with the filing of EIA Form 860 with the U.S. Department of Energy.					
CRA is requesting that the Project Proponent provide the EIA Form 860, the EPA Phase 1 Environmental Assessment Report as well as the Oklahoma Department of Transportation Permit for Utility Lines Constructed in Road Right of Ways for at least one location throughout the Site.					
Project Proponent Response:				Date: 27/10/2011	
The requested documents are provided.					
Documentation Provided by Project Proponent:					
Oklahoma Department of Transportation Permit for Utility Line Constructed in Road Right of Way – Route 6 Oklahoma Department of Transportation Permit for Utility Line Constructed in Road Right of Way – Route 30 EIA Form 860 EPA Phase 1 Environmental Assessment Report					
Information Verified by Lead Auditor:					
CRA has reviewed the reference documentation provided by the Project Proponent. Each of the requested documents was provided and reviewed for completeness by the CRA Project Team. In all cases, it is evident from the documentation that all necessary environmental permits were applied for and achieved as required for this Project activity. Moreover, the Environmental Assessment report provides details regarding the potential affects of the Project Activity given a wider range of concerned lands such as old oil reserves. The report details that no development on such lands is evident in this Project Activity.					

Reasoning for Acceptance and Close Out:	Date: 11/11/2011
Based on the review of the provided information along with the detailed description in the VCS PD, the CRA Project Team has determined that all necessary environmental permits have been applied for, achieved and been presented in a clear and transparent manner in the VCS PD. <u>CL#4 is Closed Out.</u>	
Acceptance and Close out by Lead Auditor:	Date: 11/11/2011

3.2.9 Ownership and Other Programs

In regards to Proof of Title, the VCS Standard, Version 3.1 states that:

"The project description shall be accompanied by proof of title in respect of one or more of the following rights of use (see VCS document Program Definitions for definition of right of use) accorded to the project proponent(s):

- 1) *A right of use arising or granted under statute, regulation or decree by a competent authority.*
- 2) *A right of use arising under law.*
- 3) *A right of use arising by virtue of a statutory, property or contractual right in the plant, equipment or process that generates GHG emission reductions and/or removals (where such right includes the right of use of such reductions or removals and the project proponent has not been divested of such right of use).*
- 4) *A right of use arising by virtue of a statutory, property or contractual right in the land, vegetation or conservational or management process that generates GHG emission reductions and/or removals (where such right includes the right of use of such reductions or removals and the project proponent has not been divested of such right of use)*
- 5) *An enforceable and irrevocable agreement with the holder of the statutory, property or contractual right in the plant, equipment or process that generates GHG emission reductions and/or removals which vests the right of use in the project proponent.*
- 6) *An enforceable and irrevocable agreement with the holder of the statutory, property or contractual right in the land, vegetation or conservational or management process that generates GHG emission reductions or removals which vests the right of use in the project proponent"*

The Project Proponent states several times throughout the VCS PD that they retain the full ownership and proof of title for the Project Activity. CRA, upon review of the VCS PD and completion of the Site Visit raised CL#1 regarding the proof of title in respect to the Project Proponent providing evidence in the form of a series of the rights listed above in order to fully validate the proof of title. Documentation for specific wind turbines visited during the Site Visit

was requested by CRA in addition to the transmission line right-of-ways. The details of the CL are provided below:

Date:	19/09/2011	Raised by:	Gordon Reusing/Brent Boss		
Type:	CL	Number:	#1	Reference:	1.1
Lead Auditor Comment:					
In Section 1.1 of the PD, the Project Proponent states that <i>"the project has 100% land control for the entire project including all the turbines, substation, and transmission line right-of-way. The point of interconnection land control is currently contemplated under the Large Generator Interconnection Agreement..."</i> During the Site visit, CRA visited a property in which turbines A5.03 through A5.06 were erected. CRA is requesting that the Project Proponent provide proof of the 100 percent land control as stated above in the form of an agreement/contract. CRA is also further requesting to see the agreement for the transmission line right-of-way for the approximately 15 miles of transmission line present.					
Project Proponent Response:				Date: 27/10/2011	
The project does have land control for 100% of the project area as well as for the transmission line right-of-way. Lease agreements representing the subsection covering turbines A5.03-A5.06 are provided. In addition, documentation showing agreements covering the project substation, Sweetwater Substation, and one point along the 15 mile transmission line are attached. These documents were provided per instruction from CRA received via email on October 11, 2011.					
Documentation Provided by Project Proponent:					
Land lease agreement for parcel containing turbines A5.04 – A5.06 Land lease agreement for parcel containing turbine A5.03 Transmission easement agreement for mid-point along 15 mile transmission line Purchase agreement for project substation land. Section 5.12 of the LGIA grants permission to Dempsey Ridge Wind Farm, LLC to access the Sweetwater Substation.					
Information Verified by Lead Auditor:					
The CRA Project Team has confirmed that the documents provided by the Project Proponent are indicative of 100 percent land control. Further to the land control, each contract bears a section providing evidence of 100 percent control of the environmental attributes (including GHG emission reductions) to the Project Proponent. Finally, the requested turbine lease agreements match properly to the turbine sites and land owners that were visited by the CRA Project Team during the Site Visit and chosen arbitrarily by CRA to be provided as evidence.					

Reasoning for Acceptance and Close Out:	Date: 11/11/2011
Based on the review of the above noted documentation, the CRA Project Team has determined that the Project Proponent has obtained 100 percent of both land control and environmental attributes associated with the Project Activity. <u>CL#1 is Closed Out.</u>	
Acceptance and Close out by Lead Auditor:	Date: 11/11/2011

Further to property and environmental attribute control, the VCS PD requires that there be neither applicable emission trading programs nor binding limits on the Project Activity. The CRA Project Team has completed a review of the applicable programs within Oklahoma and has determined that this statement in the VCS PD is correct.

The Project Proponent has also stated that the "Dempsey Ridge Wind Project is not seeking registration under any other GHG programs at the moment". The VCS PD also states that should the Project activity register under another GHG program, the Project Proponent will not claim emission reductions for electricity generation under the VCS for this Project Activity.

Currently, the only other form of environmental credit that is possible within Oklahoma is the quantification and sale of Renewable Energy Credits (RECs). While the Project Activity is eligible for RECs, the Project Proponent has stated in the VCS PD that they do not plan to obtain/generate RECs for this Project Activity. The Project Proponent also further states in the VCS PD that, should the Project Proponent choose to alter their plan and obtain RECs, the necessary steps to assure that both VCU and RECs are not claimed for the electricity generation will be taken. Again in this instance, the Project Proponent has stated that no double counting of RECs and VCUs will occur and the proper records will be maintained as such.

The CRA Project Team notes that as the Project Activity is not currently operational, CRA can only take the attestation of the Project Proponent in this instance and will rely on the subsequent verification of the Project Activity to fully assess for double counting and other forms of emission reductions.

Finally, CRA has not found any evidence that the Project Activity has applied for or been rejected under any other GHG program through the review of the currently registered projects under the VCS, Climate Action Reserve, Chicago Climate Exchange, and The Climate Registry. This fact is also clearly stated within the VCS PD.

3.2.10 Additional Information Relevant to the Project

The Project Proponent has provided the CRA Project Team with commercially sensitive information regarding the investment analysis in order to prove additionality for the Project Activity. Details on the overall results of the investment analysis have been provided in the VCS PD.

Should the VCS wish to review or assess any information that has been deemed commercially sensitive, a request to CRA and the Project Proponent must be formally issued.

3.3 Application of Methodology

3.3.1 Title and Reference

The Project Proponent utilized the United Nations Framework Convention on Climate Change (UNFCCC) Clean Development Mechanism (CDM) methodology entitled: "Consolidated baseline methodology for grid connected electricity generation from renewable sources (ACM0002), Version 12.1.0" which is valid from September 17, 2010 onwards to the current time frame. Likewise, requests for registration are accepted as per the CDM guidance at the current time. This methodology has been accepted for use by the VCS.

3.3.2 Applicability

Under ACM0002, Version 12.1.0, there are a series of applicability criteria presented as follows:

"This methodology is applicable to grid-connected renewable power generation project activities that (a) install a new power plant at a site where no renewable power plant was operated prior to the implementation of the project activity (greenfield plant); (b) involve a capacity addition; (c) involve a retrofit of (an) existing plant(s); or (d) involve a replacement of (an) existing plant(s).

The methodology is applicable under the following conditions:

- *The project activity is the installation, capacity addition, retrofit or replacement of a power plant/unit of one of the following types: hydro power plant/unit (either with a run-of-river reservoir or an accumulation reservoir), wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit;*
- *In the case of capacity additions, retrofits or replacements (except for wind, solar, wave or tidal power capacity addition projects which use Option 2 on page 11 to calculate the parameter $EG_{PJ,y}$): the existing plant started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion or retrofit of the plant has been undertaken between the start of this minimum historical reference period and the implementation of the project activity;*
- *In case of hydro power plants, one of the following conditions must apply:*
 - o *The project activity is implemented in an existing reservoir, with no change in the volume of reservoir; or*
 - o *The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the Project Emissions section, is greater than 4 W/m²; or*

- o *The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the Project Emissions section, is greater than 4 W/m².*

The methodology is not applicable to the following:

- *Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site;*
- *Biomass fired power plants;*
- *Hydro power plants that result in new reservoirs or in the increase in existing reservoirs where the power density of the power plant is less than 4 W/m².*

In the case of retrofits, replacements, or capacity additions, this methodology is only applicable if the most plausible baseline scenario, as a result of the identification of baseline scenario, is "the continuation of the current situation, i.e. to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance".

Of these applicability criteria the Project Activity is applicable as an installation of a new wind power plan/unit. The Project Activity is not a capacity addition nor is it a retrofit project as confirmed by CRA during the Site Visit. As such, the CRA Project Team has determined that the Project Activity meets all of the necessary applicability criteria to be registered as a VCS Project Activity.

3.3.3 Project Boundary

Under ACM0002, Version 12.1.0, the Project Boundary is defined as:

"The spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the CDM project power plant is connected to".

The Project Proponent has clearly stated this fact in the VCS PD within Section 2.3 and has included a diagram showing the Project Activity, metering locations and offsets from fossil fuel fired plants in the baseline scenario. Having reviewed this information, the CRA Project Team has determined that the Project Proponent has applied the Project Boundary in a manner that is consistent with ACM0002 guidance.

3.3.4 Baseline Scenario

Under ACM0002, Version 12.1.0, the Baseline Scenario for a new wind power plant is defined as:

"Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system."

In the VCS PD, the Project Proponent clearly states this fact in Section 2.4. The Project Proponent has calculated the combined margin as part of the assessment of additionality and thus discussion on this item will be presented in Section 3.3.5 below. The CRA Project Team is able to confirm that the identified baseline scenario reasonably represents what would occur in the absence of the proposed VCS Project Activity.

3.3.5 Additionality

The Project Proponent utilized the CDM "Tool for demonstration and assessment of additionality", Version 5.2.1 (Additionality Tool) which is the most-up-to-date and applicable version of the tool. In order to assess the financial additionality of the Project Activity, the CRA Project Team raised CL#5 in order to request that the Project Proponent provide the CRA Project Team with sufficient details regarding the investment analysis. The details of the CL are provided below:

Date:	19/09/2011	Raised by:	Gordon Reusing/Brent Boss		
Type:	CL	Number:	#5	Reference:	2.5
Lead Auditor Comment:					
CRA is requesting that the Project Proponent provide the full spreadsheet calculations for the investment analysis along with proof (receipts, purchase orders, etc.) for the major items (turbine components, substation components, excavation work, etc.) such that the CRA Project Team can validate the costs used by the Project Proponent in the investment analysis. For items in which costs are directly the responsibility of Acciona (i.e., operations and maintenance) the Project Proponent is asked to provide details regarding the basis of assumption for these costs.					
Project Proponent Response:				Date: 27/10/2011, 23/11/2011, 14/12/2011	
The basis of assumption for operations and maintenance comes from operating wind farms, including Gamesa turbines, for many years. Acciona has an operational wind farm in Oklahoma and operates over 700 MW of wind turbines in North America. This expertise allows the company to appropriately forecast O&M costs at future installations.					
Documentation for major project costs provided by Project Proponent.					
Documentation Provided by Project Proponent:					
Turbine Supply Agreement (provided in response to CL#2) Dempsey Ridge Investment Analysis Spreadsheet Mortenson Form of Request for Payment – June 2011(provided in response to CL#2) Main Transformer Purchase Order Network Upgrades Agreement to support Investment Analysis, Dated March 4, 2011E-mail Correspondence on Details of Inputs into Financial Analysis, Dated November 23, 2011 Power Reference Case Electricity & Fuel Price Outlook Midwest Region, Spring 2010, prepared by Ventyx Calculation Spreadsheet for Benchmark Index Value					

Information Verified by Lead Auditor:	
Based on the review of financial evidence in the form of receipts, request for payments, and purchase orders, the CRA Project Team has determined that the inputs into the capital cost estimate portion of the investment analysis are accurate. Further to this effect the Project Proponent has provided a sensitivity analysis showing the effects of ± 10 percent changes in the cost of the major items such as capital and operational expenditures. In all cases the CRA Project Team has confirmed that the base case as well as the sensitivity analysis portions of the assessment remains under the established benchmark value of 8-10 percent is referenced accordingly within the VCS PD. The benchmark value is obtained through completion of a calculation spreadsheet in which the data is based from a referenced report prepared by Ventyx that has specific and relevant data relevant to the SPP grid.	
Reasoning for Acceptance/Non-Acceptance and Close Out:	Date: 15/12/2011
Based on the review of the investment analysis spreadsheet, the applicable references within the VCS PD and the additional proof of investment provided by the Project Proponent to justify capital and operating expenditures, the CRA Project Team has determined that the investment analysis portion of the additionality assessment has been applied correctly according to the Additionality Tool and relevant VCS guidance.	
<u>CL#5 is Closed Out.</u>	
Acceptance and Close out by Lead Auditor:	Date: 15/12/2011

In addition to the investment analysis, the Project Proponent has addressed the alternatives to the baseline scenario and a common practice analysis. As per the requirements of ACM0002, the Project Proponent has identified three alternatives to the Project Activity as follows

- Project Activity undertaken without registration as a VCS Project Activity
- Alternative that delivers a similar quality of service (i.e., solar)
- Continuation of the current situation (i.e., no Project Activity)

The alternatives and their applicability have been addressed by the Project Proponent in the VCS PD in line with the requirements of ACM0002.

As there are a number of wind farms present within Oklahoma and the immediate area, the Project Proponent has also completed a full common practice analysis within Oklahoma and considering the entire SPP grid. During the Site Visit, the CRA Project Team noted that there were four additional wind projects within the area of the Project Activity noting that only the Elk City II project was similar in capacity. Further, it was confirmed that to-date only one of the four projects in the area was registered under the VCS. While the other projects are not registered under the VCS, it is the understanding within Oklahoma that these projects operate under the sale of renewable energy credits (RECs). These details have been provided in full with appropriate references within the VCS PD by the Project Proponent and are in line with the requirements of the tool for demonstration and assessment of additionality.

3.3.6 Quantification of GHG Emission Reductions and Removals

The CRA Project Team, during the Site Visit, was able to confirm the number of turbines, the distances of transmission lines and the types of technology used for the Project Activity all of which play an integral role in the estimation of GHG emission reductions. Nevertheless, CRA in the Findings Assessment 1 issued CL#3 to request that the Project Proponent provide a full detail of the calculations used to establish the GHG emission reductions estimates presented in the VCS PD. These calculations included the baseline emissions, project emissions, capacity factor(s) and emission factor spreadsheets. Further, CRA also requested that the Project Proponent provide evidence as to the capacity of the installed turbines viewed during the Site Visit. The details of the CL#3 are provided below:

Date:	19/09/2011	Raised by:	Gordon Reusing/Brent Boss		
Type:	CL	Number:	#3	Reference:	1.7/3
Lead Auditor Comment:					
The Project Proponent has provided details regarding the annual estimated emission reductions over the crediting period.					
CRA is requesting that the Project Proponent provide detailed calculation spreadsheets/programs including the emission reduction calculations, emission factor calculations (operating, build margin and combined margin calculations), capacity factor calculation, and combined margin emission reductions. Any reference reports used in the calculations stated above should be provided as well to CRA. Finally, CRA is requesting to see a technical specification specifying the generating capacity of the Gamesa G90/2000-IEC IIA turbines used at the site.					
Project Proponent Response:				Date: 27/10/2011	
The requested information is provided.					
Documentation Provided by Project Proponent:					
Gamesa G90 Brochure DNV Wind Resource Report – Dempsey Ridge – August 13, 2010 Email detailing Loss Compensation between Meter and Sweetwater Substation Emissions Factor Calculation Spreadsheet (includes links to reference reports used in emission factor calculations) Version 2 of the PDD including descriptions of calculation steps and methodology					

Information Verified by Lead Auditor:	
The CRA Project Team reviewed the Gamesa brochure and was able to confirm that the details assessed during the Site Visit in addition to the details provided in the VCS PD are correct according to manufacturer specifications. The 2.0 MW capacity was added directly into the emission reduction spreadsheet. Originally, only losses from wind availability and underground transmission lines were determined via a Wind Resource and Energy Assessment Report prepared by DNV and dated, August 13, 2010. The report clearly states that a net capacity factor of 41.8 percent is achievable for this Project Activity assuming that the G90 Gamesa turbines were utilized. During the Site Visit, the CRA Project Team noted that transmission line losses between the Project Substation and the Sweetwater Substation were not accounted for. As such, the CRA Project Team requested that these be included. These transmission line losses are further discussed in the response to CAR#2 below. In the estimation of the grid emission factor the Project Proponent has applied the CDM guidance in full and have used fully referenced data for their assumptions. Finally, CRA reviewed the overall emission reduction spreadsheet and found no material errors in the documentation provided.	
Reasoning for Acceptance and Close Out:	Date: 11/11/2011
Based on the review of the information provided by the Project Proponent it is clear that all emission reduction calculations including loss calculations have been accounted for within the VCS PD. <u>CL#3 is Closed Out.</u>	
Acceptance and Close out by Lead Auditor:	Date: 11/11/2011

In addition to CL#3, the CRA Project Team issued CAR#2 in order to have the Project Proponent clearly address all technical transmission losses throughout the Project Activity. The details of CAR#2 are provided below:

Date:	19/09/2011	Raised by:	Gordon Reusing/Brent Boss		
Type:	CAR	Number:	#2	Reference:	3.2/3.4
Lead Auditor Comment:					
From a desktop look at the project emission calculations, it does not appear evident in the PD that the Project Proponent has incorporated the electrical losses along the length of transmission line from the Acciona owned substation to the Sweetwater Substation (approximately 14 miles). The Project Proponent is asked to re-visit this calculation and ensure that all transmission line losses are appropriately accounted for. Where a single emission factor may incorporate these losses, the Project Proponent is asked to either show the relevant calculations with references or to provide a fully referenced source for this assumption.					
Project Proponent Response:				Date: 10/27/2011	
The loss compensation factor (0.028%) has been added to the calculation of Estimated GHG Emission Reductions (as is shown in the Emissions Factor Calculation Spreadsheet and PDD Version 2).					

Documentation Provided by Project Proponent:	
Emissions Factor Calculation Spreadsheet (provided in response to CL#3) Version 2 of the PDD	
Information Verified by Lead Auditor:	
As per CL#3 above, during the Site Visit, the CRA Project Team noted that transmission line losses between the Project Substation and the Sweetwater Substation were not accounted for. As such, the CRA Project Team requested that these be included. The Project Proponent provided correspondence and spreadsheets from AEP regarding the transmission line losses. According to AEP, the electrical meters used for this Project Activity account for a 0.028 percent transmission loss. Therefore, the Project Proponent has included this value as a secondary loss in addition to the capacity factor. The resulting emission reductions presented in the VCS PD were then reduced from 312,746 tonnes CO ₂ e/year to 312,658 tonnes CO ₂ e/year (exactly a 0.028 percent reduction).	
Reasoning Acceptance and Close Out:	Date: 11/11/2011
Based on the review of the information provided by the third party grid operator AEP, the CRA Project Team is satisfied that all transmission line losses have been correctly accounted for in the VCS PD.	
<u>CAR#2 is Closed Out.</u>	
Acceptance and Close out by Lead Auditor:	Date: 11/11/2011

As the Project Activity is a wind power project, the relevant CDM guidance defines that there are no resulting project or leakage emissions and hence the Project Proponent has not quantified these in the VCS PD.

In total, the CRA Project Team was able to reproduce the GHG emission reduction quantification prepared by the Project Proponent. The Project Proponent has provided sufficient evidence and references for the calculations resulting in a clear and transparent report that is consistent with relevant guidance in relation to GHG quantification/estimation. The overall uncertainty regarding the emission reduction quantification is minimal as a result.

3.3.7 Methodology Deviations

The Project Proponent has stated in Section 2.6 of the VCS PD that there are no methodology deviations for this Project Activity.

The CRA Project Team has reviewed the methodology and has determined that this statement is correct. The Project Activity meets all required applicability criteria, applies the calculation methodologies to the same extent as a CDM project, and has included a monitoring plan that is consistent with CDM and VCS guidelines.

3.3.8 Monitoring Plan

Date:	19/09/2011	Raised by:	Gordon Reusing/Brent Boss		
Type:	CAR	Number:	#3	Reference:	4.3
Lead Auditor Comment:					
CRA is requesting that the Project Proponent include a diagram within the monitoring plan section of the PD showing the locations within the project boundary that will be monitored. This is intended to accompany the text already in this Section of the Project Document.					
Project Proponent Response:				Date: 27/10/2011	
The diagram originally included on page 13 of the PDD has been adjusted to more clearly show where electricity production and consumption will be measured.					
Documentation Provided by Project Proponent:					
Version 2 of the PDD					
Information Verified by Lead Auditor:					
The CRA Project Team has reviewed the revised VCS PD and has found that figure provided in Section 2.3 of the VCS PD provides sufficient information in regards to the implementation of the monitoring plan. The Project Activity will utilize a revenue meter in which the transmission line losses between the Project Substation and the Sweetwater Substation are accounted for (0.028 percent). The revenue meter is also owned and operated by AEP (utility) and has been stated to be calibrated on a biennial (i.e., every 2 years basis). Records of net electricity consumed will be presented during subsequent verifications in the form of invoices/receipts from SPP and therefore results in minimal uncertainty. Furthermore the location of the AEP revenue meter was visited by the CRA Project Team during the Site Visit. The CRA Project Team notes that the Project Proponent will also be monitoring the output of electricity to the grid through their check meters of which the Project Proponent notes that the meters will be maintained according to good utility practice. The Monitoring Plan is deemed to be in accordance with VCS requirements and represents minimal overall risk assuming it is implemented as per the VCS PD.					
Reasoning for Acceptance and Close Out:				Date: 11/11/2011	
Based on the information reviewed by the CRA Project Team and the completion of the Site Visit, the CRA Project Team has confirmed that the Monitoring Plan stated in the VCS PD by the Project Proponent sufficiently addresses all required monitoring parameters as well as the operation and calibration procedures as per the VCS guidance.					
<u>CAR#3 is Closed Out.</u>					
Acceptance and Close out by Lead Auditor:				Date: 11/11/2011	

Subsequent to the monitoring parameters to be monitored during the operation of the Project Activity, the Project Proponent included a series of data parameters that were available during the validation stage. These parameters included the grid emission factor, the projected net electricity generated by the Project Activity (via EIA-906/920/923 and EIA-860), and information relating to

the baseline power plant electricity generation figures. The parameters presented within the VCS PD are in line with the CDM methodologies and the VCS guidance and allow for an accurate estimation of the projected emission reductions.

3.4 Environmental Impact

The Project Proponent has noted and the CRA Project Team has confirmed as per CL#4 that that no permit of approval is required for the Project Activity by the Oklahoma Department of Wildlife Conservation or the United States Fish and Wildlife Service. Nevertheless, CRA understands that a series of environmental reports including an Environmental Impact Assessment and FAA assessments are completed for these types of Project activities. Included within these reports are studies related to a wide range of environmental impacts. As such, the CRA Project Team raised CL#6 in the Findings Assessment in order to have the Project Proponent include a more in-depth description of some of the features included in these assessments. The details of the CL are presented below:

Date:	19/09/2011	Raised by:	Gordon Reusing/Brent Boss		
Type:	CL	Number:	#6	Reference:	5
Lead Auditor Comment:					
CRA is requesting that the Project Proponent include further details regarding the environmental impacts reviewed prior to project initiation. CRA understands that an EIA is not required if a Federal Nexus is not identified (which it is not); however, there are typically studies regarding birds (various migratory bird, bats, etc.) and wetland protection that are undertaken voluntarily in these instances that govern the design and locations of the turbines. The Project Proponent is requested to further expand this section of the Project Document to describe some of the voluntary measures used to minimize/avoid environmental impacts.					
Project Proponent Response:				Date: 27/10/2011	
CRA is correct that many voluntary measures were undertaken to minimize / avoid environmental impacts. Section 5 of the PDD has been edited to further describe these measures.					
Documentation Provided by Project Proponent:					
Version 2 of the PDD					

Information Verified by Lead Auditor:	
The CRA Project Team reviewed the revised VCS PD which now contains the following text regarding environmental impact from the Project Activity: <i>"Several voluntary measures have been incorporated into the Dempsey Ridge Wind Farm Project. The Project has been designed to avoid all permanent impacts to water features. Temporary impacts to water/wetland features have been limited to less than 0.01 acres, resulting from trenching of the underground collection system. These temporary impacts will be minimized and restored. The turbines used for the Project will have tubular monopole structures that will inhibit perching by avian species. The Project lighting plan will use the minimum lighting necessary to meet Federal Aviation Administration lighting requirements, therefore minimizing avian related light impacts. The Project layout has minimized the use of overhead structures to the extent feasible. The collection system is all underground; the overhead structures only occur from the project substation to the interconnect substation, where the power is stepped up and it becomes economically infeasible to bury the transmission line. The overhead line will be marked at intervals with bird diverters along its entire length."</i> The text provided by the Project Proponent is deemed to be sufficient and was confirmed to the extent possible during the Site Visit and also in the review of the Environmental Impact Assessment Report for the Project Activity.	
Reasoning Acceptance and Close Out:	Date: 11/11/2011
Based on the review of the revised VCS PD, the evidences of minimal environmental impact and restoration efforts viewed by the CRA Project Team during the Site Visit, and the review of the Environmental Impact Assessment Report, the CRA Project Team has determined that the Project Proponent has provided sufficient evidence that potential environmental impacts regarding the Project Activity have been addressed in full. <u>CL#6 is Closed Out.</u>	
Acceptance and Close out by Lead Auditor:	Date: 11/11/2011

3.5 Comments by Stakeholders

The Project Proponent noted in Section 6 of the VCS PD that that local regulators and landowners have been engaged in a series of meetings, phone discussions, and letter updates. In order to fully assess the validity of this statement, the CRA Project Team raised CL#7 to request that the Project Proponent provide details regarding the attendance, and content of the meetings. The details of the CL are provided below:

Date:	19/09/2011		Raised by:	Gordon Reusing/Brent Boss	
Type:	CL	Number:	#7	Reference:	6
Lead Auditor Comment:					
CRA is requesting that the Project Proponent provide details of stakeholder comments received and how due account was taken to address each of these comments. In cases where meetings were attended, meeting minutes and attendance sign in sheets must be sent to CRA as evidence. Pictures of events would also be appreciated.					
Project Proponent Response:				Date: 27/10/2011	
Meeting minutes, pictures, and attendance sign in sheets are not available for the meetings described in Section 6 of the PDD. Comments from stakeholders were fielded but no significant concerns were voiced. A brochure was sent to all landowners within 5 miles of the project (included documentation).					
Documentation Provided by Project Proponent:					
Dempsey Ridge Community Mailing					
Information Verified by Lead Auditor:					
The Project Proponent provided the CRA Project Team with a generic brochure type document that was presumably sent out to a number of local stakeholders in order to generate feedback as applicable on the Project Activity. The content of the brochure was sufficient and gave reasonable details regarding the Project Activity including locations for the turbines, dimensions, and contact information. As no sign in sheets were available from the Project Proponent, the CRA Project Team requested that contact information from people that attended the meetings be passed along to CRA such that the CRA Project Team can confirm the details of the meetings and that all stakeholder comments were taken into consideration by the Project Proponent. The CRA Project Team contacted Mr. Brian Hay of Roger Mills County. Mr. Hay indicated that the Project Proponent had sufficiently provided a platform to address local stakeholder concerns and that no particular concerns were raised as per their knowledge. He further noted that approximately 75 attendees were present at the meeting which he attended.					
Reasoning Acceptance and Close Out:				Date: 17/11/2011	
Based on the information brochure reviewed by the CRA Project Team and the conversations with the local stakeholder, the CRA Project Team has determined that the Project Proponent has engaged local stakeholders to a degree above required and is in compliance with the VCS requirements.					
<u>CL#7 is Closed Out.</u>					
Acceptance and Close out by Lead Auditor:				Date: 17/11/2011	

4 VALIDATION CONCLUSION

CRA was contracted by Dempsey Ridge Wind Farm, LLC to perform a validation of the Dempsey Ridge Wind Project in the State of Oklahoma, U.S.A.

As stated in Section 1.1, CRA as validator/verifier is responsible for reviewing the VCS PD and any supporting documentation to ensure that the principles of VCS Standard Version 3 are met, specifically that the Project Activity will result in emission reductions that are:

- Relevant
- Complete
- Consistent
- Accurate
- Transparent
- Conservative

Validation Opinion

The validation was performed in accordance with the VCS Program Guide, Version 3.0, and VCS Standard, Version 3.1 in addition to UNFCCC CDM methodologies and methodological tools.

Through the construction of a 66 turbine wind project with a total nameplate capacity of 132 MW, the Project Activity will result in a reduction of GHG emissions that is relevant, complete, consistent, accurate, transparent and conservative. Furthermore the emission reductions generated by the Project Activity will serve to contribute to sustainable development, and will result in long-term benefits to the mitigation of climate change.

Upon completion of the validation process it is the CRA Project Team's opinion that that all relevant VCS validation criteria have been satisfied. The Project Activity properly applies the criteria of ACM0002 Version 12.1.0. Within the VCS PD it was demonstrated and confirmed by CRA that the listed alternatives were credible and complete and that the Project Activity in the absence of CDM would not be the most realistic baseline scenario. Therefore, it is CRA's opinion that the emission reductions attributable to the Project Activity are additional to any emission reductions that would occur in the absence of the Project Activity.

All CARs and CLs raised by CRA have been satisfactorily resolved by the Project Proponent. In total, the emission reductions from the Project Activity are estimated to be 3,126,586 tonnes of CO₂e over a renewable 10-year crediting period with the first crediting period between December 15, 2011 and December 14, 2021, resulting in an average of 312,658 tonnes of CO₂e annually throughout the crediting period. The estimated emission reductions have been reviewed by CRA for completeness, accuracy, and consistency. At the conclusion of this review CRA deemed it likely that the stated quantity of emission reductions may be achieved should the related assumptions and operational conditions remain unchanged.

Based on the validation assessment performed, CRA is issuing a Positive Validation Opinion in regards to this Project Activity and will therefore recommend the Project Activity for registration with the VCS with no limitations or qualifications.

Respectfully Submitted,

CONESTOGA-ROVERS & ASSOCIATES



Gordon Reusing, M.A.Sc., P.Eng



Brent Boss, P.Eng.

ANNEX A: ABBREVIATIONS

ACM	Approved Consolidated Methodology
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CL	Clarification Request
CO ₂ e	Carbon Dioxide Equivalent
CRA	Conestoga-Rovers & Associates
DOE	Designated Operational Entity
FAR	Forward Action Request
GHG	Greenhouse Gas
kV	Kilovolt
MW	Megawatt
SPP	Southwest Power Pool
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Verified Carbon Standard
VCS PD	Verified Carbon Standard Project Document

ANNEX B: VALIDATION PROTOCOL

PROJECT DOCUMENT REVIEW		
(1) Does the VCS PD include at a minimum:		<i>Note: Various findings were issued as applicable to the Project Proponent regarding the items presented below. Details of which are presented throughout the Validation Report and summarized within.</i>
Project Summary	☒	Throughout Section 1 of the VCS PD as per the VCS PD version 03 template.
Baseline Methodology	☒	Throughout Section 2.4 of the VCS PD as per the VCS PD version 03 template.
Duration of the Project Activity/Crediting Period	☒	Throughout Sections 1.5 and 1.6 of the VCS PD as per the VCS PD version 03 template.
Monitoring Methodology and Plan	☒	Throughout Section 4 of the VCS PD as per the VCS PD version 03 template.
Calculation of GHG emission reductions, using conservative assumptions for estimating emission reductions	☒	Calculation spreadsheets were provided to CRA upon request in the findings assessment. In all instances conservative values were used.
Environmental Impacts	☒	Throughout Section 5 of the VCS PD as per the VCS PD version 03 template.

Stakeholder Comments	☒	Throughout Section 6 of the VCS PD as per the VCS PD version 03 template.
(2) Ensure the VCS PD meets the following criteria:		
The documentation is complete and comprehensive and follows the structure and criteria given in the VCS-PD template.	☒	Several findings were raised regards to the clarification of content of applicable sections of the VCS PD. The Project Proponent successfully Closed Out each finding.
The baseline and monitoring methodologies are justified and appropriate for the specific project.	☒	ACM0002 Version 12.1.0. As a wind project, the Project Activity is valid
The assumptions for the baseline are conservative and appropriate.	☒	Assumptions made throughout the VCS PD result in a conservative and appropriate baseline.
The description of the baseline development has considered technological, political, socio-demographic, environmental, and legal trends of relevance to the project.	☒	Confirmed, as applied throughout the VCS PD. Proof of environmental and legal items were requested by CRA in CL#1, #6, and #7.
Additionality of the project is sufficiently demonstrated in the VCS PD.	☒	CL#5 was raised to assess further for additionality.
All aspects related to direct and indirect emissions, including leakage, are captured in the VCS PD and potentially claimed emission reductions.	☒	All sources of emissions were confirmed during the Site Visit and through the review of the Emission Reduction Spreadsheets

The calculation of GHG emission reductions is appropriate and uses conservative assumptions for estimating emission reductions.	☒	Assumptions within the VCS PD rely heavily on manufacturer specifications and will rely on third party monitors in verification. Overall the assumptions made result in conservative estimates.
Stakeholder consultation has been carried out, if applicable, and comments are taken into account in the project design.	☒	Several meetings were held by the Project Proponent. CL#7 was raised by CRA in order to assess further.
The technical features of the project, as well as other information about the project has been sufficiently addressed.	☒	CRA's Technical Review in conjunction with the Site Visit has confirmed that all technical information as required is included in the VCS PD and supporting information.
The monitoring plan clearly identifies the frequency of, responsibility, and authority for monitoring, measurement and data recording activities, and sufficiently describes quality control/quality assurance/management control procedures.	☒	Monitoring will be the responsibility primarily of third parties; however the Project Proponent will have their own meters as checks and will be required to calibrate as per the VCS PD.
(3) Has the VCS PD been prepared using the most up-to-date template from the VCS?	☒	Yes. Template Version 3.
PROJECT DESCRIPTION AND SITE VISIT		
(1) Has the Project Proponent provided a clear definition of the project activity enabling understanding of the precise nature of the project activity and the technical aspects of implementation?	☒	The definition of the Project Activity within the VCS PD was sufficient such that during the Site Visit the CRA Project Team was able to confirm all aspects as stated in the VCS PD.

(2) If the proposed VCS project activity involves the alteration of an existing installation or process, ensure that the project description clearly states the differences resulting from the project activity compared to the pre-project situation.	☒	The Project Activity is being developed as a new project and is in no way altering an existing project.
(3) Site Visit has been completed if any of the following project statuses apply:	☒	Site Visit conducted on August 31, 2011.
Project	☒	Project Activity is deemed as a "Project" as it will result in less than 1,000,000 tonnes of CO ₂ e emission reduction per year.
Mega-Project	☒	N/A
Grouped Project(s)	☒	N/A
BASELINE AND MONITORING METHODOLOGY REVIEW		
(1) Is the selected methodology applicable to the project activity	☒	ACM0002 Version 12.1. The Project Activity is applicable as a new wind power project.
(2) Has the selected methodology been correctly applied by the following with respect to the Project Boundary :		
The VCS PD shall correctly describe the project boundary, including the physical delineation of the proposed VCS project activity included within the project boundary for the purpose of calculating project and baseline emissions for the proposed VCS project activity.	☒	Section 2.3 of the VCS PD presents a figure and descriptions of the delineation between the baseline scenario and the Project Activity in accordance with ACM0002.
Have all sources and GHGs required by the methodology been included within the project boundary. If the methodology allows project proponents to choose whether a source or gas is to be included within the project boundary, determine whether the project proponents have justified that choice. Confirm that the justification provided is reasonable, based on assessment of supporting documented evidence provided by the project proponents and corroborated by observations if required.	☒	Only CO ₂ emissions related to electricity generation and consumption are required for this Project Activity. All sources have been included in the VCS PD.

(3)	Has the selected methodology been correctly applied by the following with respect to the Baseline Identification :		
	Does the VCS PD identify the baseline for the proposed VCS project activity, defined as the scenario that reasonably represents the anthropogenic emissions by sources of GHGs that would occur in the absence of the proposed VCS project activity?	☒	Baseline assessment is presented throughout Section 2.4 of the VCS PD. The Baseline Scenario as a new grid power plant/unit is defined appropriately according to ACM0002.
	Confirm that any procedure contained in the methodology to identify the most reasonable baseline scenario, has been correctly applied. If the selected methodology requires use of tools to establish the baseline scenario, consult the methodology on the application of these tools. In such cases, the guidance in the methodology shall supersede the tool. The DOE shall check each step in the procedure described in the VCS PD against the requirements of the methodology.	☒	As a new grid power plant there is only one option as was selected by the Project Proponent.
	If the methodology requires several alternative scenarios to be considered in the identification of the most reasonable baseline scenario, based on financial expertise and local and sectoral knowledge, determine whether all scenarios that are considered by the project proponents and are supplementary to those required by the methodology, are reasonable in the context of the proposed VCS project activity and that no reasonable alternative scenario has been excluded.	☒	N/A
	Determine whether the baseline scenario identified is reasonable by validating the assumptions, calculations and rationales used, as described in the VCS PD. Ensure that documents and sources referred to in the VCS PD are correctly quoted and interpreted.	☒	Reasonable as it is the only selection. Confirmed during the Site Visit.
	Cross check the information provided in the VCS PD with other verifiable and credible sources, such as local expert opinion, if available.	☒	N/A
	Drawing on knowledge of the sector and/or advice from local experts, confirm that all relevant policies and circumstances have been identified and correctly considered in the VCS PD, in accordance with the guidance by the VCS.	☒	Policies and applicable laws are described in Section 1.11. All applicable laws are considered and applied accordingly.

	Determine whether the VCS PD provides a verifiable description of the identified baseline scenario, including a description of the technology that would be employed and/or the activities that would take place in the absence of the proposed VCS project activity.	☒	Section 2.4 of the VCS PD provides this description.
(4)	Has the selected methodology been correctly applied by the following with respect to the Algorithms and/or Formulae used :		
	The steps taken and equations applied to calculate project emissions, baseline emissions, leakage, and emission reductions shall comply with the requirements of the selected baseline and monitoring methodology.	☒	Calculations confirmed as per CL#3 raised by CRA. Net electricity including transmission line losses are accounted for accurately according to ACM0002.
	Determine whether the equations and parameters in the VCS PD have been correctly applied by comparing them to those in the selected approved methodology.	☒	Confirmed as per CL#3 above
	If the methodology provides for selection between different options for equations or parameters, confirm that adequate justification has been provided and that the correct equations and parameters have been used, in accordance with the methodology selected.	☒	N/A
	Verify the justification given in the VCS PD for the choice of data and parameters used in the equations. If data and parameters will not be monitored throughout the crediting period of the proposed VCS project activity but have already been determined and will remain fixed throughout the crediting period, assess that all data sources and assumptions are appropriate and calculations are correct, applicable to the proposed VCS project activity and will result in a conservative estimate of the emission reductions. If data and parameters will be monitored on implementation and hence become available only after validation of the project activity, the DOE shall confirm that the estimates provided in the VCS PD for these data and parameters are reasonable.	☒	In many cases third party meters will be used. This eliminated much uncertainty in the values to be applied during verification. Check electricity meters are also included and will be operated by the Project Proponent.
ADDITIONALITY			
(1)	Assess that the selected methodology been correctly applied by completing the following with respect to Identification of Alternatives :		

The list of alternatives includes as one of the options that the project activity is undertaken without being registered as a proposed VCS project activity.	☒	Section 2.5 of the VCS PD applies these values.
The list contains all plausible alternatives that are considered to be a viable means of supplying the outputs or services that are to be supplied by the proposed VCS project activity.	☒	Section 2.5 of the VCS PD applies these values.
The alternatives comply with all applicable and enforced legislation.	☒	Section 2.5 of the VCS PD applies these values (no legislation).
(2) Assess that the selected methodology been correctly applied by completing the following with respect to Investment Analysis :		
If investment analysis has been used to demonstrate the additionality of the proposed VCS project activity, the VCS PD shall provide evidence that the proposed VCS project activity would not be: (a) The most economically or financially attractive alternative. (b) Economically or financially feasible, without the revenue from the sale of certified emission reductions (VCUs).	☒	Confirmed through IRR calculation on a post-investment basis. All assumptions were validated by CRA and confirmed as accurate. Project is not financially attractive, or feasible.
The proposed VCS project activity would produce no financial or economic benefits other than VCS-related income. Document the costs associated with the proposed VCS project activity and the alternatives identified and demonstrate that there is at least one alternative which is less costly than the proposed VCS project activity.	☒	Only electricity sales to the grid. However this alone was not enough to make the project economically attractive.
The proposed VCS project activity is less economically or financially attractive than at least one other credible and realistic alternative.	☒	The baseline scenario is no investment.
The financial returns of the proposed VCS project activity would be insufficient to justify the required investment.	☒	Confirmed as per the above.
Conduct a thorough assessment of all parameters and assumptions used in calculating the relevant financial indicator, and determine the accuracy and suitability of these parameters using the available evidence and expertise in relevant accounting practices.	☒	Confirmed as per above. References have been checked.
Cross-check the parameters against third-party or publicly available sources, such as invoices or price indices.	☒	Confirmed as per above. References have been checked.

Review feasibility reports, public announcements and annual financial reports related to the proposed VCS project activity and the project proponents.	☒	N/A
Assess the correctness of computations carried out and documented by the project proponents.	☒	CL#5 was raised to assess for these calculations. All inputs were confirmed.
Assess the sensitivity analysis by the project proponents to determine under what conditions variations in the result would occur, and the likelihood of these conditions.	☒	Sensitivity Analysis was plus or minus 10 percent as stated in the VCS PD.
Determine whether the type of benchmark applied is suitable for the type of financial indicator presented.	☒	IRR Benchmark of 8-10 percent is suitable.
Ensure that any risk premiums applied in determining the benchmark reflect the risks associated with the project type or activity.	☒	Confirmed.
Determine whether it is reasonable to assume that no investment would be made at a rate of return lower than the benchmark by, for example, assessing previous investment decisions by the project proponents involved and determining whether the same benchmark has been applied or if there are verifiable circumstances that have led to a change in the benchmark.	☒	Based on CRA experience with other wind projects and the references provided in the VCS PD this has been confirmed.
If a Feasibility Study Report (FSR) is used ensure it has been the basis of the decision to proceed with the investment in the project, i.e. that the period of time between the finalization of the FSR and the investment decision is sufficiently short for the DOE to confirm that it is unlikely in the context of the underlying project activity that the input values would have materially change.	☒	N/A
The values used in the VCS PD and associated annexes are fully consistent with the FSR, and where inconsistencies occur validate the appropriateness of the values.	☒	N/A
On the basis of its specific local and sectoral expertise, confirmation is provided, by cross-checking or other appropriate manner, that the input values from the FSR are valid and applicable at the time of the investment decision.	☒	N/A

(3) Assess that the selected methodology been correctly applied by completing the following with respect to Barrier Analysis :		
If barrier analysis has been used to demonstrate the additionality of the proposed VCS project activity, the VCS PD shall demonstrate that the proposed VCS project activity faces barriers that: (a) Prevent the implementation of this type of proposed VCS project activity. (b) Do not prevent the implementation of at least one of the alternatives.	☒	N/A – Investment Analysis conducted in place.
Determine whether the barriers are real. Assess the available evidence and/or undertake interviews with relevant individuals (including members of industry associations, government officials or local experts if necessary) to determine whether the barriers listed in the VCS PD exist. Ensure that existence of barriers is substantiated by independent sources of data such as relevant national legislation, surveys of local conditions and national or international statistics.	☒	N/A – Investment Analysis conducted in place.
Determine whether the barriers prevent the implementation of the project activity but not the implementation of at least one of the possible alternatives. Since not all barriers present an insurmountable hurdle to a project activity being implemented, judge whether a barrier or set of barriers would prevent the implementation of the proposed VCS project activity and would not equally prevent implementation of at least one of the possible alternatives, in particular the identified baseline scenario.	☒	N/A – Investment Analysis conducted in place.
(4) Assess that the selected methodology been correctly applied by completing the following with respect to Common Practice Analysis :		
Assess whether the geographical scope (e.g. the defined region) of the common practice analysis is appropriate for the assessment of common practice related to the project activity's technology or industry type. For certain technologies the relevant region for assessment will be local and for others it may be transnational/ global. If a region other than the entire host country is chosen, assess the explanation why this region is more appropriate.	☒	Common practice analysis is applied under the entire SPP and within Oklahoma. Details in Section 2.5 of the VCS PD.

Using official sources and local and industry expertise, determine to what extent similar and operational projects (e.g., using similar technology or practice), other than VCS project activities, have been undertaken in the defined region.	☒	Consulting the VCS website there are minimal wind projects registered within Oklahoma. Several other project have developed in the State however the wind power generation provides a small portion of the overall electricity to the SPP grid.
If similar and operational projects, other than VCS project activities, are already “widely observed and commonly carried out” in the defined region, assess whether there are essential distinctions between the proposed VCS project activity and the other similar activities.	☒	Not widely observed in the area (four additional projects observed). Of these projects most rely on RECs. One project is also registered under the VCS.
MONITORING PLAN		
(1) Compliance of the monitoring plan with the approved methodology:		
By means of document review. Identify the list of parameters required by the selected approved methodology.	☒	Net electricity generation is confirmed as the only parameter as per ACM0002.
Confirm that the monitoring plan contains all necessary parameters, that they are clearly described and that the means of monitoring described in the plan complies with the requirements of the methodology.	☒	Third party monitors as well as check monitors operated by Project Proponent. Monitoring responsibilities are clearly described in the VCS PD.
(2) Review of the documented procedures, interviews with relevant personnel, project plans and any physical inspection of the proposed VCS project activity site to assess whether.		
The monitoring arrangements described in the monitoring plan are feasible within the project design.	☒	Confirmed during Site Visit.
The means of implementation of the monitoring plan, including the data management and quality assurance and quality control procedures, are sufficient to ensure that the emission reductions achieved by/resulting from the proposed VCS project activity can be reported ex post and verified.	☒	Confirmed during Site Visit.

STAKEHOLDER CONSULTATION		
(1) The DOE shall, by means of document review and interviews with local stakeholders as appropriate, determine:		
Comments by stakeholders that can reasonably be considered relevant for the proposed VCS project activity have been invited.	☒	Several public meetings were held. CL#7 was raised to provide CRA with details to confirm participation and action of the Project Proponent in response to public inputs.
The summary of the comments received as provided in the VCS PD is complete.	☒	No comments summarized. CRA confirmed with meeting attendees that no significant comments were brought up in the meetings.
The project proponent has taken due account of any comments received and have described this process in the VCS PD.	☒	As per the above cell, no comments were received that required action by the Project Proponent.
ENVIRONMENTAL IMPACTS		
(1) Confirm, by means of a document review and/or using local official sources and expertise, whether the project proponent has undertaken an analysis of environmental impacts and, if required by the host Party, an environmental impact assessment.	☒	CL#6 was raised in order for CRA to assess for environmental impacts and associated permitting requirements. The Project Proponent provided sufficient government issued documentation (detailed in the Validation Report) regarding the matter. The potential environmental impacts have been addressed.

VALIDATION REPORT		
(1) The Validation Report shall include all of the following:		
Describe how the validation of the project boundary has been performed, by detailing the documentation assessed (e.g., a commissioning report) and by describing its observations during any site visit undertaken (i.e., observations of the physical site or equipment used in the process). Provide a statement whether the identified boundary and the selected sources and gases are justified for the project activity. Should the DOE identify emission sources that will be affected by the project activity and are not addressed by the selected approved methodology, the DOE shall request clarification of, revision to or deviation from the methodology.	☒	List of all Documentation reviewed by CRA is presented in Section 2.3 of the Validation Report.
(2) Provide an opinion as to whether:		
All the assumptions and data used by the project proponents are listed in the VCS PD, including their references and sources.	☒	Validation Opinion is presented in Section 4.
All documentation used is relevant for establishing the baseline scenario and correctly quoted and interpreted in the VCS PD.	☒	Presented in Section 3.2.4 of the Validation Report.
Assumptions and data used in the identification of the baseline scenario are justified appropriately, supported by evidence and can be deemed reasonable.	☒	Presented in Section 3.2.4 of the Validation Report.
Relevant national and/or sectoral policies and circumstances are considered and listed in the VCS PD.	☒	Presented in Section 3.2.8 of the Validation Report.
The approved baseline methodology has been correctly applied to identify the most reasonable baseline scenario and the identified baseline scenario reasonably represents what would occur in the absence of the proposed VCS project activity.	☒	Validation Opinion is presented in Section 3.2.4.

(3) Clearly describe in the validation report the steps taken to assess the requirements for algorithms and/or formulae used and shall provide an opinion as to whether:		
All assumptions and data used by the project proponents are listed in the VCS PD, including their references and sources.	☒	Throughout Section 3 of the Validation Report in the various findings responses as well as the in the Validation Opinion in Section 4.
All documentation used by project proponents as the basis for assumptions and source of data is correctly quoted and interpreted in the VCS PD.	☒	Throughout Section 3 of the Validation Report in the various findings responses as well as the in the Validation Opinion in Section 4.
All values used in the VCS PD are considered reasonable in the context of the proposed VCS project activity.	☒	Throughout Section 3 of the Validation Report in the various findings responses as well as the in the Validation Opinion in Section 4.
The baseline methodology has been applied correctly to calculate project emissions, baseline emissions, leakage and emission reductions.	☒	Throughout Section 3 of the Validation Report in the various findings responses as well as the in the Validation Opinion in Section 4.
All estimates of the baseline emissions can be replicated using the data and parameter values provided in the VCS PD.	☒	Throughout Section 3 of the Validation Report in the various findings responses as well as the in the Validation Opinion in Section 4.
(4) The validation report shall clearly describe all steps taken, and sources of information used to cross-check the information contained in the VCS PD on additionality. The validation report shall contain information regarding how it was determined that the documentation assessed is authentic, where appropriate.	☒	Project Proponent provided full references for SPP as well as all legal documentation for additionality.

(5)	The validation report shall describe the following with respect to the Consideration of VCS:		
	Describe the validation of the project activity start date provided in the VCS PD.	☒	Section 3.2.3 of the Validation Report
	Describe the evidence for prior consideration of the VCS (if necessary) that was assessed.	☒	N/A – Project Activity was not yet operational during validation.
(6)	The validation report shall describe the following with respect to Investment Analysis:		
	Describe in detail how the parameters used in any financial calculations have been validated.	☒	Section 3.3.5 of the Validation Report.
	Describe how the suitability of any benchmark applied has been assessed.	☒	Section 3.3.5 of the Validation Report.
	Confirm whether the underlying assumptions are appropriate and the financial calculations are correct.	☒	Section 3.3.5 of the Validation Report.
(7)	The validation report shall describe the following with respect to Barrier Analysis:		
	Provide an assessment of each barrier listed in the VCS PD, which describes how the DOE has undertaken validation of the barrier.	☒	N/A – Investment Analysis conducted.
	Provide an overall determination of the credibility of the barrier analysis performed.	☒	N/A – Investment Analysis conducted.
(8)	The validation report shall describe the following with respect to Common Practice Analysis:		
	How the geographical scope of the common practice analysis has been validated.	☒	Section 3.3.5 of the Validation Report.
	How the DOE has undertaken an assessment of the existence of similar projects.	☒	Section 3.3.5 of the Validation Report.
	How the DOE has assessed the essential distinctions between the proposed VCS project activity and any similar projects that are widely observed and commonly carried out.	☒	Section 3.3.5 of the Validation Report.
	Confirmation by the DOE that the proposed VCS project activity is not common practice.	☒	Section 3.3.5 of the Validation Report.

(9)	The validation report shall describe the following with respect to the Monitoring Plan:		
	State opinion of the compliance of the monitoring plan with the requirements of the methodology.	☒	Section 3.2.8 of the Validation Report.
	Describe the steps undertaken to assess whether the monitoring arrangements described in the monitoring plan are feasible within the project design.	☒	Section 3.2.8 of the Validation Report and CAR#3.
	State opinion of the project proponents ability to implement the monitoring plan.	☒	Section 3.2.8 of the Validation Report.
(10)	The validation report shall describe the following with respect to the stakeholder consultation.		
	Describe the steps taken to assess the adequacy of the stakeholder consultation.	☒	Section 3.4 of the Validation Report and CL#7.
	State the opinion on the adequacy of the local stakeholder consultation.	☒	Section 3.4 of the Validation Report and CL#7.
(11)	The validation report shall describe whether the project proponents have undertaken an analysis of environmental impacts and, if required by the host Party, an environmental impact assessment in accordance with procedures as required by the host Party.	☒	Section 3.3 of the Validation Report and CL#6.
(12)	The validation report shall include the DOE's final validation opinion.	☒	Section 4 of the Validation Report.
(13)	The validation report shall include the following at a minimum:		
	State conclusions regarding the proposed VCS project activity's conformity with applicable VCS requirements.	☒	Section 4 of the Validation Report. All findings are closed and meet the applicable VCS requirements.
	Give an overview of the validation activities carried out in order to arrive at the final validation conclusions and opinion, including a general discussion of details captured by the validation protocol and conclusions related to VCS requirements.	☒	Validation process presented in Section 1.3 and conclusions presented in Section 2 of the Validation Report.

Reflect the results of the dialogue between the DOE and the project proponents, as well as any adjustments made to the project design following stakeholder consultation. It shall reflect the responses to CARs and CLs, and discussions on and revisions to project documentation.	☒	Throughout the Validation Report. No adjustments made after stakeholder consultation as per CL#7.
A summary of the validation process and its conclusions.	☒	Validation process presented in Section 1.3 and conclusions presented in Section 4 of the Validation Report.
All the applied approaches, findings and conclusions, especially on: baseline selection, additionality, emission factors and monitoring.	☒	Throughout Section 3 of the Validation Report.
A list of interviewees and documents reviewed.	☒	List of interviewees is presented in Section 2.3. List of documents reviewed is presented in Section 2.4.
Details of the validation team.	☒	Section 2.2 and Annex B.
Information on quality control within the team/of the validation process.	☒	Section 3.1
Appointment certificates or curricula vitae of the validation team members.	☒	Annex C presents curricula vitae for team members.

ANNEX C: CURRICULA VITAE

EDUCATION

M.A.Sc. Mechanical Engineering, University of Waterloo, 1989

B.A.Sc. Mechanical Engineering, University of Waterloo, 1987

EMPLOYMENT HISTORY

1990- Present Principal/Vice-President
Conestoga-Rovers & Associates, Waterloo, ON
Named CRA Principal/Vice President, 2003
Named CRA Associate, 1998

1989-90 Instructor for Engineering Professionals, Beijing Languages Training Center, P.R. China

PROFESSIONAL REGISTRATIONS/AFFILIATIONS

Licensed Professional Engineer: Ontario and Michigan

Member, Air and Waste Management Association

PROFILE OF PROFESSIONAL ACTIVITIES

Air Compliance, Permitting and Assessments

- Air compliance audits, Title V permitting, State permitting, Federally Enforceable State Operating Permits (FESOPs)/Synthetic Minor permitting, and evaluation and implementation of applicable NSPS, NESHAP, and MACT standards for manufacturing facilities including chemical, automotive, cellophane, coating, distillery, energy, fiberglass, food, glass, locomotive, metal finishing, molding, petroleum, secondary metals, steel and wood furniture manufacturing sectors in the United States, Canada, and the UK
- Completed over 100 Ontario Emission Summary and Dispersion Modelling (ESDM) Reports for a variety of industries
- Environmental Impact Statements (EIS) and Environmental Assessments (EA) for over 10 sites
- Air emissions modeling, air dispersion modeling, permitting, risk assessments, noise assessments and ambient air monitoring programs for quarries, mines, aggregate processing equipment, cement manufacturing, landfills and site remediation facilities
- Risk Management Plans (112R RMPs) including hazard assessments and off-site consequence analyses
- USEPA Community Right to Know Application for a Continuous Release
- USEPA Clean Air Act Emission Reduction Credit (ERC) Applications for emissions trading
- Project Manager and primary technical resource for the General Motors Corporation EPCRA Corporate Manual and the General Motors of Canada Limited NPRI and OnAir Corporate Manual inclusive of the development of the associated training programs. Key components include detailed OEM process knowledge, VOC emission quantification methods and regulation compliance
- Developed and manage numerous ambient air monitoring programs for particulate (PM, PM10, PM2.5), VOCs, TRS, and ozone

- Expert for quantification of emissions reductions as part of CRA's role as an Applicant Entity (AE) for Clean Development Mechanism (CDM) projects in the United Nations Framework Convention on Climate Change and for Alberta Environment offset project emissions
- Manage and conduct corporate training programs for US EPCRA and Canadian NPRI Reporting
- Managed and conducted EPCRA, NPRI, and OnAir Reporting for over 50 facilities
- Air emissions inventories, dispersion modeling and permitting for over 200 manufacturing facilities
- Air emissions assessments, permitting, and monitoring for over 30 hazardous waste site remedial actions including groundwater treatment systems, soil remediation systems and fugitive emissions
- Litigation support including expert testimony
- Odor emissions assessments and preparation of remedial action plans for numerous facilities in the food, chemical and automotive sectors
- Incinerator/oxidizer design, installation, permitting and trial burn stack testing including a RCRA hazardous waste incinerator
- Air emissions assessments for over ten landfill sites including estimation of landfill gas generation rates and particulate and evaluation of off-site impacts of odor and VOCs and NSPS requirements
- Managed and conducted stack testing programs for over 50 facilities

Noise and Vibration Compliance, Permitting, and Assessments

- Noise impact assessments for wind farms including noise modeling and noise monitoring of various proposed and existing wind farm projects in Barrie, Ontario and New York State in accordance with applicable noise guidelines, bylaws, and regulations
- Noise and vibration impact assessments and attenuation for equipment and traffic sources at over 50 manufacturing facilities, residential developments, and landfill sites
- Noise impact assessments and abatement for a variety of clients involved in food processing including ice cream, cheese manufacturing, meat processing, and chemical preservatives
- Conducted noise impact assessment for Oklahoma Highway 64 expansion using Federal Highway Administration Traffic Noise Model (TNM)
- Prepared residential noise barrier design for highway noise impacts using Ontario Road Noise Analysis Method for Environment and Transportation (ORNAMENT) model
- Managed a railroad noise assessment for a proposed residential development using the Ontario Sound from Trains Environmental Analysis Method (STEAM) model
- Managed noise monitoring programs and impact studies for two lime mining and manufacturing facilities including large kiln operations and traffic assessments
- Prepared an Acoustic Audit report for a casting plant in accordance with permit requirements
- Managed noise study for landfill site including road traffic and on-site equipment and barrier design
- Managed acoustic audit for a dust collection system including sound frequency measurements for ductwork, fan, and collector
- Acoustic audit and residential impact evaluation for an oxidizer used in automotive industry

Incineration, Gasification and Thermal Treatment Facilities

Mr. Reusing has extensive air emissions and noise emissions experience with incineration, gasification and thermal treatment facilities, including incineration of municipal and hazardous wastes, and

gasification of biomass, biosolids, and municipal waste. His experience includes both waste disposal and energy from waste facilities. Mr. Reusing has completed numerous emissions inventories, Applications for Certificates of Approval (Air), noise assessments, trial burns, environmental assessments, stack testing, ambient air monitoring, and engineering emission control studies for many types of incineration and gasification facilities including:

- Clean Harbors (liquid hazardous waste incineration), Corunna, Ontario
- Durez Corporation (liquid hazardous waste incineration), Niagara Falls, New York
- Algonquin Power (municipal waste incineration to power), Brampton, Ontario
- REM Energy (municipal waste gasification to power), multiple sites, Canada and US
- Pristine Superfund Site, (PCB waste thermal desorption site), Reading, Ohio
- Clean Harbors (solid waste thermal desorption), Corunna, Ontario
- Liberty Energy (biomass and biosolids gasification to power), Hamilton, Ontario
- Elementa Group (municipal waste steam reformation to energy), Sault Ste. Marie, Ontario
- Index Energy (biomass incineration to power), Ajax, Ontario
- Carter Industrials Superfund Site, (PCB waste thermal desorption site), Detroit, Michigan

Iron and Steel and Foundry Facilities

Mr. Reusing has managed emissions inventories, Applications for Certificates of Approval (Air), stack testing, ambient air monitoring, and engineering emission control studies for many iron and steel and foundry facilities including:

- Algoma Essar, Primary Steel Mill, Sault Ste. Marie, Ontario
- Stelco Steel, Primary Steel Mill, Hamilton, Ontario
- Dofasco Steel, Primary Steel Mill, Hamilton, Ontario
- Gerdeau-Ameristeel, Secondary Steel Mill, Whitby, Ontario
- Atlas Specialty Steel, Secondary Steel Mill, Welland, Ontario
- Standard Induction Casting, Steel Foundry, Windsor, Ontario
- Diversa Cast, Steel Foundry, Guelph, Ontario
- Slater Steel, Secondary Steel Mill, Hamilton, Ontario
- Daimler Chrysler, Aluminum Castings Plant, Etobicoke, Ontario
- Cambridge Brass, Brass Foundry, Cambridge, Ontario
- Oxford Automotive, Chatham and Wallaceburg, Ontario
- Canada Alloy Castings (a Division of Flowserve), Steel Foundry, Kitchener, Ontario
- Delta Faucet, Brass Foundry, London, Ontario
- Milward Alloys, Secondary Brass Foundry, Buffalo, New York
- H. Kramer, Secondary Brass Foundry, Chicago, Illinois
- Heico Steel, Secondary Steel Mill, Hawkesbury, Ontario

Renewable Energy Projects

Mr. Reusing is a renewable energy technology and air emissions expert with a keen interest in renewable energy and considerable experience in the project management of renewable energy projects. Mr. Reusing has completed solar, wind, biomass, and biosolids power feasibility and environmental impact assessments for sites across North America. Mr. Reusing has considerable experience working with Municipalities and has managed public information sessions and consultations on a variety of renewable energy projects.

Mr. Reusing has managed the compliance permitting and environmental assessment programs for several renewable energy facilities. These include: solar and alternative energy feasibility study for Township of Michipicoten, Ontario; a wind energy feasibility study for City of Barrie; a wind energy feasibility and energy audit study for Huron County in Ontario; 1,000 MW of wind projects in the state of New York, the Liberty Energy 10 MW biomass and biosolids gasification facility in Hamilton, Ontario; the Elementa Group 10 MW municipal waste steam reformation plant and associated pilot plant in Sault Ste. Marie, Ontario; the Index Energy Ajax Cogeneration 25 MW wood waste to steam and power plant in Ajax, Ontario; Mr. Reusing has also verified the greenhouse gas (GHG) credits for the Verdant 10 MW wood waste power plant and the Blue Ridge and Sundance wood biomass thermal energy plants in Alberta.

Environmental Impact Statement (US-EIS) and Environmental Assessment (Canadian-EA) Projects

Mr. Reusing has managed the air emissions and noise assessments for numerous environmental impact statement (EIS) and environmental assessment (EA) projects in the United States and Canada. This work includes advanced emissions and dispersion modeling, ambient air monitoring, noise monitoring programs, advanced acoustic modeling and presentations for agency and public meetings for the following EIS, EA and high-profile air assessment projects:

- Liberty Energy Biomass Power Plant, Hamilton, Ontario
- Green Lane Landfill (City of Toronto), St. Thomas, Ontario
- Fort-Erie to Buffalo International Bridge Crossing, Ambassador Niagara Signature Bridge Group
- Sydney Tar Ponds Site, Sydney, Nova Scotia
- Wind Farms, 4 sites, each 400 to 1,000 MW capacity, Upstate New York
- Nucular Waste Processing Facility, Mississauga, Ontario
- PCB Waste Processing Facility, Cornwall, Ontario
- Touquoy Gold Project, Moose River Gold Mines, Halifax Regional Municipality
- Clean Harbors (hazardous waste landfill expansion), Corunna, Ontario

Chemtura Canada Co./Cie. (formerly Crompton Co.), Elmira, Ontario

CRA has provided air and noise consulting services and ambient air monitoring programs for Chemtura Canada Co./Cie. since 1990. The Chemtura (formerly known as Crompton) site in Elmira, Ontario required ambient air quality monitoring to be completed during excavation and transfer activities associated with the soil removal and transfer to a secure containment facility. CRA was retained to develop and implement a perimeter air quality monitoring program at the site.

Chemtura also required an extensive VOC and reduced sulphur monitoring program as part of an odour emissions investigation over a period of 3 years. CRA implemented a complex program consisting of portable GCs and continuous reduced sulphur monitors for instantaneous, compound specific

monitoring. In addition, CRA conducted time-averaged VOC and sulphur compound monitoring using USEPA and NIOSH methods. CRA also designed, installed, operated and maintained a meteorological station on site for 3 years. CRA continues to provide significant air quality services to Chemtura which includes ambient air quality monitoring for selected VOCs, source testing, annual emissions reporting including Reg. 127 and NPRI, C of A (Air) preparation, site specific risk assessments and other applicable regulatory assistance.

MRR PCB Incineration Facility, Cornwall, Ontario

The Material Resource Recovery (MRR) PCB incineration facility retained CRA to conduct an ambient air monitoring program for particulate, PCBs and dioxins and furans in 2005. CRA also conducted a phytotoxicology sampling program and a 5-year technical review of the PCB incinerator operation. Two public presentations of the 5-year review and the air sampling and phytotoxicology sampling programs were conducted and lead by Mr. Gordon Reusing, the Project Manager for this Proposal. CRA is currently preparing an Application for C of A (Waste) and (Air) for major modifications, including emissions estimates and dispersion modeling.

Landfills – Air and Noise Assessments, Regulatory Reporting

Mr. Reusing has extensive air and noise assessment experience and regulatory reporting experience, completing over 80 reports each year for a wide variety of industrial and municipal clients, including over 15 landfill and waste management sites, including:

- Merrick Landfill Site and City Public Works Garage, City of North Bay, Ontario
- Mayer Waste Disposal Site, Township of Champlain, Ontario
- Marathon Landfill Site, Town of Marathon, Ontario
- Green Lane Landfill Site, St. Thomas, Ontario
- Millstream Landfill, Victoria, British Columbia
- Municipality of McDougall Landfill Site, Township of McDougall, Ontario
- City of Kawartha Lakes 6 Landfill Sites and Water Pollution Control Plant, Lindsay, Ontario
- Dawn and Moore Landfill Sites, County of Lambton, Ontario
- St. Mary's Landfill Site, St. Mary's, Ontario
- Mid-Huron Landfill Site, Clinton, Ontario
- Peterborough County/City Waste Management Facility, Peterborough, Ontario
- Brighton and Seymore Landfill Sites, County of Northumberland, Ontario
- Highwest Landfill, Victoria, British Columbia

Quarries and Mining – Air and Noise Assessments, Regulatory Reporting

Mr. Reusing has completed numerous air and noise assessments, ambient air monitoring and regulatory reporting projects for quarry and mining sites, including:

- Dufferin Milton Quarry, Dufferin Aggregates a Division of St. Lawrence Cement, Milton, Ontario
 - Air and noise permitting for 3 to 6 million tonnes per year limestone quarry

- Vinemount Quarry, Division of Waterford Sand and Gravel, Hamilton, Ontario
 - Ontario Municipal Board hearings for quarry expansion, ambient air monitoring programs and air quality assessments for 1.5 million tonnes per year limestone quarry
- McDougall Quarry, Fowler Construction Company Limited, Parry Sound, Ontario
 - Air and noise permitting for limestone quarry processing equipment
- Lafarge Cement Quarries (2), Bath and Woodstock Cement Plants, Ontario
 - Air and noise permitting and blasting assessment for limestone quarry operations
- Federal White Cement Plant Quarries (2), Woodstock Plant, Ontario
 - Air and noise permitting for limestone quarry operations and air quality assessments
- Rockfort Quarry, James Dick Construction Ltd, Caledon, Ontario
 - Air quality assessments and dispersion modeling for proposed 1.5 to 2.5 million tonnes per year limestone quarry
- St. Vincent Quarry, Grey County, Ontario
 - Noise and blasting assessment
- Durham Aggregate Pit, Grey County, Ontario
 - Acoustic Assessment Report
- Vermiculite Canada Mine, Regis Resources, Buckhorn, Ontario
 - Air and noise permitting for vermiculite open surface mine
- Touquoy Gold Mine Project, Moose River Gold Mines, Halifax Regional Municipality, Nova Scotia
 - Air, noise, and light environmental assessment studies

PUBLICATIONS AND PRESENTATIONS

- Reusing, G.L., R. Maier, "Tire Recycling Pilot Plant Using Microwave Technology", Air and Waste Management Association, Ontario Section Annual Conference, Toronto, October 6, 2010
- Reusing, G.L., Tim Wiens, "Noise Modelling Versus Reality Under Worst-Case Meteorological Conditions", Canadian Acoustics Proceedings, Volume 38, Number 3, September 2010
- Reusing, G.L., "Liberty Energy Study", Latest Developments in Air Modeling Conference, Air and Waste Management Association, Toronto, January 19-22, 2009
- Reusing, G.L., "District Energy Plants and Ajax Case Study", Sustainable Energy Career Symposium, University of Waterloo, January 26, 2009
- Reusing, G.L., Nolan, W., Kerr, G., Taylor, C., "Biomass to Energy: Greenhouse Gas Reduction Quantification Protocols and Case Study" 2nd Climate Change Technology Conference, Hamilton, May 12-15, 2009
- Reusing, G.L., Taylor, C., Vel, S. "Greenhouse Gas Reduction Quantification Protocols for Biomass Projects", Annual Air and Waste Management Conference, Detroit, June 16-19, 2009
- Reusing, G.L., Annual Environmental Compliance Training Seminars for General Motors, Masco Corporation, Tomkins Corporation, Magna International, Linamar Corporation and various industry associations 2003-2007
- Reusing, G.L., Session Moderator, Environmental Nuisances: Noise, Light, Odor and Fugitive Dust, Air and Waste Management Conference, Vancouver, May 2007

- Reusing, G.L., "New Ontario Dispersion Models and Air Standards, Odor Assessments and Noise Assessments", Environmental Law & Regulation Conferences, Canadian Institute, 2005 and 2006
- Reusing, G.L., "Introduction to Environmental Issues for Occupational Health and Safety", Environmental Panel Discussion Expert, University of Western Ontario Course, November 2006
- Reusing, G.L., "Fugitive Dust Assessment and Control", Environmental Nuisances: Noise, Odor and Fugitive Dust, Air and Waste Management Conference, Toronto, May 9-11, 2005
- Reusing, G.L., "New Ontario Dispersion Models and Air Standards, Odor Assessments and Noise Assessments", Environmental Law & Regulation Conference, Canadian Institute, December 2, 2005
- Reusing, G.L., "Preparing Applications for Certificates of Approval (Air)", Centre for Health-Environment-Safety (CHES), Training Seminar for Industry, March 10, 2005
- Reusing, G.L., "Expediting Certificates of Approval Air", Environmental Law & Regulation Conference, Canadian Institute, December 8, 2004
- Reusing, G.L., Freeman, D., "Air Dispersion Modeling", Training for New Brunswick Department of Environment and Local Government Air and Risk Assessment Staff, Fredericton, New Brunswick, November 2002
- Reusing, G.L., Law, S., Loney, A., "Ambient Air Odor Regulations in Canada and the United States", Paper Presented to the 2002 Joint CSCE/EWRI of ASCE Environmental Engineering Conference, An International Perspective on Environmental Engineering, Niagara Falls, Ontario, July 2002
- Reusing, G.L., "Odor Assessment Methodology for a Complex Industrial Facility", Paper Presented to the Odors and Toxic Air Emissions 2002 Specialty Conference, Water Environment Federation, Albuquerque, New Mexico, April 2002
- Reusing, G.L., "Industrial Wood-Fired Boiler Optimization and Emissions Compliance", in Pollution Engineering, April 2002
- Reusing, G.L., "Ontario Environmental Compliance Seminar - Air Regulations", Canadian Association of Metal Finishers, September 2001
- Reusing, G.L., "Understanding the Clean Air Act", Paper Presented to the Environmental Regulation Course, Executive Enterprises, Cincinnati, October 1995
- Reusing, G.L., Crutcher, A.J., Benson, M.A., "Waste Management Issues for the Forest Industry - Burning of Woodwaste", Paper Presented to the 1994 Environmental Law and Management Conference for the Canadian Forest Industry, Toronto, September 1994
- Reusing, G.L., Bragg, G.M., "A Multi-Chamber Ventilation Model with Random Parameters", in Building and Environment, Volume 25, No. 4, 1990
- Siurna, L., Bragg, G.M., Reusing, G.L., "Transient Solutions to a Stochastic Ventilation Model", in Building and Environment, Volume 24, No. 3, 1989

EDUCATION

B.Eng. Environmental Engineering (Co-op), University of Guelph, 2008
Other
Courses: 40-Hour OSHA Health and Safety Training (as per OSHA 29 CFR 1910.120), 2006

EMPLOYMENT

2008- Project Engineer
Present Conestoga-Rovers & Associates
2007 Student Engineering Assistant, Conestoga-Rovers & Associates (8 months)
2006 Student Engineering Assistant, Conestoga-Rovers & Associates (8 months)
2005 Student Biomonitoring Technician, Ontario Ministry of the Environment (4 months)

AFFILIATIONS

Association of Professional Engineers of Ontario, Practicing Member (P.Eng.)

PROFILE OF PROFESSIONAL ACTIVITIES

Regulatory Compliance

- Developed a detailed design and design and operations report for the landfill gas collection and control system for the Humberstone Landfill, Welland, Ontario, and the Stratford Landfill, Stratford, Ontario including the well field design, specification drawings including all relevant hydraulics, buried pipe and condensate trap sizing calculations to obtain the Certificate of Approval (Waste). Assisted in the obtaining of the Certificate of Approval (Air) for both Sites as well.
- Provides operational assistance for the Eastview Landfill including balancing of the well field, assessments of the leachate collection system and the operations of the utilization facility for compliance with Certificate of Approval Waste and Air requirements.
- Provides operational support for organics processing facility's in London and Ottawa, Ontario including odour assessments involving the odour abatement equipment efficiencies and operations improvements to minimize fugitive odours.
- Assisted in developing the model package (Design and Operations Report) for the Application for Amendment to Provisional Certificate of Approval for a Waste Disposal Site, for landfill sites which apply under amended Ontario Regulations 232/98 and 347 for the Ontario Ministry of the Environment
- Assisted in preparation of a study regarding applicable wastewater treatment technologies and disposal options for an organics processing facility in Ontario
- Assisted with the submission of applications for Amendments Certificate of Approval for Air, Waste Disposal Site and Section 53 (Industrial Sewage Works) under the Environmental Protection Act (including formulation of a Design and Operations Report for the site) for source-separated organics aerobic composting facilities in London, Ontario and Ottawa, Ontario

Greenhouse Gas Auditing Projects

- Listed as a Key Team Member and Project Manager in the Greenhouse Gas Assurances (GGAS) Group and assisted in the successfully obtaining CRA's Designated Operating Entity (DOE) status with the UNFCCC effective as of May 28, 2010
- Lead the application and registration of CRA with the Verified Carbon Standard (VCS) as an accredited Validator/Verifier and is the primary contact and project resource for all VCS related project works and will be completing a validation of verification of a wind project located in Oklahoma as a Lead Auditing Team Member (2011)
- Currently in the process of completing a CDM validation as a Lead Auditor in Training for a carbon dioxide removal project activity at a hydrogen production facility in Argentina (2011). Work includes findings assessment preparation, site-visit, and validation report and validation opinion formation
- Conducted greenhouse gas verification assessments as a Lead Auditor in Training for three projects for Alberta Environment; a liquid natural gas plant in Boyle, Alberta (2011), a pulp mill (2011) in Fort Saskatchewan, Alberta, and a static-pile aerobic composting site (2009) in Edmonton, Alberta under the Alberta Offset System which included a site visit, review of the overall processes, record keeping practices and techniques, emission reduction calculations compliance, and a report on findings
- Currently in the process of completing two CDM validations as a Lead Auditor for landfill sites located in Los Angeles, Chile and in Tucumán, Argentina (2011). Work includes findings assessment preparation, site-visit, and validation report and validation opinion formation
- Currently in the process of completing a VCS validation and verification assignment as a Lead Auditor in Training for wind power project located in Dempsey Ridge, Oklahoma (2011). Work includes findings assessment preparation, site-visit, and validation report and validation opinion formation and subsequent verification reports.
- Currently in the process of completing a Swiss Charter verification as a Lead Auditor for a refrigerator recycling plant located in São Paulo, Brazil (2011). Work includes findings assessment preparation, site-visit, and verification report and verification opinion formation
- Experience with the validation process in preparation of Project Design Documents (PDD) for emission reduction projects related to landfill gas destruction under the Clean Development Mechanism (CDM) for the Manaus landfill (Manaus, Brasil)
- Performed greenhouse gas emission reductions calculations and prepared the Monitoring Report for the Aurà and CEAMSE landfill sites in Brasil and Argentina respectively. The reports were completed to UNFCCC standards and included a review of the overall process, record keeping practices and techniques and emission reduction calculation compliance
- Performed greenhouse gas emission reduction calculations using a modified first order kinetic landfill gas model for a municipal solid waste anaerobic digester under CDM requirements for various sites across the Canada and the USA as well as in Egypt. All of these Sites also included an assessment of emission reductions associated with cogeneration
- Completed assessment for emission reduction credits for a large-scale operation green-packaging project using sugar cane bagasse in Brasil under CDM biomass methodology AM0057 requirements. The project additionally generates electricity using the bagasse material
- Prepared detailed assessment of transferability of Alberta Offset System protocols to CDM protocols in relation to both cement and asphalt methodologies

- Conducted a greenhouse gas verification report for the Eastview Landfill Site in Guelph, Ontario. The report was compiled in accordance with the requirements of the PERRL Initiative
- Developed a Project Information Note (PIN) for the emissions avoided through aerobic composting at the Orgaworld London and Ottawa, Ontario composting facilities as well as the City of Guelph Wet/Dry composting facility. Preparation of this document includes the quantification of emission reduction using the Alberta Offset System Protocols
- Developed several project documents under various emissions reporting standards for landfill operations in British Columbia including the Nanaimo Landfill and the Salmon Arm Landfill Sites and in Ontario at the Eastview Landfill Site. These reports have been prepared in accordance with ISO-14064 Part 2 standards using various GHG methodologies to quantify the emissions such as those from the UNFCCC and CAR

Computer Aided Design

- Performs day-to-day Auto-CAD drawings including process flow diagrams, general and civil scale drawings related to a variety of composting and landfill related projects

Solid Waste Management

- Prepared cost estimates for the installation of landfill gas collection and control systems using both flaring and utilization technologies for international and Canadian landfills: Manaus landfill (Manaus, Brasil), and the Eastview landfill (Guelph, Ontario)
- Assisted with the preparation of successful proposals for a five-year contract to haul and process source-separated organics for the City of Toronto and a twenty-year contract to process source-separated organics for the City of Ottawa.
- Assisted in the completion of a 2007 Baseline Study of Canadian Landfills based on waste filing practices and leachate management considering nearly 90 landfill sites for Environment Canada

Modelling and Assessment

- Experience with Scholl-Canyon and Rettenberger first-order landfill gas generation models for the prediction of landfill gas generation at several landfills in Canada, the United States of America (U.S.A.) and South America
- Experience with Scholl-Canyon and Rettenberger first-order landfill gas generation models as they apply to anaerobic municipal solid waste digesters for projects in the U.S.A.
- Performed landfill gas modelling and assessment for international landfills: González Catàn landfill and Ensenada landfill (Buenos Aires, Argentina), Aurà landfill (Belém, Brasil), Manaus landfill (Manaus, Brasil)
- Performed greenhouse gas emission reductions calculations and reporting for the Eastview landfill (Guelph, Ontario) and assisted with emission reductions calculations for the Merrick landfill (North Bay, Ontario) under the Pilot Emission Reductions, Removals, and Learnings (PERRL) initiative

Agricultural Engineering

- Developed and assisted in implementing a monitoring methodology under the Climate Action Reserve (CAR) for the collection and utilization of methane gas produced in anaerobic dairy manure digesters for various projects in California, U.S.A.

- Assisted in approvals process for Provincial certificates of approval for the utilization of leachate and ammonium sulphate as a non-agricultural source material (NASM) on agricultural lands for a composting facility's in both London and Ottawa, Ontario

Presentations

- Prepared and delivered a 1 hour presentation entitled "Understanding the Clean Development Mechanism (CDM) Project Development Process" to the CRA community through a recorded webinar conference. The presentation covered all aspect of project validation and verification from the perspective of a project developer as well as an independent party conducting validations or verifications of project activities
- Prepared a presentation on the current and future odour management at a composting facility operation within Ontario. The presentation was presented to local stakeholders, members of the MOE and the local Municipality
- Assisted in the preparation of a presentation entitled "*A Life-Cycle Greenhouse Gas Comparison of Anaerobic Digestion Versus Composting of Source-Separated Organics*" Presented at the Compost Council of Canada's Conference on September 20, 2011

EDUCATION

B.Sc. Eng. University of Guelph, Environmental Engineering, 1996

Other

Courses: 40-Hour OSHA HAZWOPER Training and 8-Hour Annual OSHA Refresher (1999 and 2000–2009, respectively)
Testing Industrial Air Emissions, 2000
Chemical Hydrogeology, University of Waterloo, 2002
Environmental Microbiology, 2002
Industrial Processes, 2004
Environmental Economics, 2006
Industrial Ecology, 2007
ISO 14064 Part 1 – Greenhouse Gas Inventories, 2008
ISO 14064 Part 2 – Greenhouse Gas Projects, 2008
ISO 14064 Part 3 – Greenhouse Gas Verification, 2010

EMPLOYMENT

2005–Present	Associate – Sustainability, Compliance, and Air Groups Conestoga-Rovers & Associates
1999-05	Project Manager, Conestoga-Rovers & Associates
1998-99	Project Engineer, Conestoga-Rovers & Associates
1998	Research Assistant, Agriculture and Agri-Food Canada
1996-97	Environmental and Quality Assurance Technician, Golden Town Apple Products

AFFILIATIONS

Professional Engineer, Association of Professional Engineers of Ontario
Michigan Board of Professional Engineers Fundamentals of Engineering Exam, April 1999

PROFILE OF PROFESSIONAL ACTIVITIES

Life Cycle Assessment, Greenhouse Gas Emissions Reporting, and Validation, and Verification

- Project Manager and technical advisor for the preparation and verification of applications for funding to Sustainable Development Technology Canada for various clients, including the preparation of life cycle assessments
- Project Manager for the preparation of a web-based, database-driven Environmental Footprint Calculator for a large cement, aggregate, and construction company in Canada

- Lead verifier, verification team member, and independent peer reviewer for verifications and verification audits of greenhouse gas inventories and projects in Alberta and British Columbia
- Lead validator for a greenhouse gas project being completed under the Clean Development Mechanism of the Kyoto Protocol at a hydrogen plant in Argentina
- Project Manager for review and assessment of greenhouse gas emissions from the upstream oil and gas industry for Environment Canada
- Peer Reviewer for the preparation of a Greenhouse Gas Inventory for a large North American potato chip producer
- Lead technical advisor for the preparation of a Greenhouse Gas Inventory for a large North American waste company
- Lead technical advisor for the preparation of Greenhouse Gas Emissions assessments for several clients
- Senior Technical Advisor for the assessment of reporting requirements under the USEPA Mandatory Greenhouse Gas Reporting Rule for clients in the petroleum industry

Air Emissions Sampling, Permitting, and Reporting

- Project Manager for numerous air emissions (including Greenhouse Gas Emissions) assessments for clients in Canada reporting under the National Pollutant Release Inventory (NPRI) and the Greenhouse Gas Reporting Program
- Project Manager, Project Coordinator, and project engineer on numerous air permit applications and air emissions reports for numerous clients throughout Ontario
- Project Coordinator for the Ontario Ambient Air Monitoring Sites for Environment Canada's Canadian National Air Toxics Measurement Program in 2004/2005. Responsible for coordination of all aspects of the sampling and reporting activities for over 10 ambient air monitoring sites in Ontario
- Conducted sampling and reporting for numerous air emission source testing projects in Canada, the United States, and Puerto Rico, including specialized field gas chromatography sampling
- Lead technical advisor for ambient air monitoring programs at multiple sites in Ontario and New Brunswick
- Project Manager and Coordinator for air emissions activities associated with multiple facilities for an automotive parts manufacturer in Ontario, including preparation of Ontario Ministry of the Environment Director's Order appeal documents, Certificate of Approval (Air) Applications, Ontario Regulation 127 and National Pollutant Release Inventory reporting, and source sampling

Agriculture-Related Experience

- Primary researcher for preparation of a paper regarding the evaluation of swine manure treatment processes for Agriculture and Agri-Food Canada
- Researcher for the evaluation of a prototype cattle manure treatment technology for Agriculture and Agri-Food Canada
- Project Manager for assessment of environmental issues associated with an aerobic composting operation

Environmental Due Diligence and Remediation

- Project Manager for ongoing Remedial Investigation/Feasibility Study (RI/FS) activities at a Superfund Landfill Site in Ohio
- Project Manager for RCRA corrective action and Ohio Voluntary Action Program activities at a former refractory manufacturing facility in Ohio
- Conduct investigative and remedial activities for a chemical manufacturing facility in Ontario including:
 - Project management, technical and field support relating to the remediation of contaminated off-Site Municipal Aquifer
 - Project Manager for the design and construction of a \$4.2 million dollar ammonia treatment system for contaminated groundwater
 - Project Coordinator for annual ambient air monitoring program downwind of the Site
 - Project Coordinator for the 1998 through 2004 Annual Environmental Reports
 - Project Engineer for surface water monitoring programs, primary author of monthly Progress Reports, assessment and management of analytical data
 - Supervise and conduct field activities such as groundwater sampling, groundwater elevation monitoring, surface water sampling, surficial soil sampling, and waste water sampling air and odour sampling
- Project Manager for a large indoor contaminated soil excavation and groundwater collection trench installation at a former wallpaper manufacturing facility in Ontario
- Project Manager and Project Coordinator for a large site assessment, plant demolition, and contaminated soil and groundwater remediation project at a former airplane manufacturing facility in Ontario
- Project Manager and Phase I auditor for a large multi-site due diligence project at pulp and paper, mining, and port facilities in the Province of Newfoundland and Labrador
- Project Manager and Project Coordinator for several litigation support projects in the United States, including preparation of expert reports, expert witness support, and completion of potentially responsible party searches
- Project Manager and Assessor for numerous Phase I and II Environmental Site Assessments and Environmental Compliance Audits in the United States and Canada
- Project Manager for activities at a large chemical manufacturer in Ontario, including wastewater treatment system optimization, compliance audit, Certificate of Approval (Air) Application preparation, asbestos survey, and ongoing compliance assistance
- Project Manager for an AS/SVE and bioremediation project at an industrial site in New Jersey
- Project Manager/Coordinator for facility-wide environmental and health and safety compliance audits and environmental monitoring programs for two large automotive manufacturing sites in Ontario
- Managing and preparation of Phase I and Phase II Site Assessments for numerous property transfers in the United States and Canada
- Project engineer for an Engineering Evaluation and Cost Assessment (EE/CA) for the remediation of a lead-acid battery disposal area in Michigan

EDUCATION

- Ph.D. University of Guelph, Environmental Engineering, 2003
Thesis Title: Mass Transfer Processes in the Soil Vapour Extraction of Gasoline from Unsaturated Soils
- M.Sc. University of Guelph, Environmental Engineering, 1997
Thesis Title: Passive Volatilization Behaviour of Gasoline in Unsaturated Soils
- B.Sc. (ENG) University of Guelph, Environmental Engineering, 1995

EMPLOYMENT

- 2009- Associate
Present Conestoga-Rovers & Associates
2006- Project Manager
2008 Conestoga-Rovers & Associates
2004-06 Engineering Assistant, Conestoga-Rovers & Associates
1995-03 Graduate Teaching Assistant, School of Engineering, University of Guelph (Soil Mechanics, Fluid Mechanics, Thermodynamics, Network Theory, Engineering Design, Statics and Dynamics)
1995-03 Graduate Research Assistant, School of Engineering, University of Guelph
1999 Sessional Course Instructor: Mass Transfer Operations

PROFILE OF PROFESSIONAL ACTIVITIES

Waste Processing Technologies

- Overall investigation of different organics processing technologies including open windrow, anaerobic digestion and biological stabilization; additional work involving assessment of potential greenhouse gas emissions from source-separated organics programs under methane avoidance
- Project Manager for the City of Toronto's new source-separated organics (SSO) facilities for the pre-design and request-for-proposal development for two 75,000 tonne/year SSO anaerobic digesters, including design review, contract administration and site inspection responsibilities
- Project Manager for site inspection, design review and contract administration of the City of Guelph's new Source-Separated Organic Waste Processing Facility
- Technical expert for the development of new bulk good recycling systems for the City of Toronto
- Managed successful proposals for: a ten-year contract to haul and process source-separated organics utilizing aerobic composting for the Region of York, a five-year contract to haul and process source-separated organics for the City of Toronto, and a twenty-year contract to process source-separated organics for the City of Ottawa. Ongoing work in the composting area includes:
 - Operational assistance and optimization of odour abatement systems and processing techniques

- submission of applications for Certificate of Approval for Air & Noise and Waste Disposal Site under the Environmental Protection Act (including formulation of a Design and Operations Report for the site) and overall interaction with the Ministry of the Environment
- municipal site plan approval process and building permit
- development of business in Greater Toronto Area and other municipalities for securing additional source material
- obtaining short-listed qualifications for the City of Ottawa, City of Guelph and Regional Municipality of Niagara
- Involved in the design and permitting of leaf and yard waste composting sites in Ontario
- Additional involvement in feasibility studies for liquid and solid waste anaerobic digestion projects.
- Development of leaf and yard waste composting facilities at several locations throughout Ontario, including pad sizing and equipment specification, MOE reporting and municipal permits

Technical Reports

- Project Manager for recent assignment completed on behalf of the British Columbia Ministry of the Environment for the development of new modeling formulations to predict greenhouse gas emissions from landfill in the Province, including a Landfill Gas Design Guidelines document and the formulation of Best Management Practices for additional greenhouse gas reductions
- Engaged in calculations for a report to the Greater Vancouver Regional District concerning increases in landfill gas production as a result of the addition of sewage sludge biosolids
- Performed a landfill gas collection assessment report for the Eastview Landfill in Guelph, Ontario relative to existing and future quantities of landfill gas available for utilization
- Oversaw a study for bioaerosol and trace volatile organic compound characterization from stack effluent at an industrial composting facility
- Managed a project for Natural Resources Canada to assess the state-of-the-art in biogas pretreatment technologies for a range of utilization options and incorporating technical and economic factors to yield guidance with respect to overall technology selection
- Coordinated and performed technical work for a study of leachate treatment with respect to effluent colour and BOD5 at the Green Lane landfill in St. Thomas, Ontario; compiled application for a Certificate of Approval (Industrial Sewage Works) based on the above-noted report
- Prepared a research brief for the Alliance landfill concerning oxidation of methane in cover soils; engaged in field investigation and performed an analysis for the same landfill to determine means of optimizing landfill gas quality for potential utilization
- Prepared the 2004 Annual Performance Report for the leachate treatment facility at the Green Lane landfill
- Performed an assessment regarding landfill gas generation potential and migration/end-use risk for a landfill in Calgary (Blackfoot Landfill)
- Assessed methane generation potential and potential risks associated with methane migration for a large site in Pontiac, Michigan based on field results; developed a conceptual design for a passive venting system for the building footprint and interpreted results of additional gas probe data
- Performed a feasibility study for soil vapour extraction at the A1 landfill site, including analysis of analytical results and field results for determination of residual contaminant levels and potential for air-phase stripping

Modeling and Assessment

- Performed landfill gas modeling and carbon credit assessment for international landfills: Gonzalez-Catan and Ensenada landfills (Buenos Aires, Argentina), San Nicolas and Las Cumbres landfills (Aguascalientes, Mexico), Huilango landfill (Cuautitlan Izcalli, Mexico) Villa Dominico landfill (Buenos Aires, Argentina), Tlalnepantla landfill (Tlalnepantla, Mexico), Canabrava Landfill (Salvador, Brasil), Cordoba landfill (Bower, Argentina), the Tucuman bioreactor located at the Pacara Pintado landfill (Tucuman, Argentina), several additional sites in Mexico (Verde Valle, El Verde, Torreon, Ahome Sinaloa, Garcia, and Cadereyta) and the Bordo Poniente landfill located in Mexico City
- Assisted with financial and technical calculations related to the feasibility of operating landfill gas collection and flaring systems in Mexico, including estimates of carbon credit revenue and capital and operating costs for the landfill gas collection and flaring systems; also performed feasibility analysis of landfill gas utilization facilities for the purpose of power production
- Performed landfill gas modeling and assessment for domestic landfills: Eastview landfill (Guelph, Ontario), Green Lane landfill (St. Thomas, Ontario), Halton Hills landfill (Milton, Ontario), W12A landfill (London, Ontario), Petrolia landfill (Sarnia, Ontario), LaSalle landfill (Sarnia, Ontario), Alliance Landfill (Scranton, Pennsylvania)
- Performed greenhouse gas emissions reduction calculations and reporting for the Eastview landfill in Guelph, Ontario and assisted with emissions reduction calculations for the Peterborough landfill in Peterborough, Ontario, and the Merrick landfill in North Bay, Ontario, under the Pilot Emission Reductions and Removals Learning (PERRL) initiative
- Performed landfill gas utilization assessment (electricity generation capability) for the San Nicolas and Las Cumbres landfills (Aguascalientes, Mexico), Huilango landfill (Cuautitlan Izcalli, Mexico), Green Lane landfill (St. Thomas, Ontario), and Eastview landfill (Guelph, Ontario)
- Preparation of assessment reports for Guelph Hydro under the Federation of Canadian Municipalities' Green Municipal Fund
- Project Manager for the preparation of an assessment of landfill gas direct use and electricity production for a rendering plant
- Engaged currently in activities related to landfill chemical release including inventory development of active large landfills across Canada on behalf of Environment Canada
- Involved in preparation of landfill gas reports under new Ontario landfill regulation for two municipalities

Field Installations and Activities

- Performed field monitoring and overall landfill gas management support for the following Waste Management landfill sites: Highway 48 (Stouffville, ON), Storrington (Kingston, ON), and East Gwillimbury (East Gwillimbury, ON)
- Project Manager for evaluation and recommendations for upgrading the landfill gas collection system at the Mohawk Landfill in Brantford, Ontario

- Evaluated the potential for off-site migration of landfill gas components from the Kitchener Landfill (Regional Municipality of Waterloo), including assessment of the existing active migration control system
- Conceptual design and construction support for the conversion of a passive venting system into an active gas collection system at the Highway 48 landfill as part of a perimeter migration control system
- Conceptual design for a perimeter gas monitoring system for the Boldenar Park landfill in Elmira, Ontario
- Supervised barhole probe monitoring program and interpreted results for a field work investigative program performed at the East Gwillimbury Landfill (Toronto, ON)
- Performed a biogas assessment for municipal wastewater digester gas (WoodwardAve/Hamilton wastewater treatment plant), including sampling and analysis of results for use in overall evaluation of a utilization project
- Engaged in ongoing technical support for the landfill gas collection well field and flaring system at the Eastview landfill in Guelph, Ontario, including coordination of fuel supply for a landfill gas utilization facility on site and installation of additional landfill gas wells and test probes
- Performed landfill gas well extraction system testing at the Eastview landfill in Guelph, Ontario for the purposes of determining total landfill gas capacity and areas of optimal gas production
- Several soil gas and landfill gas field activities related to field characterization of gas (field equipment) and obtaining samples for laboratory analysis (Tedlar bags and SUMA canisters); additional indoor air characterization work for combustion products such as NO₂, NO and CO using a variety of equipment and lab analytical method
- Coordinated a soil gas study (field work and analysis/interpretation of data) of VOC-contaminated groundwater for the Henkel Corporation in Hamilton, Ontario and reviewed conceptual passive venting design for mitigation of methane accumulation for the same site

Greenhouse Gas Work

- CRA lead for the formulation of Project Design Documents (PDDs) for emission reduction projects related to landfill gas destruction under the Clean Development Mechanism (CDM) for five landfills: Canabrava Landfill (Salvador, Brasil), Aura Landfill (Belem, Brasil), Manaus Landfill (Manaus, Brasil) and Gonzalez-Catan and Ensenada Landfills (Buenos Aires, Argentina)
- Current lead on managing the credit certification and issuance process as related to the CDM, including interaction with a Designated Operational Entity and management of the overall process related to request for issuance
- Experience with Designated National Authority procedures under the United Nations Framework Convention on Climate Change for the following countries: Brasil, Argentina, United Kingdom and Canada; submitted applications for host country approval in Brasil and Argentina
- Project Manager for carbon credit generation pre-feasibility for 10 landfill gas projects on behalf of the World Bank
- Performed landfill gas assessment for carbon capture for six landfills in Mexico, including economic assessment of developing Clean Development Mechanism projects at these sites for a private waste management company

- Performed greenhouse gas emissions reduction calculations and reporting for the Eastview landfill in Guelph, Ontario and assisted with emissions reduction calculations for the Peterborough landfill in Peterborough, Ontario, and the Merrick landfill in North Bay, Ontario, under the Pilot Emission Reductions and Removals Learning (PERRL) initiative
- CRA lead for environmental quantification (lifecycle greenhouse gas analysis) under Sustainable Development Technologies Canada with project reports completed for solar and wind developers and additional work performed on validation of fuel cell, biodiesel and wastewater projects
- Managed a technical report for Natural Resources Canada under the Technology Early Action Measures (TEAM) initiative to study the greenhouse gas emission reductions associated with a borehole thermal energy and direct seawater cooling system located in Halifax, Nova Scotia
- CRA lead for greenhouse gas verification under the Chicago Climate Exchange in the waste sectoral scope
- Managed a report entitled “Assessment of Greenhouse Gas Generation and Potential Reductions for Select Landfills in Ontario” for the Ministry of the Environment
- Engaged in a greenhouse gas quantification for two farm level anaerobic digesters under the livestock reporting protocol through the California Climate Action Registry
- Project Manager for the life cycle greenhouse gas assessment of the Alberta beef sector and development of management practices to reduce greenhouse gases
- Technical expert in the life cycle evaluation of recycled oil for the British Columbia Used Oil Association
- Technical expert for the verification of greenhouse gas emissions from large-scale oil sands tailing ponds
- Project Manager for an Environment Canada assignment to estimate greenhouse gas emissions from unmanaged landfills in Canada for purposes of reporting Canada's greenhouse gas inventory under the Kyoto Protocol
- Assessment of greenhouse gas emission reduction potentials for numerous landfill gas projects including utilization, source-separated organics composting facilities, anaerobic digesters incorporating source-separated organics, biomass (wood) combustion facilities, municipal waste incinerators, cement additives (phosphate cement) and afforestation/reforestation

Auditing and Affiliations

- Internal ISO auditor under Conestoga-Rovers & Associates quality system
- Board of Directors member (Education and Training) for the municipal waste integration network (mwin), 2006

RESEARCH

Modeling

- Performed model development, coding, testing, and calibration of a control volume soil vapour extraction model (FRACMAT) for soil gas advective flow in soil
- Developed mass transfer models using physical parameters in soil vapour extraction
- Model development using finite difference, finite element and moment analysis methods
- Structural and fluid flow work with computer-aided engineering FEM package SDRC-Ideas

- Experience with Scholl-Canyon first-order landfill gas generation model for the prediction of landfill gas generation at several North and South American landfills
- Experience with PIPE2006 hydraulic flow modeling package for grid-type piping networks to assess overall losses in landfill gas collection systems
- Work with groundwater model MODFLOW

Experimental and Field Equipment

- Calibrated and operated gas chromatographs equipped with photoionization, flame ionization, and electron capture detectors; infrared methane detectors and catalytic bead detectors for methane detection and safety assessment; hot-wire anemometer devices and pitot tubes for velocity measurements and velocity traverses; and manual and digital manometers for pressure readings
- Designed pump-induced airflow systems including heat exchangers, humidifying units, and sample collection devices
- Developed and tested lab-scale soil vapour extraction system with temperature and humidity control
- Developed and tested lab-scale airflow dispersion apparatus for porous media
- Experience with bench-scale bioventing, supercritical fluid extraction, reverse osmosis, and composting systems

Extensive soil sampling experience as related to soil properties and soil contaminants

PUBLICATIONS

Published Refereed Papers:

- Gidda, T., Stiver, W.H., and Zytner, R.G. 2000. The Passive Volatilization of Gasoline from Unsaturated Soil. *Journal of Contaminant Hydrology*. 39: 137-159
- Gidda, T., Cann, D.P., Stiver, W.H., and Zytner, R.G. 2004. Airflow Dispersion in Unsaturated Soil. *Journal of Contaminant Hydrology*. 82: 118-132
- Gidda, T., Bogolowski, T., Mosher, R., and Millar, D. Life Cycle Greenhouse Gas Assessment for Landfill Gas Utilization. Presented in the peer review track for the 13th Annual Landfill Symposium of the Solid Waste Association of North America in June 2008.

Papers in Progress or Submitted (intended for refereed journals):

- Gidda, T., Stiver, W.H., and Zytner, R.G. 2004. Soil Vapour Extraction: A Comprehensive Literature Review
- Gidda, T., Stiver, W.H., and Zytner, R.G. 2004. Mass Transfer Processes in Soil Vapour Extraction 1. Experimental Methods
- Gidda, T., Stiver, W.H., and Zytner, R.G. 2004. Mass Transfer Processes in Soil Vapour Extraction 2. Mass Transfer Modeling
- Gidda, T., Stafford, K., Lugowski, A., and Millar, D. 2007. Leachate Treatment at a Full-Scale Operating Facility to Optimize Colour and BOD in Effluent: A Two-Year Experimental Study. Submitted to *Chemosphere*

Conference Papers and Presentations:

- Gidda, T. 2007. Greenhouse Gas Management: An Overview of the Carbon Credit Market. Presented at the Municipal Waste Integration Network's (mwin's) Annual General Meeting, Cobourg, Ontario.
- Gidda, T. and Leehane, N. 2007. Greenhouse Gas/Carbon Emission Reductions and Trading. Presented for the CRA Sustainable Solutions Group, March 28.
- Gidda, T., Treadwell, G., Mosher, F., and Rovers, F. 2007. Carbon Credit Trading at the Canabrava Landfill Site: Challenges and Opportunities under the Kyoto Protocol. Submitted and accepted at the Solid Waste Association of North America's 30th Annual Landfill Gas Symposium, March 4-8, 2007, Monterrey, California, United States
- Gidda, T. and Moffat, B. 2007. Carbon Credits – The Future has Arrived. Presentation delivered at the 2007 Annual Business Conference of the Professional Dairy Producers of Wisconsin (March 13-14, 2007) in Madison, Wisconsin, United States
- Gidda, T. 2007. Carbon Credit Trading: Challenges and Opportunities under the Kyoto Protocol. Presentation delivered at the Americana conference (March 20-22, 2007) in Montreal, Quebec, Canada
- Gidda, T. 2006. CDM Project Development: South America. Presentation delivered on behalf of Canada's Clean Development Mechanism and Joint Implementation Office on March 28, 2006 in Vancouver, British Columbia, Canada
- Gidda, T. 2006. Host Country Approvals: Brasil and Argentina. Presentation delivered on behalf of Canada's Clean Development Mechanism and Joint Implementation Office on March 27, 2006 in Vancouver, British Columbia, Canada
- Gidda, T. 2006. CDM Project Development: South America. Presentation delivered on behalf of Canada's Clean Development Mechanism and Joint Implementation Office on March 1, 2006 in Winnipeg, Manitoba, Canada
- Gidda, T. 2006. CDM Project Development. Presentation delivered on behalf of Canada's Clean Development Mechanism and Joint Implementation Office on March 1, 2006 in Winnipeg, Manitoba, Canada
- Gidda, T. 2006. Landfill Gas and Emission Trading under the UNFCCC. Presentation delivered on behalf of the Air and Waste Management Association's speaker series on April 19, 2006 in Waterloo, Ontario, Canada
- Gidda, T. 2006. Landfill Gas Collection in Developing Countries. Submitted and accepted at the Solid Waste Association of North America's 11th Annual Landfill Symposium, June 5-8, 2006, Nashville, Tennessee
- Mosher, R., Gidda, T., and McBean, E.A. 2006. Landfill Bioreactors: A New Perspective On Solid Waste Management in the Caribbean. Submitted and accepted at the Third Caribbean Environmental Forum and Exhibition, June 5-9, 2006, Antigua
- McBean, E.A., Gidda, T., Mosher, F., Rovers, F., and Vaccariello, H. 2006. Landfill Gas Collection in Developing Countries. Submitted and accepted at the Solid Waste Association of North America's 11th Annual Landfill Symposium, June 5-8, 2006, Nashville, Tennessee
- Gidda, T., Millar, D., McBean, E.A., Mosher, F., and Varghese, B. 2005. Landfill Gas Collection and Utilization: Energy from Waste and Links to Kyoto. Submitted and accepted at ChemCon 2005, December 14-17, 2005, New Delhi, India

- Gidda, T. 2005. Development of CDM Projects. Presentation delivered on behalf of Canada's Clean Development Mechanism and Joint Implementation Office on December 14, 2005 in Toronto, Ontario, Canada
- McBean, E.A., Rovers, F.A., del Rosso, E., and Gidda, T. 2005. Performance Results from the Tucuman Solid Waste Bioreactor. Submitted and accepted at the Sardinia 2005 Tenth International Waste Management and Landfill Symposium, October 3-7, Cagliari, Italy
- McBean, E.A., Ritchie, S., and Gidda, T. 2005. Landfill Gas Collection for Greenhouse Gas Credits: An Argentinean Case Study. Submitted and accepted at the Sardinia 2005 Tenth International Waste Management and Landfill Symposium, October 3-7, Cagliari, Italy
- Mosher, F., Gidda, T., Millar, D., and Hatrick, D. 2005. Rapid Stabilization at a Large, Deep Landfill: Lessons Learned. Solid Waste Association of North America (SWANA), June 6-10, Boulder, Colorado
- Gidda, T., Mosher, F., McBean, E.A., and Stafford, K. 2005. Aspects of Landfill Gas Collection and Utilization: Energy from Waste. Presented by T. Gidda at the American Association of Petroleum Geologists Convention, June 19-22, Calgary, Alberta
- Mosher, F., McBean, E.A., Rovers, F.A. 2005. Landfill Gas and Renewable Energy in Developing Countries: Links to Kyoto. Presented by T. Gidda at the American Association of Petroleum Geologists Convention, June 19-22, Calgary, Alberta
- Gidda, T., Stiver, W.H., and Zytner, R.G. 2002. Mass Transfer Behaviour in the Soil Vapour Extraction of Gasoline from Unsaturated Soils. Joint CSCE/EWRI of ASCE International Conference on Environmental Engineering, July 21-July 24, Niagara Falls, Ontario
- Cann, D.P., Gidda, T., Stiver, W.H., and Zytner, R.G. 2002. Estimate of Air Flow Dispersion and Dispersivity for Five Soils. Joint CSCE/EWRI of ASCE International Conference on Environmental Engineering, July 21-July 24, Niagara Falls, Ontario
- Gidda, T., Stiver, W.H., and Zytner, R.G. 2000. Soil Vapour Extraction: Experimental and Modeling Study for the Determination of Mass Transfer Coefficients. Annual CSCE Conference, June 7-10, London, Ontario
- Gidda, T., Stiver, W.H., and Zytner, R.G. 1999. Formulation of a Better Synthetic Gasoline for Use in SVE Experiments. ASCE-CSCE National Conference on Environmental Engineering, July 25-28, Norfolk, Virginia
- Gidda, T., Stiver, W.H., and Zytner, R.G. 1997. Volatilization Behaviour of Gasoline from Unsaturated Clay Loam Soil. Air & Waste Management Association's 90th Annual Meeting & Exhibition, June 8-13, Toronto, Ontario
- Gidda, T., Stiver, W.H., and Zytner, R.G. 1996. Passive Volatilization of Gasoline from Unsaturated Soil. Chapter 33, Contaminated Soils Volume 2. Chapter 33: 447-461

Published Reports:

- Gidda, T., Stiver, W.H., and Zytner, R.G. Gasoline Volatilization from Wet Soil. A Report submitted to Imperial Oil Limited, August 1997. 245 pages