Methodology Element Validation Report for Vessels Coal Gas, Inc.

Voluntary Carbon Standard 2007.1

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1 Introduction

This report is provided to Vessels Coal Gas, Inc. (Vessels Coal Gas) as a deliverable of the Voluntary Carbon Standard 2007.1 (VCS) second methodology assessment process for the proposed revisions to the Clean Development Mechanism (CDM) methodology ACM0008 (Version 6) – *Consolidated methodology for coal bed methane, coal mine methane and ventilation air methane capture and use for power (electrical or motive) and heat and/or destruction through flaring or flameless oxidation.* The proposed methodology element is titled *Revisions to ACM0008 to Include Methane Capture and Destruction from Abandoned Coal Mines*. This report provides a description of the steps involved in conducting the second validation assessment and summarizes the findings of the second validation assessment performed on the basis of the VCS 2007.1 and the VCS Program Normative Guidance Document: Double Approval Process, Version 1.0 (VCS Program Document). The first assessment of the Methodology Element was completed by Det Norske Veritas.

The Audit Team was provided Version 4 of the proposed Methodology Element on December 11, 2009. Based on this documentation, a document review and desktop audit took place, which resulted in Corrective Action and Clarification Requests (discussed later in this report) and revisions to the Methodology Element. The final version, dated February 22, 2010, serves as the basis of the final conclusions presented herewith.

1.1 Objective

The purpose of the methodology validation assessment is to have an independent third party assess the conformance of the proposed methodology revisions with VCS requirements.

1.2 Scope and Criteria

The validation assessment scope is defined as an independent and objective review of the proposed methodology revisions. The validation assessment is conducted using the Voluntary Carbon Standard 2007.1 and the VCS Program Normative Guidance Document: Double Approval Process, Version 1.0 as the criteria. Additionally, First Environment applies its professional judgment as informed by ISO 14064-2 and 14064-3 in assessing the proposed methodology revisions.

1.3 Assurance

First Environment, Inc. (First Environment) and Vessels Coal Gas have agreed that a reasonable level of assurance be applied to this assessment.

2 Methodology

The following validation process was used:

- conflict of interest review;
- selection of validation team;
- kick-off meeting with Vessels Coal Gas and WSP Environment & Energy;

- development of the validation plan;
- desktop review of the proposed Methodology Element and other relevant documentation;
- follow-up discussions with Vessels Coal Gas for supplemental information as needed;
- corrective action cycle; and
- validation report development.

The validation process was utilized to evaluate whether the proposed Methodology Element is consistent with VCS and the VCS Program Document. A validation conformance checklist was developed for the methodology that summarizes the criteria used to evaluate the Methodology Element, conformance with each criterion, and the Audit Team's validation findings.

Conflict of Interest Review

Prior to beginning any validation project, First Environment conducts an evaluation to identify any potential conflicts of interest associated with the project. No potential conflicts were found for this project.

Audit Team

First Environment's audit team consisted of the following individuals who were selected based on their validation experience, as well as familiarity with combustion processes and coal mine operations.

Michael Carim – Lead Auditor
Iris Caldwell – Auditor
Ellen Reid – Auditor
Jay Wintergreen – Internal Reviewer

Audit Kick-off

The validation process was initiated with a kick-off conference call on December 11, 2009 between First Environment and the primary Vessels Coal Gas contacts, Tom Vessels and Julian Huzyk, and WSP contact, Mike Huisenga. The communication focused on confirming the validation scope, objectives, criteria, schedule, and the information required for the validation assessment.

Development of the Validation Plan

Based on the information discussed during the kick-off conference call, the Audit Team formally documented its validation plan and provided the validation plan to Vessels Coal Gas.

Corrective Actions and Supplemental Information

The Audit Team issued requests for corrective action and clarification during the validation assessment process. The corrective action and clarification requests and the responses provided are summarized in Section 2.3.

Validation Reporting

Validation reporting, represented by this report for Vessels Coal Gas, documents the validation assessment process and identifies its findings and results.

2.1 Review of Documents

Eligibility requirements, baseline approach, additionality, project boundary, emissions, leakage, monitoring, data and parameters, and other pertinent criteria were assessed to evaluate the proposed Methodology Element against VCS program requirements. Discrepancies between the proposed methodology revisions and the validation criteria were considered material and identified for corrective action.

2.2 Follow-up Interviews

The Audit Team held teleconferences with the following individuals throughout the course of the methodology assessment:

- Tom Vessels – Vessels Coal Gas
- Julian Huzyk – Vessels Coal Gas
- Mike Huisenga – WSP Environment & Energy
- Eric Christensen – WSP Environment & Energy

2.3 Resolution of Any Material Discrepancy

As described above, the Audit Team requested corrective action, clarification, and supplemental information during the validation process. The corrective action and clarification requests and the responses are summarized in the tables below. As indicated, Vessels Coal Gas adequately resolved all of these requests.

Requests for Corrective Action and Clarification

ID	Corrective Action Request	Summary of Methodology Developer Response	Validation Conclusion
1	Please provide additional justification for the approach used to model baseline emissions from abandoned mines ($AMM_{i,y}$).	References to publications from the US EPA and IPCC, as well as research produced by the Australian mining consultant Lunagas Pty Limited, were provided to justify the use of hyperbolic decline curves to model emissions of AMM. Evidence provided adequately explains the approach and use of such models. Specifically, the methodology revision identifies two options for using a hyperbolic decline curve. In the first, a developer may use monitored emission rate data since time of mine closure to develop a decline curve. The emission rate data is plotted against time and an equation of the form specified is generated. In the second approach, the developer may use decline curve coefficients obtained from published, peer-reviewed sources if they are applicable to the project site.	Response is acceptable.

ID	Clarification Request	Summary of Methodology Developer Response	Validation Conclusion
1	Please provide further clarification on the definition of a partially flooded mine, including any thresholds that will be used to establish a mine's status. Given that all abandoned mines are flooded to some degree, please include clarification on how the methodology's applicability will be determined on a case-by-case basis.	The definition of a flooded mine was expanded in the final version of the Methodology Element. See also response to Clarification Request No. 2.	Response is acceptable.
2	Please clarify whether abandoned mines where dewatering would occur in the baseline scenario are eligible under the proposed methodological revision.	In the case of an abandoned mine project; proponents would not be allowed to pump water from a flooded mine prior to the project start date in order to increase the production of methane in the baseline. In other words, if a mine has been flooded since the mine closure date, then it is considered flooded in the baseline. If pumping has been ongoing since mine closure date in order to comply with environmental regulations or for other reasons, then the mine is considered un-flooded in the baseline.	Response is acceptable.

ID	Clarification Request	Summary of Methodology Developer Response	Validation Conclusion
		A second applicability condition was added to the Methodology Element to specifically address the Clarification Request.	
3	Please clarify why the proposed methodological revision includes the addition of the terms GAS_y and EF_{GAS} in Equation 26.	ACM0008 does not include a calculation procedure to estimate baseline emissions from destruction of natural gas in the gas grid displaced by injection of CBM/CMM in the project. The methodology does, however, provide a calculation for the emissions from methane destruction of gas injected into gas grids in the project (refer to MD_{GAS} in equation (3) of ACM0008). As an example, refer to $BE_{USE,y}$ in equation (11) which includes "supply to gas grid", then refer to equation (26) which does not include a term for gas supplied to gas grids. Conversely, equation (11) does not reference methane used as a vehicle fuel, but does provide a calculation procedure for such use in equation (26). These points are being made to support the argument that ACM0008 is intended to include gas grid injection in the baseline, but due to the poor assembly of the methodology, it currently doesn't.	Response is acceptable.

3 Assessment Findings

The methodology validation assessment includes evaluation of the proposed Methodology Element against specific VCS program requirements. A summary of the proposed revisions to ACM0008 and First Environment's assessment is provided below.

3.1 Eligibility Criteria

The ACM0008 (Version 6) methodology specifically limits eligibility to those project activities located at active coal mining operations. The proposed Methodology Element includes the addition of project activities at abandoned/decommissioned coal mines, with the exception of flooded abandoned mines. The proposed revisions to ACM0008 also include clear definitions of relevant terms–abandoned mine methane (AMM), flooded mine, and venting mine–to help assess project eligibility. Other eligibility criteria from ACM0008 (Version 6) remain largely unchanged, with the exception of minor revisions necessary to extend the methodology's applicability to abandoned/decommissioned mines.

The criteria identified provide a clear basis for determining the Methodology Element's applicability to potential project activities. Further, the exclusion of flooded mines, or those that

would have been drained in the baseline scenario precludes project activities that would create GHG emissions for the purpose of reducing them. On these bases, First Environment concluded that the revised eligibility requirements are appropriate and adequate.

3.2 Baseline Approach

The ACM0008 methodology describes a process for identifying the baseline scenario. The proposed methodology revisions include the addition of AMM when the other three types of mine methane are referenced (e.g., CMM/CBM/VAM/AMM), but otherwise leaves ACM0008's approach to baseline determination unchanged. Because they represent only minor, explicable changes to ACM0008, First Environment concluded that these revisions to the baseline approach were appropriate and adequate.

3.3 Additionality

No revisions were made to the process to evaluate additionality as described in ACM0008 (Version 6).

3.4 Project Boundary

Proposed revisions were made to Table 1 in ACM0008 to include AMM as well as clarify the inclusion of fugitive methane leaks from sealed vents, shafts, portals or gob wells, or from fractures in the overburden, and CO_2 from pipeline injection of gas (from combustion of the fuel) as baseline emissions sources.

First Environment concluded that the proposed revisions provided sufficient criteria to clarify the project boundary and that all relevant emission sources and GHGs are included.

3.5 Emissions

Baseline Emissions Quantification

The ACM0008 (Version 6) methodology quantifies baseline emissions from the destruction of methane, release of methane to the atmosphere, and production of energy (to be displaced by project activity) that would have occurred in the baseline scenario. The proposed Methodology Element specifically includes AMM that would have been destroyed or otherwise released to the atmosphere in the baseline scenario. The existing baseline emissions equations in ACM0008 (Version 6) were revised to include appropriate parameters for AMM. Specifically, the Methodology Element proposes amendments to Equations 12, 14, and 16 in the baseline calculation to include AMM among the possible options for mine methane extraction. The Methodology Element addresses potential sources of methane that are destroyed in the baseline scenario by including methane gas:

- recovered after the mining process by drainage from sealed goafs *and passageways* but before the mine is closed (revision in italics); and
- extracted from open or sealed vents, shafts, portals or gob wells at locations where active ventilation has ceased.

Procedures were incorporated into the Methodology Element for the ex-ante estimation of the quantity of AMM generated in the baseline scenario. The Methodology Element proposes using hyperbolic decline curves for the methane emission rate of abandoned/decommissioned mines through either site-specific sampling or published values from reputable sources. The Methodology Element provides adequate guidance on the selection of a hyperbolic decline curve and establishes criteria to assess whether chosen models are appropriate. Finally, the Methodology Element stipulates that this ex-ante estimation be compared to methane collected and metered in the project activity, and that the lesser of the two quantities of AMM be used for the purposes of emission reduction calculations. This requirement ensures a conservative estimation of baseline methane emissions.

The Methodology Element also proposes an amendment to Equation 25 in ACM0008 to incorporate the total amount of AMM captured in a given year. This revision extends the calculation of baseline energy demand under ACM0008 to include emissions from grid-delivered gas in the larger set of total potential baseline emissions from the displacement of power or heat production by the project activity. Additionally, the Methodology Element provides a procedure for determining the emission factor of the gas grid fuel displaced by the project activity. As the original methodology intends to account for baseline emissions from electricity production (in MWh) and heat production (in GJ), the inclusion of grid-delivered gas is appropriate.

All new and revised formulae and quantification methods were reviewed for accuracy and appropriateness. First Environment concluded that the approach to calculate baseline emissions is appropriate and adequate.

Project Emissions Quantification

No revisions were made to the quantification of project emissions as described in ACM0008 (Version 6).

Emission Reductions Quantification

No revisions were made to the quantification of emission reductions as described in ACM0008 (Version 6).

3.6 Leakage

No revisions were made to the methodology for quantifying leakage emissions as described in ACM0008 (Version 6).

3.7 Monitoring

In addition to the monitoring approach described in ACM0008 (Version 6), the proposed Methodology Element identify several new data and parameters to be monitored in relation to AMM and displacement of gas grid fuel. Monitoring requirements for new parameters are consistent with the norms and methods of other parameters in ACM0008 and also with best practices in GHG accounting. Additionally, the monitoring approach provided captures all parameters relevant to quantification of baseline and project emissions, given the proposed revisions to ACM0008. On these bases, First Environment determined that the monitoring

approach for the new data and parameters is appropriate and adequate to obtain the necessary data for emission reductions quantification.

3.8 Data and Parameters

The Methodology Element includes the addition of several new data and parameters–identified as either monitored or not monitored–related to the inclusion of AMM within scope of the methodology; other elements of the methodology's monitoring approach remain unchanged from ACM0008. First Environment reviewed the descriptions of the new data and parameters, including requirements for source of data, measurement procedures, monitoring frequencies, and use of default values. First Environment concluded that the new data and parameters and the associated requirements for measurement and monitoring are appropriate and sufficient to apply to all equations and reduce uncertainty in emission reduction calculations described in the revisions to ACM0008.

3.9 Adherence to the Project-Level Principles of the VCS Program

The proposed Methodology Element was developed in accordance with the requirements of VCS 2007.1 and adequately addresses the principles of relevance, completeness, consistency, accuracy, transparency, and conservativeness.

3.10 Comments by Stakeholders

In accordance with VCS requirements, a 30-day public stakeholder consultation was conducted from July 14, 2009 through August 13, 2009. The proposed Methodology Element received four sets of comments from stakeholders. Stakeholder comments were addressed during the first validation assessment, however, several of First Environment's corrective action and clarification requests raised questions similar in nature to those broached in the public consultation process. The responses provided to these corrective actions and clarifications were also sufficient to address stakeholder comments; so, First Environment is satisfied that all comments by stakeholders have been adequately addressed during the validation process.

4 Assessment Conclusion

First Environment performed the methodology validation assessment of the Methodology Element as part of the VCS double-approval process. First Environment used the Voluntary Carbon Standard 2007.1 and the VCS Program Normative Guidance Document: Double Approval Process, Version 1.0 as the assessment criteria and to guide the methodology validation assessment process.

The review of the proposed methodology and the satisfaction of corrective action and clarification requests have provided First Environment with sufficient evidence to determine the fulfillment of stated criteria.

The Methodology Element was prepared in accordance with the Voluntary Carbon Standard 2007.1 and the VCS Program Normative Guidance Document: Double Approval Process, Version 1.0. The proposed methodology belongs to VCS Sectoral Scope 8 – Mining and Mineral Production and Sectoral Scope 10 – Fugitive emissions from fuels (solid, oil and gas).

In summary, it is First Environment's opinion that the Methodology Element entitled *Revisions to ACM0008 to Include Methane Capture and Destruction from Abandoned Coal Mines* and dated February 22, 2010, meets all relevant VCS requirements.

The validation of the Project is based on the information made available to us and the engagement conditions detailed in this report. First Environment cannot guarantee the accuracy or correctness of this information. Hence, First Environment cannot be held liable by any party for decisions made or not made based on this report or opinion.

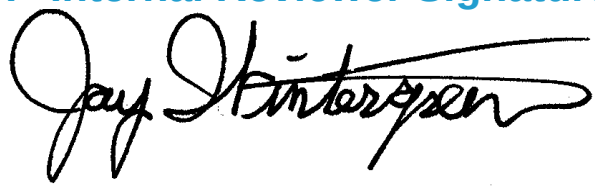
5 Eligibility Criteria For Validator

The requirements of Section 4.7.3 of the VCS Program Normative Document: Double Approval Process, Version 1.0 have been fulfilled by the first validator of the Methodology Element, Det Norske Veritas.

6 Lead Validator Signature

Michael M. Carim
Associate

7 Internal Reviewer Signature



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