Approved VCS Methodology Revision VMR0002

Version 1.0

"Revision to ACM0008 to Include Methane Capture and Destruction from Abandoned Coal Mines"

Sectoral Scopes 8 and 10

Background Information

This document identifies specific revisions to the UNFCCC approved consolidated methodology ACM0008 Version 6 issued 25 March 2009 titled "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 revisions provide text modifications to the methodology language to allow for inclusion of coal mine methane capture and destruction from abandoned coal mines in addition to a proposed calculation procedure for the determination of baseline emissions from venting and sealed abandoned coal mines. The revision document shows the proposed modifications in red text where they are applicable in ACM0008. This document doesn't provide a complete re-working of ACM0008; only the sections of ACM0008 relevant to the required modifications are shown.

I. SOURCE, DEFINITIONS AND APPLICABILITY

Definitions (page 2)

Revision: Add Definition

Abandoned Mine Methane (AMM). Methane extracted from open or sealed vents, shafts, portals or gob wells at locations where active ventilation has ceased.

Flooded Mine. A mine which has been flooded by surface or ground water and where active pumping is not taking place. Abandoned mines frequently fill with water from surrounding strata; the water impedes the escape of methane from the coal seam effectively trapping it. Flooded mines typically produce gas for only a few years.

Venting Mine. An adandoned coal mine where vents at shafts, portals or gob wells have not been completely or partially sealed.

Applicability (page 2)

Revision: Add AMM to applicability statements, but exclude flooded abandoned mines

This methodology applies to CMM, AMM and VAM capture, utilization and destruction project activities at ~~a~~ working and abandoned/decommissioned coal mines, where the baseline is the partial or total atmospheric release of the methane and the project activities include the following method to treat the gas captured:

- The methane is captured and destroyed through flaring; and/or
- The methane is captured and destroyed through flameless oxidation and/or
- The methane is captured and destroyed through utilization to produce electricity, motive power and/or thermal energy; emission reductions may or may not be claimed for displacing or avoiding energy from other sources;
- The remaining share of the methane, to be diluted for safety reason, may still be vented;
- All the CBM, AMM or CMM captured by the project should either be used or destroyed, and cannot be vented, with the exception of methane in dilute concentrations vented with other exhaust gases from the processing of methane to remove unwanted gas constituents.

Project participants must be able to supply the necessary data for *ex ante* projections of methane demand as described in sections Baseline Emissions and Leakage to use this methodology, and data for *ex ante* projection of emissions of methane from abandoned mines, if applicable.

The methodology applies to both new, ~~and~~ existing mining, and post-mining activities.

The methodology **does <u>not</u> apply** to project activities with any of the following features:

- Operate in open cast mines;
- ~~Capture methane from abandoned/decommissioned coalmines;~~
- Capture methane from abandoned/decommissioned coalmines that are flooded in the baseline;
- Begin pumping water from the mine in order to increase the production of methane when pumping had not been occurring historically in the baseline following mine abandonment, unless pumping is mandated to comply with environmental regulations or for other reasons;
- Capture/use of virgin coal bed methane, e.g. methane of high quality extracted from coal seams independently of any mining activities;
- Use CO2 or any other fluid/gas to enhance CBM drainage before mining takes place.

II. BASELINE METHODOLOGY PROCEDURE

Project Boundary (page 4)

Revision: Amend table 1 so that AMM is not excluded

	Source	Gas		Justification/ Explanation
Baseline Emissions	Emissions of methane as a result of venting and/or fugitive leaks from sealed vents, shafts portals or gob wells or from fractures in the overburden	CH_4	Included	• Main emission source. However, certain sources of methane may not be included, as noted in the applicability conditions; • Recovery of methane from coal seams will be taken into account only when the particular seams are mined through or disturbed by the mining activity; ~~• Recovery of methane from abandoned coalmines will not be included;~~ • The amount of methane to be released depends on the amount used (for local consumption, gas sales, etc) in the baseline.
	Captive power and/or heat, ~~and~~ vehicle fuel use, and injection into gas grids	CO2	Included	• Only when the baseline scenario involves such usage
		CH4	Excluded	• Excluded for simplification. This is conservative.
		N2O	Excluded	• Excluded for simplification. This is conservative.

Identification of the Baseline Scenario (page 5, 6, 7, 13, 14, 15, 16, 17)

Revision: There are numerous references to CMM/CBM/VAM and CMM or CBM or VAM, for example, in the descriptive text on these pages. This text is altered to include AMM, e.g. CMM/CBM/VAM/AMM.

Baseline Emissions (page 12)

Revision: Remove AMM exclusion from baseline

Methane destruction in the baseline

Depending on the nature of the activities in the baseline scenario, CBM/CMM can be removed at five different stages – (1) as coal bed methane from a CBM to goaf wells prior to mining, or from underground pre-mining CMM drainage; (2) during the mining process using surface or underground post mining CMM drainage techniques, (3) during the mining process using ventilation air, ~~or~~ (4) after the mining process by drainage from sealed goafs and passageways but before the mine is closed or (5) extracted from open or sealed vents, shafts, portals or gob wells at locations where active ventilation has ceased.

Baseline Emissions (page 13)

Revision: Add AMM to Baseline methane destruction calculation

$$BE_{MDy} = (CEF_{CH4} + r \times CEF_{NMHC}) \times \sum_i \left(CBM_{BL,i,y} + VAM_{BL,i,y} + CMM_{BL,i,y} + PMM_{BL,i,y} + AMM_{BL,i,y} \right) \quad \textbf{(12)}$$

Where:

BE_{MDy}	= Baseline emissions from destruction of methane in the baseline scenario in year *y* (tCO_2e)
i	= Use of methane (flaring, power generation, heat generation, supply to gas grid to various combustion end uses)
$CBM_{BL,i,y}$	= CBM that would have been captured, sent to and destroyed by use *i* in the baseline scenario in the year *y* (expressed in tCH_4)
$VAM_{BL,i,y}$	= VAM that would have been captured, sent to and destroyed by use *i* in the baseline scenario in the year *y* (expressed in tCH_4)
$CMM_{BL,i,y}$	= Pre-mining CMM that would have been captured, sent to and destroyed by use *i* in the baseline scenario in year *y* (expressed in tCH_4)
$PMM_{BL,i,y}$	= Post-mining CMM that would have been captured, sent to and destroyed by use *i* in the baseline scenario in year *y* (tCH_4)
$AMM_{BL,i,y}$	= AMM that would have been captured, sent to and destroyed by use *i* in the baseline scenario in year *y* (tCH_4)
CEF_{CH4}	= Carbon emission factor for combusted methane (2.75 tCO_2e/tCH_4)
CEF_{NMHC}	= Carbon emission factor for combusted non methane hydrocarbons. This parameter should be obtained through periodical analysis of captured methane ($tCO_2eq/tNMHC$)
r	= Relative proportion of NMHC compared to methane

Calculation of the mean annual demand (Thy) for each year of the crediting period (p. 13)

Revision: Include AMM in calculation of mean thermal demand in baseline

$$\left(VAM_{BL,th,y} + CBM_{BL,th,y} + CMM_{BL,th,y} + PMM_{BL,th,y} + AMM_{BL,th,y} \right) = \sum_{k=1}^{365} TH_{BL,k} \quad \textbf{(14)}$$

Where:

$VAM_{BL,th,y}$	= VAM that would have been captured and destroyed by thermal demand in the baseline scenario (tCH_4)
$CBM_{BL,th,y}$	= CBM that would have been captured and destroyed by thermal demand in the baseline scenario (tCH_4)
$CMM_{BL,th,y}$	= Pre-mining CMM that would have been captured and destroyed by thermal demand in the baseline scenario (tCH_4)
$PMM_{BL,th,y}$	= Post-mining CMM that would have been captured and destroyed by thermal demand in the baseline scenario (tCH_4)
$AMM_{BL,th,y}$	= AMM that would have been captured and destroyed by thermal demand in the baseline scenario (tCH_4)
th	= Index for thermal use of CBM, VAM, CMM and PMM in the baseline, which includes on-site heat generation and supply to the gas grid for various combustion end uses
$TH_{BL,k}$	= Methane used to serve estimated thermal energy demand in the baseline for day k of year y (tCH_4)

Methane released into the atmosphere (page 17)

Revision: Remove restriction of applicability of AMM; Include AMM in baseline methane release calculation

Depending on the nature of the project activity, CBM/VAM/CMM/AMM can be removed at five different stages – (1) as coal bed methane from a CBM wells prior to mining, or from underground pre-mining CMM drainage; (2) during the mining process using surface or underground post mining CMM drainage techniques; (3) during the mining process using ventilation air~~, or~~ (4) after the mining process by drainage from sealed goafs and passageways but before the mine is closed or (5) extracted from open or sealed vents, shafts, portals or gob wells at locations where active ventilation has ceased This methane would have been emitted to the atmosphere in the baseline scenario, unless some capture and use activities form part of the baseline:

$$BE_{MRy} = GWP_{CH4} \times \left[\sum_i \left(CBMe_{i,y} - CBM_{BLi,y}\right) + \sum_i \left(CMM_{PJi,y} - CMM_{BLi,y}\right) + \sum_i \left(PMM_{PJi,y} - PMM_{BLi,y}\right) + iVAMPJi,y{-}VAMBLi,y{+}iAMMi,y{-}AMMBLi,y \right. \quad \textbf{(16)}$$

Where:

BE_{MRy}	= Baseline emissions from release of methane into the atmosphere in year *y* that is avoided by the project activity (tCO_2e)
i	= Use of methane (flaring, power generation, heat generation, supply to gas grid to various combustion end uses)
$CBMe_{i,y}$	= Eligible CBM captured, sent to and destroyed by use i in the project for year *y* (expressed in tCH_4)
$CBM_{BLi,y}$	= CBM that would have been captured, sent to and destroyed by use *i* in the baseline scenario in the year *y* (expressed in tCH_4)
$CMM_{PJi,y}$	= Pre-mining CMM captured, sent to and destroyed by use *i* in the project activity in year *y* (expressed in tCH_4)
$CMM_{BLi,y}$	= Pre-mining CMM that would have been captured, sent to and destroyed by use *i* in the baseline scenario in year *y* (expressed in tCH_4)
$PMM_{PJi,y}$	= Post-mining CMM captured, sent to and destroyed by use *i* in the project activity in year *y* (tCH_4)
$PMM_{BLi,y}$	= Post-mining CMM that would have been captured, sent to and destroyed by use *i* in the baseline scenario in year *y* (tCH_4)
$VAM_{PJi,y}$	= VAM sent to and destroyed by use *i* in the project activity in year *y* (tCH_4). In the case of flameless oxidation, $VAM_{PJ,i,y}$ is equivalent to MD_{OX} defined previously
$VAM_{BLi,y}$	= VAM that would have been captured, sent to and destroyed by use *i* in the baseline scenario in year *y* (tCH_4)
$AMM_{i,y}$	= AMM sent to and destroyed by use *i* that would have been released to the atmosphere in the absence of the project in year *y* (expressed in tCH4).
$AMM_{BLi,y}$	= AMM that would have been captured, sent to and destroyed by use *i* in the baseline scenario in year *y* (expressed in tCH_4)
GWP_{CH4}	= Global warming potential of methane (21 tCO_2e/tCH_4)

Baseline Emissions (page 22)

Revision: Insert AMMy calculation procedure following "***Pre-mining and post-mining CMM extraction and VAM";*** adjust equation numbers accordingly for the remainder of the document.

Emissions of methane from venting and sealed abandoned mines

The approach to determine the quantity of methane which would be released to the atmosphere by an abandoned mine in year *y* is detailed below. The following data parameters are required to estimate the emission rate of an abandoned mine over time:

1. Date of mine closure or decommissioning
2. Methane emissions at time of mine closure in cubic meters of CH_4 per day (m^3/d) at normal conditions of temperature and pressure
3. Current mine status (venting/sealed/flooded)
4. The percentage of sealing, if the mine is sealed

Step 1: Determine the hyperbolic emission rate decline curve coefficients

The emissions rate of an abandoned mine through time can be described by a hyperbolic emission rate decline curve and this function is directly related to the unique physical parameters of the coal mine. If measured emission flow rates are available as per the requirements listed under option A, then option A is the preferred approach. If measured data is not available then coefficients taken from a coal basin or coal rank specific model should be used.

Option A:

Derive hyperbolic emission rate decline curve coefficients using measured data.

To use this methodology, an emission rate at mine closure must be available through published sources (i.e. MSHA, EPA). After mine closure, two parameters must be monitored: local barometric pressure and mine methane emission flow rates corrected for temperature and pressure.

If the project begins operation within one year of the date of mine closure, these parameters should be monitored on an hourly or more frequent basis for the full duration of time between mine closure and project operation. If the project begins operations after one year past the date of mine closure, these parameters should be monitored for at least three periods spaced at least 4 months apart, each period having duration of at least 72 hours. The parameters should be monitored on an hourly or more frequent basis during those periods.

The monitored data should be used to develop a correlation between barometric pressure and methane emission flow rate. Annual average barometric pressure at the site should then be used to estimate the annual average emission flow rate. This flow rate should then be plotted against the time since mine closure in years in order to derive the hyperbolic emission rate decline curves by fitting the data to a curve in the form of equation 25 below.

Note that this approach will only quantify the emissions of methane from measureable leakage sources such as sealed vents and portals and will fail to quantify emissions of methane from fractures in the overburden. Therefore, this is likely to underestimate the real baseline emissions of methane but allows for a conservative estimate of the project’s emission reductions.

Option B:

Obtain hyperbolic decline curve coefficients from published data sources such as information used during the development of the national greenhouse gas inventory for the project's country of origin. Project developers are required to use coal basin specific decline curves, unless there is only one representative coal basin in a particular country. In this case, a country specific decline curve is sufficient.

Step 2: Calculate ex ante projection of emissions of methane from abandoned mines using the coefficients determined in step 2

If the mine is sealed, estimate the ratio of the sealed mine flow rate to that of a fully venting mine using equation 24. If the mine is unsealed and fully venting, the user should set S equal to 1 and proceed to equation 25.

$$S = \frac{V_{AMM,is}}{V_{AMM,i}} \qquad \textbf{(24)}$$

Where:

S	= The ratio of fully venting flow for a sealed mine
$V_{AMM,is}$	= Initial emissions of methane from abandoned mine at time t_o (after sealing)
$V_{AMM,i}$	= Emission rate at abandonment prior to sealing

The *ex ante* projection of emissions of methane from venting and sealed abandoned mines can be calculated using the following equation:

$$AMM_{DC,y} = V_{AMM,i} \cdot D_{CH4,corr} \cdot 365 \cdot S \cdot (1 + b \cdot D_i \cdot t)^{\left(\frac{-1}{b}\right)} \qquad \textbf{(25)}$$

Where:

AMM_{DCy}	= Emissions of methane from the decline curve of the abandoned mine in year *y* measured (expressed in tCH_4)
V_{AMMi}	= Emissions of methane prior to mine closure at time (t_o) in normal cubic meters per day (m^3/d)
$D_{CH4,corr}$	= Density of methane at normal conditions of temperature and pressure (0.67 kg CH_4/m^3)
b	= The dimensionless hyperbolic exponent
D_i	= The initial decline rate, (1/yr)
t	= The time elapsed from the date of mine closure to midpoint of the current crediting year *y* in years, expressed as a decimal and not rounded to an integer.
S	= sealed mine fully venting flow ratio (S < 1 for sealed mines; S = 1 for venting mines)

Step 3: Determine the appropriate value for AMM_y.

On an annual basis, the *ex ante* projected mass of methane emissions calculated using the decline curve is compared to the mass of methane captured by the project activity. The lesser of these two annual masses will be used to calculate the baseline emissions of AMM, as shown in the following equation:

$$AMM_y = \min\left(\textstyle\sum_i AMM_{PJ,i,y}, AMM_{DC,y}\right) \qquad \textbf{(26)}$$

Where:

$AMM_{PJ,i,y}$	= AMM captured by use *i* of the project activity in year *y* (tCH4)

Using the minimum of these values is conservative, and ensures that AMM_y never is greater than either the emissions projected using a decline curve or the amount of methane captured by the project activity.

Emissions from power/heat generation and vehicle fuel replaced by project (page 23)

Revision: Add abandoned mine methane to definition of ED_{CPMMy}

ED_{CPMMy} = Emissions from displacement of end uses by use of coal mine methane, VAM, ~~and~~ post-mining methane, and AMM (tCO_2)

Revision: Add $AMM_{PJ,y}$ to calculation of total methane captured.

$$CBMM_{tot,y} = CBM_{w,y} + CBM_{z,y} + CBM_{x,y} + CMM_{PJ,y} + PMM_{PJ,y} + VAM_{PJ,y} + AMM_{PJ,y} \quad \textbf{(28)}$$

Where:

$CBMM_{tot,y}$	= Total CBM, CMM, ~~and~~ VAM, and AMM captured and utilized by the project activity (tCH_4)
$CBM_{w,.y}$	= CBM captured from wells where the mining area intersected the zone of influence in year *y* (tCH_4)
$CBM_{z,.y}$	= CBM captured from wells where the mining area intersected the zone of influence prior to year *y* (tCH_4)
$CBM_{x,.y}$	= CBM captured from wells where the mining area has not yet intersected the zone of influence in year *y* (tCH_4)
$CMM_{PJ,i,y}$	= Pre-mining CMM captured by the project activity in year *y* (tCH_4)
$PMM_{PJ,y}$	= Post-mining CMM captured by the project activity in year *y* (tCH_4)
$VAM_{PJ,y}$	= VAM captured by the project activity year *y* (tCH_4)
$AMM_{PJ,y}$	= AMM captured by the project activity in year *y* (tCH_4)

Revision: Add emissions calculation for gas delivered to gas grid since MWh or GJ of electricity or heat displaced by pipeline gas cannot easily be determined. This is consistent with how ACM0008 calculates project emissions from pipelined gas.

$$PBE_{Use,y} = GEN_{,y} \times EF_{ELEC} + HEAT_y \times EF_{HEAT} + VFUEL_y \times EF_v + GAS_y \times EF_{GAS} \quad \textbf{(29)}$$

Where:

$PBE_{Use,y}$	= Potential total baseline emissions from the production of power or heat replaced by the project activity in year *y* (tCO_2e)
GEN_y	= Electricity generated by project activity in year *y* (MWh), including through the use of CBM
EF_{ELEC}	= Emissions factor of electricity (grid, captive or a combination) replaced by project (tCO_2/MWh)
$HEAT_y$	= Heat generation by project activity in year *y* (GJ), including through the use of CBM
EF_{HEAT}	= Emissions factor for heat production replaced by project activity (tCO_2/GJ)
$VFUEL_y$	= Vehicle fuel provided by the project activity in year *y* (GJ), including through the use of CBM
EF_V	= Emissions factor for vehicle operation replaced by project activity (tCO_2/GJ)
GAS_y	= Gas delivered to the gas grid in year *y* (GJ), including through the use of CBM
EF_{GAS}	= Emissions factor for gas delivered to gas grid and combusted (tCO_2e/GJ)

Revision: Add $AMM_{PJ,y}$ to calculation of displaced emissions by end uses of coal mine methane; add AMM to definition.

$$ED_{CPMM,y} = \frac{CMM_{PJ,y} + PMM_{PJ,y} + VAM_{PJ,y} + AMM_{PJ,y}}{CBMM_{tot,y}} \times PBE_{Use,y} \quad \textbf{(31)}$$

Where:

$ED_{CPMM,y}$	= Emissions from displacement of end uses by use of coal mine methane, ~~and~~ post-mining methane, and abandoned mine methane (tCO_2e)
$CMM_{PJ,y}$	= Pre-mining CMM captured by the project activity in year *y* (tCH_4)
$PMM_{PJ,y}$	= Post-mining CMM captured by the project activity in year *y* (tCH_4)
$VAM_{PJ,y}$	= VAM captured by the project activity in year *y* (tCH_4)
$AMM_{PJ,y}$	= AMM captured by the project activity in year *y* (tCH_4)
$CBMM_{tot,y}$	= Total CBM CMM AMM and VAM captured and utilized by the project activity in year *y* (tCH_4)
$PBE_{Use,y}$	= Potential total baseline emissions from the production of power or heat replaced by the project activity in year *y* (tCO_2e)

Emissions from power/heat generation and vehicle fuel replaced by project (page 26)

Revision: Add calculation of emissions factor for gas delivered to the gas grid after calculation for vehicle fuel emission factor.

Gas grid fuel displacement emissions factor

The emissions occurring in the baseline from the use of gas grid fuel which the project activity displaces are calculated as follows:

$$EF_{gas} = EF_{CO2,i} \cdot Eff_{gas-grid} \cdot \frac{44}{12} \cdot \frac{1TJ}{1000GJ} \quad \textbf{(37)}$$

Where:

EF_{gas}	= Emissions factor for gas grid fuel (tCO_2e/GJ)
$EF_{CO2,i}$	= CO2 emissions factor for displaced gas grid fuel (tC/TJ)
$Eff_{gas-grid}$	= the efficiency of transporting, delivering grid gas fuel to end users, IPCC default value of (taken as 99% from IPCC)
44/12	= Carbon to Carbon Dioxide conversion factor
1/1000	= TJ to GJ conversion factor

Data and parameters not monitored (page 30)

Revision: Add new data and parameters introduced in this methodology revision

Data / Parameter	$V_{AMM,is}$
Data unit:	m^3/d
Description	Initial emissions of methane from abandoned mine at time t_o (after sealing).
Source of data:	Public mining records
Measurement procedures (if any):	
Monitoring frequency:	Estimated *ex ante* at start of project
QA/QC procedures	
Any comment	

Data / Parameter	$V_{AMM,i}$
Data unit:	m^3/d
Description	Emission rate at abandonment prior to sealing. This can be determined by the last measured emission rate or (preferably) an average of several measurements taken when the mine was active.
Source of data:	Public mining records
Measurement procedures (if any):	
Monitoring frequency:	Estimated *ex ante* at start of project
QA/QC procedures	
Any comment	

Data / Parameter	$AMM_{BL,i,y}$
Data unit:	tCH_4
Description	AMM that would have been captured, used and destroyed by use *i* in the baseline scenario in year *y*
Source of data:	
Measurement procedures (if any):	
Monitoring frequency:	Estimated *ex ante* at start of project
QA/QC procedures	
Any comment	

Data / Parameter	B
Data unit:	Dimensionless
Description	Dimensionless hyperbolic exponent describing decline rate of AMM emissions
Source of data:	Derived from available mine data parameters or obtained from published sources
Measurement procedures (if any):	
Monitoring frequency:	Estimated *ex ante* at start of project
QA/QC procedures	
Any comment	

Data / Parameter	Di
Data unit:	1/yr
Description	The initial decline rate of decline curve describing AMM emissions in the baseline
Source of data:	Derived from available mine data parameters or obtained from published sources
Measurement procedures (if any):	
Monitoring frequency:	Estimated *ex ante* at start of project
QA/QC procedures	
Any comment	

Data / Parameter	T
Data unit:	Yr
Description	The time elapsed from the date of mine closure to the current crediting year *y* in years
Source of data:	Public mining records
Measurement procedures (if any):	
Monitoring frequency:	Calculated at the end of each crediting period
QA/QC procedures	
Any comment	

Data / Parameter	$Eff_{gas\text{-}grid}$
Data unit:	%
Description	Efficiency of transporting natural gas through the gas grid to end users
Source of data:	
Measurement procedures (if any):	
Monitoring frequency:	*Ex ante*
QA/QC procedures	
Any comment	Set at 99.0%

III Monitoring Methodology

Revision: There are numerous references to CMM/CBM/VAM and CMM or CBM or VAM, for example, in the descriptive text on these pages. This text is altered to include AMM, e.g. CMM/CBM/VAM/AMM.

Data and parameters monitored (page 34)

Revision: Add and revise data and parameters introduced by this methodology revision

Data / Parameter	$AMM_{PJ,i,y}$
Data unit:	tCH_4
Description	Abandoned mine methane captured, sent to and destroyed by use *i* in the project activity in year *y*
Source of data:	
Measurement procedures (if any):	
Monitoring frequency:	Continuous
QA/QC procedures	
Any comment	

Data / Parameter	GAS_y
Data unit:	GJ
Description	Gas delivered to gas grid in year y
Source of data:	
Measurement procedures (if any):	
Monitoring frequency:	Continuous
QA/QC procedures	
Any comment	

Data / Parameter	$EF_{CO2,i}$
Data unit:	tC/TJ
Description	CO2 emission factor of fuel used for captive power or heat, or delivered to gas grid
Source of data:	
Measurement procedures (if any):	
Monitoring frequency:	Annually or *ex ante*
QA/QC procedures	
Any comment	National sources or IPCC defaults

Document History

Version	Date of Issue	Comment
1.0	13 May 2010	Initial version, developed by Vessels Coal Gas, Inc., was assigned version 7 for development purposes and assessed as version 7 for reference in the first and second assessment reports. It has been redesignated version 1 for the purposes of finalization and approval by the VCSA.