Revisions to ACM0008 to Include Pre-drainage of Methane from an Active Open Cast Mine as a Methane Emission Reduction Activity

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Introduction

This document specifies revisions to the UNFCCC-approved consolidated methodology ACM0008 Version 5 "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 purpose of this document is to specify where in ACM0008 revisions need to be made and provides recommended revisions that would allow the recognition of the pre-drainage of methane that would have been emitted from an open cast mining operation. The numbering and headings follow ACM0008.

I. SOURCE, DEFINITIONS AND APPLICABILITY (page 1)

Definitions (page 1)

Recommended Revision: Add the following definition

Open cast mine face. That area of an open cast (surface excavation mine) coal mine that has been exposed to the atmosphere through the removal of overburden and coal.

Applicability (page 2)

Recommended Revision:

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

- Capture methane from abandoned/decommissioned coalmines;
- Capture/use of virgin coal bed methane, e.g. methane of high quality extracted from coal seams independently of any mining activities;
- Use CO_2 or any other fluid/gas to enhance CBM drainage before mining takes place.

II. BASELINE METHODOLOGY PROCEDURE (page 3)

Identification of the baseline scenario (page 5)

Step 1: Identify technically feasible options for capturing and/or using CBM or CMM or VAM (page 5)

Recommended Revision:

Step 1a: Options for CBM and CMM or VAM extraction (page 5)

The baseline scenario alternatives should include all possible options that are technically feasible to handle CBM and CMM or VAM to comply with safety regulations. These options could include:

A. Pre mining CMM extraction including CBM to open cast mine face drainage, CBM to Goaf drainage and/or Indirect CBM to Goaf only;
B. Post mining CMM extraction;
C. Possible combinations of options A, B and C with the relative shares of gas specified. These options should include the CDM project activity not implemented as a CDM project.

Baseline Emissions (page 13)

Methane destruction in the baseline (page 14)

Recommended Revision:

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 but before the mine is closed or (5) as coal bed methane from a CBM to open cast mine face.

Eligible CBM (page 19)

The approach to quantify the eligible CBM is to identify the zone of influence of CBM wells, and when these are impacted by mining activities.

Step 1: Identify relevant wells (page 19)

Step 2: Estimation of the Zone of Influence of a CBM Well and eligible methane (page 20)
Area of Overlap (page 21)

Recommended Revision:
This methodology estimates the overlap between a cylindrical gas drainage zone around a production well with the zone of disturbance around (1) a longwall panel, from which gas is emitted into the mine or (2) an open cast mine face from which gas is emitted to the atmosphere.
There are two approaches to calculate the zone of influence of a CBM well. One is the existing method to calculate the zone of influence of a CBM well (1 above). The second builds upon approach 1 and is described below.

Use the current approach in ACM0008 until the well produces elevated amounts of atmospheric gases (usually nitrogen concentrations that are at least 5 percent above baseline levels). Standard well operating procedures ensure that the elevated amounts of atmospheric gases are not due to leakage around the well bores.

The mining operation has entered the zone of influence of a CBM well when that well begins to produce atmospheric gases (as defined above). A calculated area of overlap may also be used to determine when and to what extent mining operations intersect the zone of influence of a CBM well. This will be dependent upon site specific parameters that are used to determine the overlap based on current ACM0008 methods. The area of overlap will be considered to be 100% when mining operations require that a CBM well be shut in (closed) or abandoned, or, in the case of an open cast mine, overburden stripping operations require the well to be abandoned.

Recommended Revision:
Once the zone of influence for a well in a given year overlaps the longwall panel or the open cast mine face to be mined, then the gas from the well is considered to be eligible CBM. To estimate portion of CBM that would have been released from mining activities, a geometric approach in the horizontal plane and the vertical plane is used where the area of overlap between the defined zones of influence for each well and the longwall panel or the opencast mine face to be mined ("*Area of Overlap*") is used as well as the de-stressing zone above and below the seam to be mined.

Horizontal plane: The ratio of the Area of Overlap to the total area of the zones of influence of the wells considered is calculated and used to identify the appropriate share of gas counted as eligible CBM. The equations for this are:

$$ES_h = \frac{\sum_w AO_w}{\sum_w AT_w}$$ EQ 20

Where:
ES_h = Eligible share of CBM based on the horizontal plane overlap (%)
$AO\ w$ = Area of overlap of well w with the longwall mining panel or open cast mine face (m^2)
$AT\ w$ = Total zone of influence of well w (m^2)
w = CBM wells with zones of influence that overlap with mining activity

Note that for CBM wells which will be physically intersected by mining or have been suspended or abandoned because of the ingress of atmospheric gases from the mine face, ultimately makes it unsuitable for the specific project, or surface mining activities (e.g., excavation of overburden, drilling and blasting, mining of the coal), ES_h is unity by definition. In other words, all of the CBM drained from this type of well is eligible, unless there is gas coming from seams beyond the de-stressing zone.

Recommended Revision:
Vertical plane:

A. For an underground mine, the de-stressing zone typically extends upwards 140 m and downwards 40 metres. If cased boreholes are used and the seams are fractured within the de-stressing zone, then all the gas entering the CBM well is gas that would have appeared as methane in ventilation air and CMM during and after mining. If other seams outside of the de-stressed zone are fractured, then this gas must be excluded from the eligible CBM.
B. For an open cast mine the de-stressing zone includes all strata above the mined coal seam and up to 40 meters below the mined seam. If cased boreholes are used and the seams are fractured within the de-stressing zone, then all the gas entering the CBM well is gas that would have been emitted as methane at the open cast mine face. If other seams outside of the de-stressed zone are fractured, then this gas must be excluded from the eligible CBM.

The eligible share is defined as follows:

ES t_v = t / T

Where:
$_vES$ = Eligible share of CBM based on the vertical plane overlap (%)
t = Thickness of coal which lies within the longwall or open cast mine face emission zone (m)
T = Total thickness of coal that is producing gas in the production well (m)

CO_2 emissions from use or destruction of CBM (page 22)

Recommended Revision:
Note that while only the eligible CBM should be accounted to calculate the volume of methane emissions avoided by the project, the totality of the CO_2 resulting from the use or the destruction of all the CBM extracted should be accounted as project emissions. Note that once a CBM well has been mined through underground, then the well acts in the same manner as conventional underground post mining CMM drainage (surface goaf well) and therefore all of the methane that is drained through this type of well is eligible, irrespective of whether the well is drilled offcentre to the longwall panel and some of the area of influence is outside the area of the longwall panel.

CBM drainage from outside the de-stressed zone (page 29)

Recommended Revision:
Surface CBM drainage wells can in some cases drain gas from seams that are outside the de-stressed zone for 140m specified in this methodology, or could extract from an area larger than the circular zone of influence used in this methodology. The vertical leakage would only occur if the surface wells were not cased. Similarly, if there is surface CBM extraction in the baseline, then the gas drawn from other seams would be the same in the baseline and project scenario. Therefore, in cases where:

(1) Surface boreholes drilled in the project activity are not cased;
(2) There are no surface boreholes for CBM draining present in the baseline scenario. Project participants should discount the total emissions reductions achieved. The amount of discount should be based on:

Option 1: A comparison of *ex ante* engineering estimates of CBM production from surface boreholes versus actual project activity CBM production;
Option 2: A standard discount factor of 10%

III. MONITORING METHODOLOGY (page 34)

Recommended Revision: (page 34)
All data collected as part of monitoring should be archived electronically and be kept at least for 2 years after the end of the last crediting period. 100% of the data should be monitored if not indicated otherwise in the tables below. All measurements should be conducted with calibrated measurement equipment according to relevant industry standards.

Recommended Revision: (page 46)

Data / parameter	t
Data unit	m
Description	Total thickness of coal in longwall or open cast mine face emission zone
Source of data	
Measurement procedures (if any)	
Monitoring Frequency	At start of each crediting period
QA/QC procedures	
Any comment	From geology report and drilling records

Recommended Revision: (page 47)

Data / parameter	AO_w
Data unit	m^2
Description	Area of overlap with longwall panel or open cast mine face
Source of data	
Measurement procedures (if any)	
Monitoring Frequency	Annually
QA/QC procedures	
Any comment	