Revised Monitoring Plan

Duerping Coal Mine Methane Utilization Project

Reference

UNFCCC CDM Project No. 1900

Version 0.1

8 June 2009

Issue & revision record

Doc. No	Date	Drafted By	Checked By	Approved By
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B.7 Application of the monitoring methodology and description of the monitoring plan:

B.7.1 Data and parameters monitored:

Data / Parameter:	**PEy**
Data unit:	tCO2eq
Description:	Project emissions in period y
Source of data to be used:	Calculated from sum of emissions from combustion of methane and emissions of un-combusted methane
Value of data applied for the purpose of calculating expected emission reductions in section B.5	2.75 t CO2 per tonne of methane combusted plus 0.005 t CO2 per tonne of methane burnt in from un-combusted methane
Description of measurement methods and procedures to be applied:	See PEmd and PEum below
QA/QC procedures to be applied:	Calculations will be performed by spreadsheet which will be audited periodically and protected from being over-written or altered by unauthorized personnel. Data will be backed up and archived in two different locations, where it will be archived for the crediting period +2 years. Actual project emissions will be compared with predicted project emissions at the prevailing generation capacity as a logic check.
Any comment:	No comment

Data / Parameter:	**PEme**
Data unit:	tCO2
Description:	Project emissions from energy use to capture and use methane
Source of data to be used:	n/a
Value of data applied for the purpose of calculating expected emission reductions in section B.5	n/a
Description of measurement methods and procedures to be applied:	n/a
QA/QC procedures to be applied:	n/a
Any comment:	No additional energy is used. Capture and removal of methane is the business as usual scenario.

Data / Parameter:	PEmd
Data unit:	tCO2
Description:	Project emissions from destruction of methane
Source of data to be used:	Calculated from volume of methane at normal temperature and pressure combusted by generators and flares multiplied by 2.75.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Ex ante volume of methane consumed is in Nm3, therefore no conversion is necessary before applying the density. For the ex ante prediction no conversion for NTP is required, but ex post, temperature and pressure will be recorded and the volume adjusted to NTP using the gas law P1V1/T1=P2V2/T2
Description of measurement methods and procedures to be applied:	Volume of pure methane destroyed is calculated from volume and concentration measurements taken every 30 seconds at the inlet to the generators and flare. See MDelec and MDfl below
QA/QC procedures to be applied:	Calculations will be performed by spreadsheet (every 12 hours and aggregated monthly) which will be audited periodically and protected from being over-written or altered by unauthorized personnel. Data will be backed up and archived in two different locations, where it will be archived for the crediting period + 2 years. The volume of methane destroyed will be cross checked by correlation with gross power output from the generators.
Any comment:	No comment

Data / Parameter:	PEum
Data unit:	tCO2e
Description:	Un-combusted methane emitted from the generators, flare
Source of data to be used:	Calculated from mass of methane burnt in generators, flare
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Default efficiency is 99.5%, therefore un-combusted methane from generators is 0.005 * PEmd Default efficiency for flares is 90%, therefore un-combusted methane from flare is 0,1*PEmd.
Description of measurement methods and procedures to be applied:	See PEmd above
QA/QC procedures to be applied:	Calculations will be performed by spreadsheet (every 12 hours) and aggregated monthly) which will be audited periodically and protected from being over-written or altered by unauthorized personnel. Data will be backed up and archived in two different locations, where it will be archived for the crediting period + 2 years. Application of a constant so no measurement necessary
Any comment:	No comment

Data / Parameter:	**MDelec**
Data unit:	tCH4
Description:	Methane destroyed by power generators
Source of data to be used:	Calculated from the flow at the inlet to the generators and methane concentration at the manifold to the generators.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Based on specifications of generators which consume 6.75 Nm3 of pure methane per minute, density 0.00067 t/m3 at NTP for an average of 7000 hours per year, each 1.7 MW generator will consume 1331.42 tonnes of methane per year, of which 0.5% (10 tonnes) will be emitted un-combusted.
Description of measurement methods and procedures to be applied:	See MMelec and PC CH4
QA/QC procedures to be applied:	Monthly Calculations will be performed by spreadsheet which will be audited periodically and protected from being over-written or altered by unauthorized personnel. Data will be backed up and archived in two different locations, where it will be stored for crediting period + 2 years. The volume of methane destroyed will be correlated with gross power output from the generators.
Any comment:	

Data / Parameter:	**MMelec**
Data unit:	tCH4
Description:	Methane sent to power plant
Source of data to be used:	Measured by a flow meter on the inlet to each generator. Measurements will be taken continuously and logged at nominal 30 second intervals.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Based on generator specifications of 6.75 Nm3 of pure methane per minute (equivalent to 270 NM3/h per MW)
Description of measurement methods and procedures to be applied:	Flow meter at the inlet of each generator (differential pressure, turbine or flow meter) multiplied with density of methane under normal conditions. Density of methane under normal conditions of temperature and pressure is 0.67 kg/M3 (Revised 1996 IPCC Reference Manual p.1.24 and 1.16).
QA/QC procedures to be applied:	Data will be backed up and archived in two different locations, where it will be stored for crediting period + 2 years. Flow meters will be calibrated and monitored according to the manufacturer's specifications.
Any comment:	Density of methane under normal conditions of temperature and pressure is 0.67kg/m3 (Revised 1996 IPCC Reference Manual p 1.24 and 1.16).

Data / Parameter:	Effelec
Data unit:	%
Description:	Efficiency of combustion of methane in power generators
Source of data to be used:	Default taken from methodology
Value of data applied for the purpose of calculating expected emission reductions in section B.5	99.5% (IPCC)
Description of measurement methods and procedures to be applied:	N/A
QA/QC procedures to be applied:	This figure will be built into a spreadsheet for calculating emissions. The spreadsheet will be archived periodically and stored in two locations. Access to this figure will be controlled. This is a constant so no measurement uncertainty
Any comment:	No comment

Data / Parameter:	CEF-nmhc
Data unit:	tCO2 / tNMHC
Description:	Carbon emission factor for combusted non-methane hydrocarbons.
Source of data to be used:	If necessary, the value for specific non-methane hydrocarbons will be determined by stoichiometric calculation.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Not applicable at this stage because the sum of all non-methane hydrocarbons in gas samples is less than 1% and therefore can be ignored. (See results of gas analysis in Appendix 2)
Description of measurement methods and procedures to be applied:	Derived using measurements described in PCnmhc
QA/QC procedures to be applied:	n/a
Any comment:	No comment

Data / Parameter:	PC CH4
Data unit:	%
Description:	Percentage of pure methane (wet basis) in drained gas (by volume)
Source of data to be used:	Methanometer at the manifold to the generator
Value of data applied for the purpose of calculating expected emission reductions in section B.5	This figure is not used in the ex ante calculations however, in order for the generators to operate, the methane concentration must be above 30%.

Description of measurement methods and procedures to be applied:	Methane concentration will be measured by proprietary infra red instrumentation mounted in the gas pipework at the gas treatment units. Accuracy of analysis +/- 2.5%FSD. Measurements will be taken continuously and logged at nominal 30 second intervals.
QA/QC procedures to be applied:	Data will be backed up and archived in two different locations, where it will be stored for the crediting period + 2 years. Methanometers will be calibrated and monitored according to the manufacturer's specifications.
Any comment:	No comment

Data / Parameter:	**PCnmhc**
Data unit:	%
Description:	Percentage of non-methane hydrocarbons in coal mine gas
Source of data to be used:	Will be determined from annual tests of samples of coal mine methane
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Not applicable at this stage because the sum of all non-methane hydrocarbons in gas samples is less than 1% and therefore can be ignored.
Description of measurement methods and procedures to be applied:	Annually, samples of gas will be extracted into gas sampling bottles using the appropriate procedures and analyzed by an qualified laboratory, for example, TES Bretby in the UK or an equivalent qualified laboratory in China.
QA/QC procedures to be applied:	A minimum of 3 samples will be collected in secure gas sample vessels, suitable for storage and transport to the selected laboratory. Samples will be taken in accordance with protocol procedures in the CDM monitoring manual and analyzed in a qualified laboratory. If one or more samples are found to be faulty (i.e. leaked) replacement samples will be taken. Scanned copies of the analyses will be backed up and archived in two different locations, where they will be stored for the longer of two years longer than the crediting period or two years after the last issuance of CERs.
Any comment:	No comment

Data / Parameter:	**r**
Data unit:	%
Description:	Relative proportion of NMHC compared to methane
Source of data to be used:	Calculated from PC nmhc / PC CH4
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Not applicable at this stage because the sum of all non-methane hydrocarbons in gas samples is less than 1% and therefore can be ignored.
Description of measurement methods	See PC nmhc and PC CH4

and procedures to be applied:	
QA/QC procedures to be applied:	This figure will be built into a spreadsheet for calculating emissions. The spreadsheet will be archived periodically and stored in two locations. Access to this figure will be controlled.
Any comment:	No comment

Data / Parameter:	**GENy**
Data unit:	MWh
Description:	Electricity generated by the project,
Source of data to be used:	Net power is calculated from the difference between gross power from all the generators (positive active power) and the power consumption by the project (negative active power).
Value of data applied for the purpose of calculating expected emission reductions in section B.5	In year 1, it is anticipated that a total of 5.1 MW of power generation capacity will be installed. In year two this will increase to 10.2 and in year 3 onwards, 12 MW Assuming uptime of 7000 hours per year, this will equate to an estimated power generation of: 35,700 MWh in year 1 71,400 MWh in year 2; and 83,300 MWh in year 3 onwards
Description of measurement methods and procedures to be applied:	Positive active power (gross power) and negative active power (power consumed by the project) are both measured continuously with a single power meter located at the link from the generators to the power grid. Net power is calculated from the difference of these two readings.
QA/QC procedures to be applied:	Calculations will be performed by spreadsheet which will be audited periodically and protected from being over-written or altered by unauthorized personnel. Data will be backed up and archived in two different locations, where it will be stored for the longer of two years longer than the crediting period or two years after the last issuance of CERs. The power meter will be approved by the local power company and calibrated and monitored in accordance with their instructions.
Any comment:	No comment

Data / Parameter:	**BEy**
Data unit:	tCO2
Description:	Baseline emissions in year y
Source of data to be used:	Equals $BE_{mr,y} + BE_{use,y}+BE_{MD,y}$. $BE_{MD,y}=0$. See below
Value of data applied for the purpose of calculating expected emission reductions in section B.5	See BEmr,y, $BE_{use,y}$ below
Description of	See BEmr,y, $BE_{use,y}$ below

measurement methods and procedures to be applied:	
QA/QC procedures to be applied:	See BEmr,y, $BE_{use,y}$ below
Any comment:	No comment

Data / Parameter:	**BEmr,y**
Data unit:	tCO2e
Description:	Baseline emissions from the release of methane to the atmosphere in year y that is avoided by the project activity.
Source of data to be used:	MDelec
Value of data applied for the purpose of calculating expected emission reductions in section B.5	See MDelec above
Description of measurement methods and procedures to be applied:	See MDelec above
QA/QC procedures to be applied:	See MDelec above
Any comment:	No comment

Data / Parameter:	**BEuse,y (=PBEuse,y)**
Data unit:	tCO2e
Description:	(Potential) baseline emissions from the production of power, heat or supply to the gas grid replaced by the project activity in year y.
Source of data to be used:	Calculated yearly (formula 5 in section B.6.1.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Data for Year 1: 42,001, Year 2: 78,781, Year 3 and onwards: 91,041
Description of measurement methods and procedures to be applied:	See GENy, Heaty,
QA/QC procedures to be applied:	See GENy, Heaty,
Any comment:	

Data / Parameter:	**HEATy**
Data unit:	GJ
Description:	Heat generation by project.
Source of data to be used:	Measurement of flow rate on the oil heating circuit and the oil temperatures on the outward and returning heating pipes
Value of data applied for the purpose of calculating expected emission reductions in section B.5	55.188 GJ per year
Description of measurement methods and procedures to be applied:	Waste heat will be transferred from the generators to the mines ventilation, heater and building by way of closed circuit heat transfer system. The circuits will be fitted with constant flow pumps, thermocouples in the flow and return pipes and flow meter. Actual heat transferred will be determined by measuring the flow, inlet and return temperatures and logging the data. Measurements will be taken continuously and logged at nominal 30 second intervals.
QA/QC procedures to be applied:	Temperature and flow rate data will be used to calculate heat supplied and this will be fed into a data logger for determination of heat supply. Measurement equipment will be calibrated and monitored in accordance with manufacturer instructions.
Any comment:	No comment

Data / Parameter:	**T**
Data unit:	Kelvin
Description:	Temperature of CMM
Source of data to be used:	Temperature sensor on gas pipework between the treatment unit and the generators
Value of data applied for the purpose of calculating expected emission reductions in section B.5	293
Description of measurement methods and procedures to be applied:	Thermocouple or similar suitable device
QA/QC procedures to be applied:	Calibrated and monitored as per manufacturers' instructions. Logging of data and storage for 2 years after crediting lifetime.
Any comment:	No comment

Data / Parameter:	**$CONS_{ELEC-PJ}$**
Data unit:	MWh
Description:	Additional power consumption by project activity
Source of data to be used:	N/A, since the project activity does not use any additional power when compared to the baseline
Value of data applied for the purpose of	Zero

calculating expected emission reductions in section B.5	
Description of measurement methods and procedures to be applied:	N/A
QA/QC procedures to be applied:	N/A
Any comment:	No comment

Data / Parameter:	**EFF_{HEAT}**
Data unit:	Percentage
Description:	Efficiency of heat conversion in the baseline (boiler efficiency)
Source of data to be used:	ACM0008 ver 3
Value of data applied for the purpose of calculating expected emission reductions in section B.5	100 %
Description of measurement methods and procedures to be applied:	N/A. The approved methodology provides two different options. Option B is selected whereby the boilers are assumed to convert 100% of the heat value of the coal into heat for the mine air. This is a conservative assumption because no data on efficiency of conversion is available.
QA/QC procedures to be applied:	None
Any comment:	No comment

Data / Parameter:	**MM_i**
Data unit:	tCH4
Description:	Methane measured sent to use i
Source of data to be used:	ACM0008 ver 3
Value of data applied for the purpose of calculating expected emission reductions in section B.5	100 %
Description of measurement methods and procedures to be applied:	Flow meters will electronically record gas volumes, pressure and temperature. Data will be stored for the crediting period + 2 years.
QA/QC procedures to be applied:	None
Any comment:	No comment

Data / Parameter:	**MM_{FL}**
Data unit:	tCH_4
Description:	Methane sent to flare(s)
Source of data to be used:	Measured continuously using flow meters and CH_4 levels on the inlet to the flares. Flow, temperature and absolute pressure will be recorded and the volume normalized as per Flaring tool.
Value of data applied for the purpose of calculating expected emission reductions in section B.6.3	N/A
Description of measurement methods and procedures to be applied:	Pressure, temperature, CH_4 concentration and flow meters with differential pressure measurement function will be used to determine the amount of methane sent to the flares. Mass of methane sent to the flares is determined taking into account the density of methane under normal conditions of temperature and pressure. Density of methane under normal conditions of temperature and pressure is 0.67 kg/m3 (revised 1996 IPCC Reference manual p.1.24 and 1.16).
QA/QC procedures to be applied:	Data will be backed up and archived in two different locations, where it will be stored for a period of two years after the crediting period or two years after the last issuance of CERs.
Any comment:	-

Data / Parameter:	**MD_{FL}**
Data unit:	tCH_4
Description:	Methane destroyed by flare(s)
Source of data to be used:	Calculated from MM_{FL} and $\eta_{flare,h}$
Value of data applied for the purpose of calculating expected emission reductions in section B.6.3	N/A.
Description of measurement methods and procedures to be applied:	Calculations will be performed by spreadsheet (at least monthly) which will be audited periodically and protected from being over-written or altered by unauthorized personnel. Data will be backed up and archived in two different locations, where it will be stored for the longer of two years longer than the crediting period or two years after the last issuance of CERs.
QA/QC procedures to be applied:	Data will be backed up and archived in two different locations, where it will be stored for a period of two years after the crediting period or two years after the last issuance of CERs.
Any comment:	-

Data / Parameter:	$FV_{RG,h}$
Data unit:	m3/h
Description:	volumetric flow rate of the residual gas at normal conditions in the hour h (residual gas to flare)
Source of data to be used:	Measured using a flow meter.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	N/A
Description of measurement methods and procedures to be applied:	Ensure that the same basis is considered for this measurement and the measurement of the volumetric fraction of CH4 in the residual gas when the residual gas temperature exceeds 60 °C. Measurements will be taken continuously and logged at nominal 30 second intervals.
QA/QC procedures to be applied:	Flow meters are to be periodically calibrated according to the manufacturer's recommendation.
Any comment:	No comment

Data / Parameter:	$fv_{i,h}$
Data unit:	-
Description:	Volumetric fraction of component *i* in the residual gas in the hour *h* where *i* = CH4 (simplified approach will be applied: remaining part is considered as N2).
Source of data to be used:	Measurements by project participants using a continuous gas analyzer
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Measured by infrared analyzer in dry conditions after water is removed for sampling. The same basis (dry) will be considered the measurement of the volumetric flow rate of the residual gas (FVRG,h) and $fv_{i,h}$ when the residual gas temperature exceeds 60 ºC
Description of measurement methods and procedures to be applied:	Continuously. Values to be averaged hourly time interval
QA/QC procedures to be applied:	Analyzers must be periodically calibrated according to the manufacturer's recommendation. A zero check and a typical value check should be performed by comparison with a standard certified gas.
Any comment:	As a simplified approach, project participants may only measure the Methane content of the residual gas and consider the remaining part as N2.

Data / Parameter:	*fv CH 4,RG,h*
Data unit:	-
Description:	volumetric fraction of methane in the residual gas on dry basis in the hour *h*
Source of data to be used:	Measured by project participants using a continuous gas analyzer
Value of data applied for the purpose of calculating expected emission reductions in section B.5	50%
Description of measurement methods and procedures to be applied:	Measured by infrared analyzer in dry conditions after water is removed for sampling.
QA/QC procedures to be applied:	Analyzers must be periodically calibrates according to the manufacturer's recommendation. A zero check and a typical value check should be performed by comparison with a standard certified gas.
Any comment:	As a simplified approach, project participants may only measure the methane content of the residual gas and consider the remaining part as N2.

Data / Parameter:	T_{flare}
Data unit:	℃
Description:	Temperature of the flue gas of the flare
Source of data to be used:	Temperature thermocouple
Value of data applied for the purpose of calculating expected emission reductions in section B.5	N/A
Description of measurement methods and procedures to be applied:	Monitored continuously by a Type N thermocouple. A temperature above 500 Degree indicates that a significant amount of gases are being burnt and that the flares is operating.
QA/QC procedures to be applied:	Data will be backed up and archived where it will be stored for the longer of two years longer than the crediting period or two years after the last issuance of CERs. Thermocouple will be calibrated according to the manufacturer's specifications.
Any comment:	N/A

Data / Parameter:	$\eta_{flare,h}$
Data unit:	%
Description:	Flare efficiency in hour *h*
Source of data to be used:	IPCC default value as per "Tool to determine project emissions from flaring gases containing methane."
Value of data applied for the purpose of calculating expected emission reductions in section B.6.3	90%
Description of measurement methods and procedures to be applied:	$\eta_{flare,h}$ cannot be directly monitored. Therefore, the parameter T_{flare} is instead monitored in order to measure the flare combustion efficiency (refer to the "Tool to determine project emissions from flaring gases containing methane").
QA/QC procedures to be applied:	Data will be backed up and archived in two different locations, where it will be stored for a period of two years after the crediting period or two years after the last issuance of CERs. Thermocouples should be replaced or calibrated every year.
Any comment:	N/A

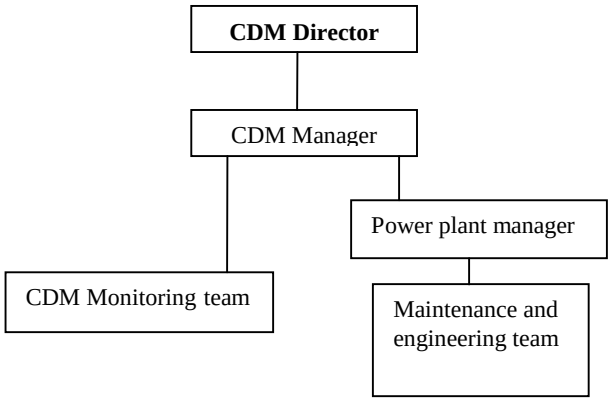
Data / Parameter:	*Manufacturer's specifications*
Data unit:	-
Description:	The flare operation in normal conditions defined by the flare manufacturer specifications provided by Nanjing Shunfen-Pioneer (flow rate 300-5000m3/h and flame temp from 500 – 1350 °C).
Source of data to be used:	Commissioning reports, certificates and approval notices provided by manufacturers or suppliers
Value of data applied for the purpose of calculating expected emission reductions in section B.5	n/a
Description of measurement methods and procedures to be applied:	Periodic checking, monitoring or calibration of equipment according to the manufacturers specifications
QA/QC procedures to be applied:	Implementation of maintenance and calibrations schedules, with results (e.g. calibration certificates) to be stored for the longer of two years longer than the crediting period or two years after the last issuance of CERs.
Any comment:	n/a

B.7.2 Description of the monitoring plan:

A monitoring plan will be implemented to ensure that the approved monitoring methodology ACM0008 version 03 is correctly implemented in order to enable the accurate and transparent determination of avoided emissions. The plan will incorporate the QA/QC procedures described in 7.1 above.

Scope: This procedure covers the project activity described in the CDM project entitled Duerping Coal Mine Methane Project.

Duerping CDM Management Structure



Responsibility and CDM management: A CDM manager will be appointed with responsibility for monitoring all Project related activities and organizing training. The CDM Project Manager is responsible for overseeing the implementation of this procedure. Competency requirements for the position of Project Manager will be defined and applied to ensure that the Project Manager is able to implement this procedure.

All calculations will be checked and signed off by the CDM monitoring manager who will also be responsible for preparing and checking documents required for verification.

A CDM monitoring team will report directly to the monitoring manager and who will have day to day responsibilities for checking instrumentation, record keeping, data handling and data processing, filing, reporting, organising repair and maintenance of monitoring equipment and ensuring the monitoring plan is adhered to as indicated in the approved PDD. The monitoring staff will receive technical training and refresher training as well as safety training to minimise exposure to workplace hazards. At least one fully trained technical member of the monitoring team will be present on every shift.

Operational staff with existing responsibilities for gas monitoring at the extraction plant will receive additional training and will collaborate with the monitoring staff. A management level link will be established to ensure effective co-operation between mine staff and CDM monitoring staff.

All relevant information, notes of meetings, data files, maintenance records, defect reports, hard copy and computerized records of monitoring will be kept at a designated location and arranged in an orderly and transparent manner to facilitate audit as and when required.

Responsibilities, procedures, methods, equipment types and specifications are described in detail in a site-specific CDM monitoring manual.

On-line monitoring system: All key meters required to determine GHG emissions and emission reductions will be monitored from a central control point which will record meter readings at a pre-determined interval as specified in the CDM monitoring manual. These data will be used to continually update total emission reductions as long as the generating plants are in operation.

Key meters will measure parameters MMelec (volume of methane sent to generators), MM_{FL} (methane sent to flare), PC CH4 (percentage methane by volume), temperature and pressure of the CMM at the flow meter and GENy (electricity generated in year y) and heat transferred to the shaft air heater. Annual measurements of PCnmhc will also be undertaken.

Calculation of avoided emissions:
The data required for calculating baseline and project emissions will be fed into a processor (spreadsheet or logarithm application) which will calculate the emission reductions according to the formulae described above, using the defined default values. Access to the computer program will be controlled for security. The process will include various checks, such as a comparison of total methane consumed against total power generated and will be regularly audited to ensure it is operating correctly.

Non essential data
The on-line monitoring system will also record “non-essential” data. Such data is termed non-essential because it is not directly listed in the CDM Monitoring Methodology, but it will constitute a means of corroborating the on-line system. Non-essential data will include measurements of net and gross output from individual generators, certificated conversion efficiency, data from extraction plant, flow rate up-stream of the vacuum pumps (can also be compared with name plate capacity of pumps, pump(s) operational and service history) and methane concentration in CMM at other points of the CMM system. Any subsequent CDM and non CDM utilization/destruction additions to the gas supply circuit will be monitored.

Accuracy and calibration of instruments
All meters will be purchased and maintained as specified in the CDM monitoring manual to achieve an accuracy of $\pm$5% methane mass flows. All key meters will be subject to a quality control regime that will include regular maintenance and calibration. A record will be maintained showing the location and unique identification number of each meter, the calibration status of that meter (when last calibrated, when next due for calibration) and who performs the calibration service. Evidence of calibration will be retained for all meters until two years after the end of the crediting period.

Mass flow of methane supplied to the engines will be corroborated by comparison with the sum of the gross engine power outputs, the relationship being a function of engine efficiency which can be considered a constant under the proposed maintenance regime

Archiving of data
The on-line system will automatically archive data to a secure and retrievable storage format on a periodic e.g. weekly basis. Calibration records will be archived in an accessible electronic format.
These data will be stored until 2 years after the end of the crediting period.

Document Control
The Project Manager will implement a document control system that ensures that the current versions of necessary documents are available at the point of use.

Preparation of monitoring report
The archived / live data will be used to prepare a periodic monitoring report to be submitted to the CDM EB for verification and issuance of CERs. A standard format for the monitoring report will be prepared and prior to the submission of the first monitoring report.

Manual data recording system
The Site Manager will implement a manual data recording system to act as a back-up for the on-line system. This will involve completion of a weekly log sheet. These log sheets will act as a back-up for mass volume combusted and a means of estimating other essential data in the event of a prolonged failure of the on-line system. Prolonged failure will constitute more than 24 hours (cumulative) without on-line monitoring.

Treatment of missing or corrupted data
Where data in the on-line system are corrupted or missing and no secondary data are available whilst the generators or the flare are operating (as shown, for example, by electricity output or positive flow) the missing data can be estimated by taking the value for the parameter in question in the hour before the error arose. More detailed information on missing or corrupt data is will be included in a site specific Monitoring Manual. If there is evidence to suggest that this value is un-representative, the average from the previous 24 hours will be used or if not possible zero will be used.

The error will be recorded in the daily log sheet and the occurrence of the error will be investigated and rectified as soon as possible. If the on-line system is compromised for more than 24 hours, data will be manually recorded.

Any deficiencies in methane flow monitoring data will be rectified by back calculation from power generation data.

Audit function and management review
The Project Manager will arrange for an audit of the management system periodically and at least once per year. The auditor will not be involved in the daily operation of the mine and if necessary, may be sourced from a third party. The auditor will assess the implementation of the monitoring procedure and the preparation of the monitoring report. Audit findings, and steps taken to address findings will be recorded and reviewed in a Management Review meeting (convened at least annually) at which time the effectiveness of these procedures will be reviewed and necessary changes implemented.

Annex 4
MONITORING INFORMATION

Monitoring will be undertaken as outlined in Section B7.2 and the operational details are described in a CDM monitoring manual specifically developed for the project and which will be made available to the validator.

The locations of methane flow monitoring to the CMM utilization plant are shown in the schematic below. Monitoring of the waste heat supply from the engines to the shaft heater has been excluded from the diagram for clarity. Phase 1 will only cover 3 engines (see section B.4).