CDM Monitoring Report

UNFCCC Registration Number: 2130

METHANE RECOVERY IN WASTEWATER TREATMENT PROJECT AIN07-W-04, SUMATERA UTARA, INDONESIA

Monitoring Period: 16 January 2009 – 28 February 2010

Document ID: MR01-AIN07-W-04, V.6
Date: 22 November 2010

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Sections

Section A General Project Information

A.1 Project information

UNFCCC Registration Number:	2130
Project Title:	Methane recovery in wastewater treatment project AIN07-W-04, Sumatera Utara, Indonesia
Crediting Period:	16 January 2009 – 15 January 2016 (renewable)
Methodology/Version:	AMS-III.H / Version 7
UNFCCC Registration Date:	16 January 2009
Report Number/Version/Date:	MR01-AIN07-W-04 / V6.0 / 22 November 2010
Monitoring Reporting Period:	16 January 2009 – 28 February 2010

Parties involved:	• Indonesia (NA1 Host Country) • Netherlands (Annex 1 Party)
Project participants:	• PT AES AgriVerde Indonesia • AES AgriVerde Ltd.

A.2 Project emission reduction history

The following table lists the monitoring reports associated with and emission reductions achieved by this project activity.

Report	Dates		ERs	Verifying DOE
	From	To		
MR01-AIN07-W-04	16 Jan 2009	28 Feb 2010	6,480	SIRIM QAS

A.3 Brief description of project activity

Project location : PT Victorindo Alam Lestari
Village : Huta Lombang
Sub-District : Lubuk Barumun
District : Padang Lawas
Province : North Sumatera
Country : Indonesia
GPS Coordinate : N1.08367 – E099.46227

The project activity will capture and combust methane gas produced from the anaerobic portion of an existing wastewater treatment system in Sumatera Utara, Indonesia. The project activity utilizes a simple, effective and reliable technology to capture lagoon-produced biogas: installing sealed covers over existing anaerobic POME lagoons to create an anaerobic digester system. POME will continue to flow from the anaerobic treatment section to other lagoons and/or land application so that the effluent discharge requirements can be met. The captured biogas will be

routed to one or more high temperature, enclosed flares to destroy methane gas as it is produced. Digester sludge will continue to be handled as in the past: it is occasionally pumped into drying beds and is used as fertilizer for oil palm trees.

The mill has the option to use the captured methane for renewable energy, however no CER is claimed for this activity and it is not considered part of the project activity.

A.4 Status of project implementation and operation

A.4.1 Technology

This project technology includes the installation of an anaerobic digester and gas collection and combustion system. Technology installed is as described in the PDD.

A.4.2 Project equipment

The methane recovery and flaring components of the project activity have been implemented. Two lagoons were covered and two flares were installed for each lagoon to sufficiently combust the methane. Each system is effectively named system 1 and system 2 throughout this crediting period. During this crediting period due to unforeseen biological outage, only one system is operational.

Construction of the digesters and methane recovery system was completed and operational on 19 June 2008.

The mill has the option to utilize the methane captured for renewable energy; however, this renewable energy component was not implemented during this monitoring period.

A.4.3 Monitoring and metering equipment

This project monitoring and metering equipment includes the installation of a gas meter, temperature sensing device, and data capture system. Equipment is installed as described in the PDD.

Section B Monitoring systems and procedures including quality assurance and quality control measures applied

B.1 Monitoring systems overview

Flare and Biogas Monitoring System

The monitoring system (referred to as the data logger) captures and stores readings from the mass flow meters and thermocouples from the flare system. These readings are transmitted to a centralized data storage location. The data from each flare system will be monitored by the Operations, Maintenance & Monitoring (OMM) department to ensure the flare system is functioning properly.

Diagrams of flare combustion systems and monitoring system are shown in Figure 1.

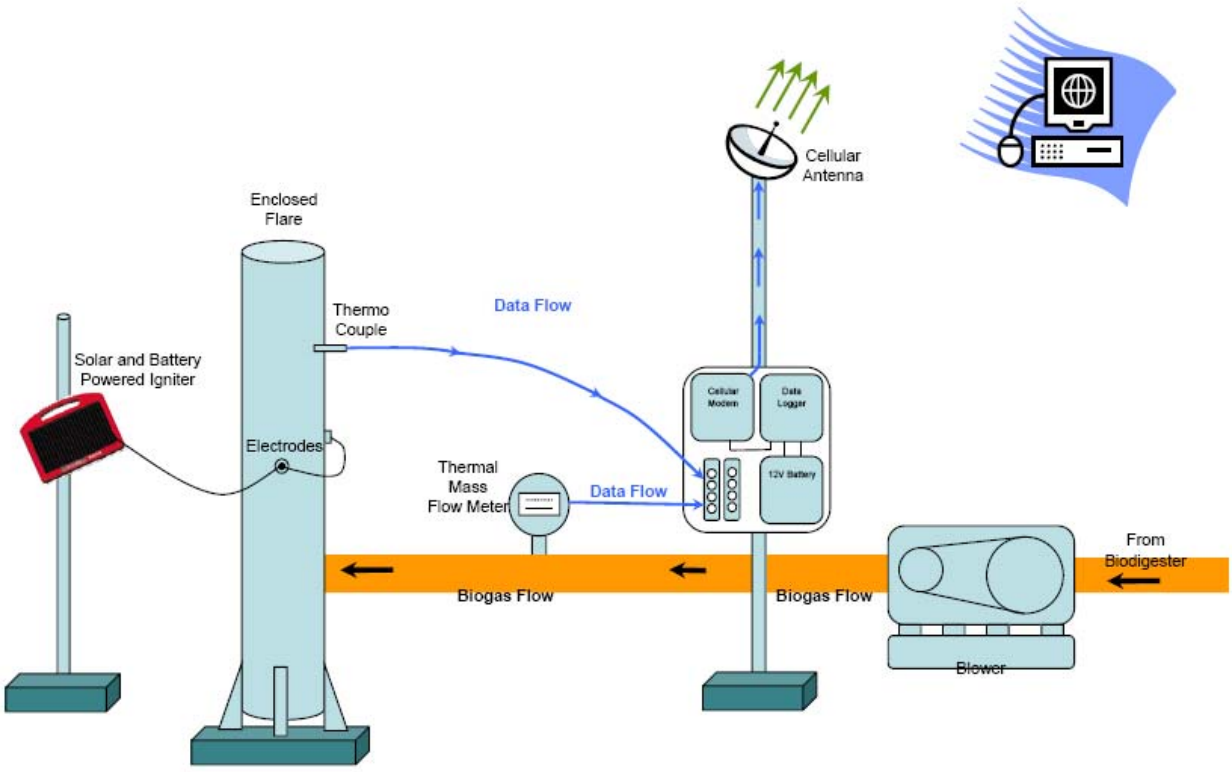

Figure 1. Diagram of Flare with Remote Monitoring System

B.2 Monitoring procedures

Monitoring system and monitoring manual has been developed to ensure accurate data capture during operation.

Field monitoring data is being collected by Regional Maintenance Technician, mill employee and by third party (accredited lab) and once the data has been collected; it is then sent directly to the main office for data integrity check, a joint effort by CDM Services Manager as the coordinator and by Operation: Science and Technology department. Once monitoring data has been thoroughly checked, the data is then uploaded to online storage system for safekeeping.

Detailed step by step procedure can be found in the monitoring manual

Diagrams monitoring data capture and transfer systems are shown in Figure 2.

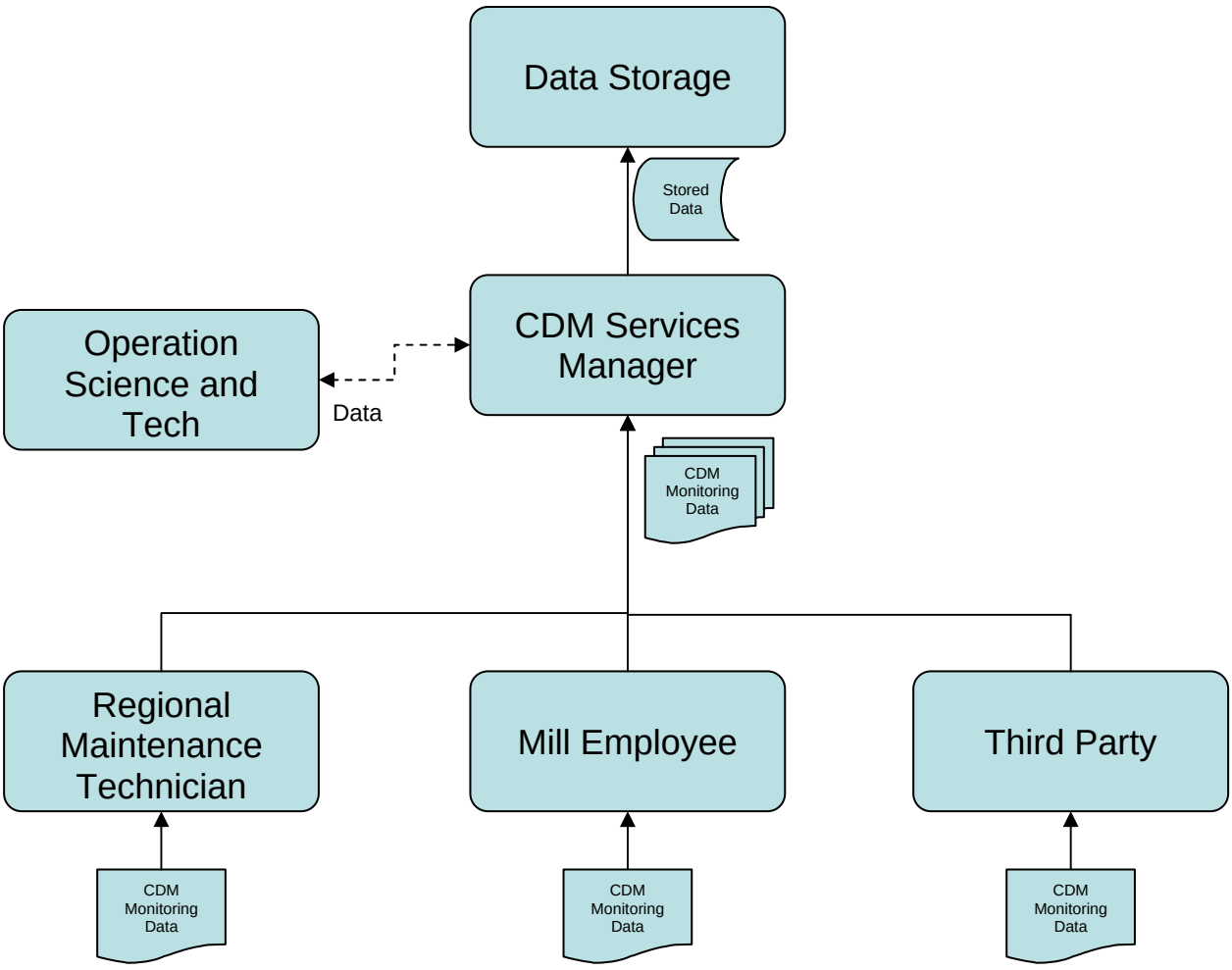

Figure 2. Diagram of monitoring data capture and transfer system

B.3 *The monitoring data for this project are monitored by the Operations, Maintenance & Monitoring (OMM) department with the following procedures based on the monitored parameters:* QA/QC measures applied

B.3.1 QA/QC roles and responsibilities

Complete work instructions and QA/QC roles and responsibilities are listed in Annex 4 of the PDD. Below is a summary of QA/QC responsibilities and documentation applied for the monitored parameters:

Parameter	Documentation	Performed by	QA/QC check performed by:
Volume of wastewater treated ($Q_{y,ww}$)	3rd party lab result	3rd party	3rd party
COD of wastewater entering the digester ($COD_{y,ww,untreated}$)	3rd party lab result	3rd party	3rd party
COD of treated wastewater ($COD_{y,ww,treated}$)	3rd party lab result	3rd party	3rd party
Biogas captured and flared (BGP_{flare})	Quarterly Monitoring Report (Electronic)	RMT	QA, OP
Biogas methane content (MC_{biogas})	Quarterly Monitoring Report (Electronic)	RMT	QA, OP
Flare combustion operation (CFE_{ww})	Paper/electronic from mill records	ME, RMT	QA, OP
Electricity generated by biomass ($EG_{Biomass}$)	Paper/electronic from mill records	ME, RMT	QA,OP
Electricity generated by diesel (EG_{Diesel})	Paper/electronic from mill records	ME, RMT	QA,OP
Electricity consumed by project ($EC_{project}$)	Equipment specification	RMT	QA,OP
End use of final sludge ($S_{f, end\ use}$)	Paper/electronic from mill record	ME, RMT	QA,OP
Processed fresh fruit bunch	Paper/electronic from mill record	ME, RMT	QA, OP

ME- Mill employee, RMT - Regional maintenance technician; QA - quality assurance; OP - operations

B.3.2 Training of operations and monitoring personnel

Below are all relevant trainings associated with the project

Training	Purpose	Description
Waste Water Treatment System	Normal Operation	Basic waste water treatment porcess, anaerobic treatment process & trouble shooting
PDD	Project Process Flow Reporting Procedure Monitoring Procedure Personnel Orientation	1) Monitoring parameters & requirements 2) Data logger manual for 1 flare system 3) Monitoring requirement - regulatory & biology
First Aid Training Level two	First Aid training	1) CPR practical 2) Simulation 3) AED demonstration 4) Fracture, Head and Spinal Injury Management system
Safety Presentation	Safety Video on Fatal 2006 Oilfield Explossion in Missippi	1) Electrical Safety 2) Hand and Power Tool 3) Safety & Awareness
First Aid Training Level two	First Aid training	1) CPR practical 2) Simulation 3) AED demonstration 4) Fracture, Head and Spinal Injury Management system
Defensive Driving Program	Safety and Security Training	2 Days Vehicle Defensive Driving Programme for Staff Development
Safety Presentation	Safety analysis Reporting Procedure Safety database management at docushare Incident Reporting and Escalation	1) Electrical Safety 2) Hand and Power Tool 3) Safety & Awareness
Maximo Training	Reporting Procedure Sub System Specific Module Normal Operation Data Collection & Quality Control	1) Maximo Overview 2) Training manual for WO 3) Training manual for puchasing 4) Training manual for service request
Site Performance Discussion	Project Process Flow Reporting Procedure Monitoring Procedure Normal Operation Personnel Orientation	1) Monitoring parameters & requirements 2) Data logger manual for 1 flare system 3) Monitoring requirement - regulatory & biology 4) Safety procedures (LOTO) for blower maintenance 5) Safety during sampling 6) SupaVac pump - overview
OMM Training	Project Process Flow Reporting Procedure Monitoring Procedure Normal Operation Personnel Orientation	1) Monitoring parameters & requirements 2) Data logger manual for 1 flare system 3) Monitoring requirement - regulatory & biology 4) Safety procedures (LOTO) for blower maintenance 5) Safety during sampling 6) SupaVac pump - overview
CDM Training	Project Process Flow Reporting Procedure Monitoring Procedure Normal Operation Personnel Orientation	1) Monitoring parameters & requirements 2) Data logger manual for 1 flare system 3) Monitoring requirement - regulatory & biology 4) Safety procedures (LOTO) for blower maintenance 5) Safety during sampling 6) SupaVac pump - overview
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Section C Monitoring parameters and activities

C.1 Monitored parameters used to calculate emission reductions

Parameter	Unit	Description	Frequency	Data Source
BGP_{Flare}	Nm^3	Amount of biogas recovered and directed to flare for combustion	More often than hourly	Continuous flow meter
MC_{biogas}	% CH_4 (volume)	Methane content of biogas	Quarterly	Gas analyser
CFE_{ww}	%	Flares shall be operated in accordance with manufacturer specifications. Flare combustion temperature and biogas flow rate data will be recorded more frequently than hourly. If in any specific hour either of these parameters is out of specification, a flare efficiency of 50% will be used for this specific hour. If at any given time the temperature of the flare is below 500C, 0% efficiency will be used for this period Provided these parameters are within specification, a value of 0.9 shall be used	More often than hourly	Thermocouple (flare temperature) and gas analyzer (biogas flow rate)
$PE_{y, power}$	tCO_2	Emissions from electricity or diesel consumption	n/a	Facility records, Equipment specification
EG_{diesel}	kWh	Electricity produced by on-site diesel generators	Annually	Facility records
$EG_{biomass}$	kWh	Electricity produced by on-site biomass generators	Annually	Facility records
$EC_{project}$	kWh	Electricity consumed by project	n/a	Equipment specification

C.2 Additional monitored parameters

Parameter	Unit	Description	Frequency	Data Source
$Q_{y,ww}$	m^3	Volume of wastewater treated	Annually	Mill records and 3rd party verified conversion factor
$COD_{y,ww,untreated}$	Tonnes/m^3	Chemical oxygen demand of wastewater entering the anaerobic treatment system	Semi-annually	3rd party sampling
$COD_{y,ww,treated}$	Tonnes/m^3	Chemical oxygen demand of wastewater treated in the anaerobic treatment system	Semi-annually	3rd party sampling
$S_{f,end\ use}$		End use of final sludge	Verified quarterly	Desludging record
$FFB_{processed}$	Tonnes	FFB processed by mill	Annually	Mill records
BGP_{RE}	m^3	Amount of biogas recovered and directed to renewable energy unit	More often than hourly	Continuous flow meter
RE_{ON}	°C	Signal to prove the renewable energy unit is combusting the biogas	More often than hourly	Renewable energy unit mounted thermocouple

C.3 Monitoring Activities

Discrepancies, outages or failures occurred during this monitoring period are listed in ER Spreadsheet as shown to the DOE

Effluent conversion factor from FFB to wastewater volume was site verified by third party laboratory with result factor of 0.8 m^3 of wastewater per ton of FFB

The Project Activity data was collected in accordance with the registered PDD, and approved monitoring methodology, AMS IIIH V.7. The data shown in Table C.2 is a summation or average of the required waste water parameters that are to be monitored.

No renewable energy unit was utilized during the crediting period and all biogas were directed to the flare unit, consequently no monitoring activities are required for amount of biogas recovered and directed to Renewable Energy Unit (BGP_{RE}) and signal to prove the Renewable Energy Unit is combusting the biogas (RE_{ON})

During crediting period, no sludge were removed from the project activity and consequently end use of final sludge ($S_{f,\ end\ use}$) were not required to be monitored during crediting period and the methane emission from anaerobic decay of the final sludge were neglected.

Table C.2. Monitored Data

Year	Month	*FFB processed (Tonnes)*	*Site verified effluent conversion factor*	Volume of wastewater (m^3)	COD Untreated Tonnes/m^3 (Average)	COD Treated Tonnes/m^3 (Average)	Biogas Flared (Nm^3)	Biogas Flared (Nm^3) *(Adjusted for efficiency)*	Methane content of biogas *(95% Confidence Interval)*	Total Methane destroyed (Tonnes)	Project Emissions from Electricity Consumption (tCO_2e)	Project Emissions from degradable organic carbon in treated wastewater (tCO_2e)	Project Emissions from dissolved methane in treated wastewater (tCO_2e)
				$Q_{y,ww}$	$COD_{y,ww,untreated}$	$COD_{y,ww,treated}$	BGP_{Flare}	BGP_{Flare}*CFE_{ww}	MC_{biogas}	MDy	$PE_{y,power}$	$PE_{y,ww,treated}$	$PE_{y,dissolved}$
2009	1	0.00	0.80	0.00	0.0373	0.0075	0.00	0.00	62.60	0.00	3.68	8875.90	563.95
2009	2	21,091.00		16,872.80			47,644.20	41,231.50		18.01			
2009	3	24,427.00		19,541.60			73,914.51	59,517.55		26.00			
2009	4	26,032.00		20,825.60			115,429.41	85,428.02		37.31			
2009	5	28,885.00		23,108.00			127,210.00	73,242.80		31.99			
2009	6	30,546.00		24,436.80			209,332.00	120,705.30		52.72			
2009	7	32,172.00		25,737.60			149,089.00	88,885.30		38.82			
2009	8	29,474.00		23,579.20			198,585.00	166,375.40		72.67			
2009	9	23,896.00		19,116.80			221,668.00	192,289.30		83.99			
2009	10	31,962.00		25,569.60			220,554.00	197,136.80		86.11			
2009	11	27,760.00		22,208.00			180,907.00	154,590.90		67.52			
2009	12	24,148.00		19,318.40			208,017.00	184,472.40		77.22			
2010	1	19,278.00		15,422.40			211,452.00	187,088.10		81.72			
2010	2	16,011.00		12,808.80			216,432.00	192,769.30		84.20			

Table C.2. Monitored data

C.4 Special events

C.4.1 Equipment outages

During monitoring period, outages that occur are categorized into 2 events:

1. Forced outage, unplanned suspension of normal operation due to unforeseen factor such as: power loss, system interlock, biological condition.
2. Scheduled outage, planned suspension of normal operation such as: equipment replacement, maintenance.

During outages, no data were recorded as reflected in the data collection spreadsheet.

Equipment outages experienced and system impact details during this crediting period can be found in the ER Spreadsheet as shown to the DOE

C.4.2 Equipment removal and replacements

Equipment removed or replaced and system impact (if any) during this reporting period is listed below:

		MMD	Serial Number	Date of Install	Date of Replacement	Comments	WO
biodigester 2 (Flare 1 & Flare 2	F1	FCI Flow Meter ST50	291292	19-Jun-08	5-Nov-09	First installation - Replaced with SN 295695 - Flare 1 Ground flare	n/a
		FCI Flow Meter ST50	295695	5-Nov-09	TBD	Current	7297
	F2	FCI Flow Meter ST50	291297	19-Jun-08	6-Apr-09	First installation - Replaced with SN 295699, Flare 2 Ground flare	n/a
		FCI Flow Meter ST50	295299	6-Apr-09	5-Nov-09	Replaced with SN 295706, Flare 2 Ground flare	6015
		FCI Flow Meter ST50	295706	5-Nov-09	TBD	Current	7372
biodigester 2 (Flare 1 & Flare 2	F1	Thermocouple Flare 1	n/a	19-Jun-08	5-Mar-09	First installation	n/a
		Thermocouple Flare 1	n/a	5-Mar-09	21-Aug-09	First installation replaced with 18"	n/a
		Thermocouple Flare 1	n/a	21-Aug-09	TBD	Due to abnormal data reading - Current	8717
	F2	Thermocouple Flare 2	n/a	19-Jun-08	5-Mar-09	First installation	n/a
		Thermocouple Flare 2	n/a	5-Mar-09	10-Nov-09	First installation replaced with 18"	n/a
		Thermocouple Flare 2	n/a	10-Nov-09	8-Dec-09	Due to abnormal data reading	14779
		Thermocouple Flare 2	n/a	8-Dec-09	TBD	Due to abnormal data reading - Current	14439
Data Logger		Data Logger NI module 9211	1343B91	19-Jun-08	TBD	Current	n/a
		Data Logger NI module 9203	134FFC7	19-Jun-08	TBD	Current	n/a

Section D Calibration of monitoring instruments

D.1 Measuring and monitoring device (MMD) requiring calibration

All equipment was factory calibrated by the manufacturers and in accordance with the manufacturers, initial calibration period started after initial usage in the system.

		MMD	Serial Number	Calibration Start	Calibration Due	Comments
Gas Flow Meters	F1	FCI Flow Meter ST50	291292	19-Jun-08	18-Dec-09	Installed new on 19 June 2008 & Replaced 5 Nov 2009
		FCI Flow Meter ST50	295695	5-Nov-09	4-May-11	Current - Installed new 5 November 2009
	F2	FCI Flow Meter ST50	291297	19-Jun-08	18-Dec-09	Installed new on 19 June 2008 & Replaced 6 April 2009
		FCI Flow Meter ST50	295299	6-Apr-09	5-Oct-10	Installed new on 6 April 2009 & Replaced 5 Nov 2009
		FCI Flow Meter ST50	295706	5-Nov-09	4-May-11	Current - Installed new 5 November 2009
Gas Analyzer		Gas analyzer ADC LFG 20	1139	19-Aug-08	18-Aug-09	Calibration at once a year
		Gas analyzer ADC LFG 20	1139	17-Jun-09	16-Jun-10	Calibration at once a year
		Gas analyzer Landtec	BM12142	12-Jan-10	11-Jul-10	Calibration every 6 months
Data Logger		Data Logger NI module 9211	1343B91	19-Jun-08	18-Jun-10	Current - Installed new 19 June 2008
		Data Logger NI module 9203	134FFC7	19-Jun-08	18-Jun-10	Current - Installed new 19 June 2008

Section E Emission factors, IPCC default and other reference values

E.1 Fixed values

Parameter	Value	Description
D_{CH4}	0.0007168 tCH_4/m^3CH_4	Density of methane at normal condition (IPCC
GWP_{CH4}	21	Global warming potential of methane (IPCC default, AMS.III.H ver.5)
EF_{diesel}	0.8 $kgCO_2/kWh$	Emission factor for on-site diesel generators (default value for >200kW system per AMS.I.D ver. 15 methodology, table 1.D.1)

Section F Applicable deviations or approved post registration changes

F.1 Deviation to the monitoring plan

No deviation was reported during crediting period.

F.2 Approved changes to registered PDD

There were no requested or approved changed to the registered PDD

Section G Calculation of GHG emissions

G.1 Emission reductions

In accordance with AMS-III.H, version 7, paragraph 16:

> *"…the calculation of emission reductions shall be based on the amount of methane recovered and fuelled or flared that is monitored ex-post. Also for these cases, the project emissions and leakage will be deducted from the emission reductions calculated from the methane recovered and combusted."*

Total emission reductions are calculated as follows, as modified from ACM0001:

$$ER_y = (MD_y * GWP\ CH_4) - PE_y$$

Where:

ER_y	Emission reductions in the year "y" (tonnes CO_2e)
MD_y	Amount of methane fuelled and flared in year "y" (tonnes CH_4)
$GWP\ CH_4$	Global warming potential for CH_4
PE_y	Project activity emissions in the year y (tonnes CO_2e)

G.2 Amount of methane destroyed

The total amount of methane destroyed (MD) is determined as follows:

$$MD_y = (BGP_{flare,y} + BGP_{RE,y}) * MC_{biogas,y} * D_{CH4} * CFE_{ww}$$

Where:

MD_y	Amount of methane destroyed in year "y" (tonnes)
$BGP_{flare,y}$	Amount of biogas recovered and directed to flare for combustion (Nm^3)
$BGP_{RE,y}$	Amount of biogas recovered and directed to renewable energy system (Nm^3)
$MC_{biogas,y}$	Methane content of biogas during the year "y" (%)
D_{CH4}	Density of Methane at normal conditions (tCH_4/m^3CH_4)
CFE_{ww}	Capture and utilization/combustion/flare efficiency of the methane recovery and combustion/utilization equipment in the wastewater treatment (%)

Since the renewable energy system is not utilized yet, the value of $BGP_{RE,y}$ is zero for this monitoring period.

G.3 Project Emissions

The project emissions in the year "y" are calculated as follows:

$$PE_y = PE_{y,\ power} + PE_{y,\ ww,\ treated} + PE_{y,\ dissolved} + PE_{y\ fugitive}$$

Where:

PE_y	Project activity emissions in the year "y" (tonnes CO_2e)
$PE_{y,\ power}$	Emissions from electricity or diesel consumption in the year "y" (tonnes CO_2e)
$PE_{y,\ ww,\ treated}$	Emissions through degradable organic carbon in treated wastewater in the year y, (tonnes CO_2e)

$PE_{y, dissolved}$	Emissions from dissolved methane in treated wastewater in the year y (tonnes CO_2e)
$PE_{y\ fugitive}$	Fugitive emissions through capture and flare inefficiencies in the anaerobic wastewater treatment in the year y (tonnes CO_2e)

$PE_{y, power}$

The project emissions from electricity consumption are deemed to be negligible however to be conservative, the emission is included in the project emission calculation. PE y, power is conservatively calculated based upon the total kilowatt hours (kWh) consumed by project activity equipment. To remain conservative, equipment is assumed to be in operation 24 hours per day, 365 days per year.

The following formula is used to convert the data to tCO2e:

$$PE_{y, power} = EC_{project} * \%EG_{diesel} * EF_{diesel} / 1000$$

Where:

$PE_{y, power}$	Project emissions due to electricity consumption of equipment (tCO2e/yr)
$EC_{project}$	Amount of electricity consumed by project equipment (kWh)
$\%EG_{diesel}$	Percentage of total site electricity derived from diesel generators
EF_{diesel}	Emission factor for diesel generator system (0.8 $kgCO_2$/kWh)

The electricity required to operate project equipment was sourced from the mill. The mill is not grid connected. The mill produces its own electricity primarily from biomass turbines, with diesel fuel used as a backup power source. Therefore, percentage of electricity derived from diesel generators is determined as follows:

$$\%EG_{diesel} = EG_{diesel} / (EG_{diesel} + EG_{biomass})$$

Where:

EG_{diesel}	Electricity produced on-site due to fossil fuel consumption (kWh)
$EG_{biomass}$	Amount of electricity produced on-site by biomass turbines (kWh)

$PE_{y, ww, treated}$

The following formula is used to calculate $PE_{y, ww, treated}$ as stated in the approved PDD section B.6.1

$$PE_{y, ww, treated} = Q_{y,ww} * COD_{y, ww, treated} * B_{o,ww} * MCF_{ww, final} * GWP_{CH4}$$

Where:

$Q_{y,ww}$	Volume of wastewater treated in the year y (m^3)
$COD_{y, ww, treated}$	Chemical oxygen demand of the treated wastewater in the year (tonnes/m^3)

$B_{o,ww}$	Methane generation capacity of the treated wastewater (IPCC adjusted default of 0.21 Kg CH4 / Kg COD)
MCF $_{ww, final}$	Methane correction factor based on type of treatment and discharge pathway of the wastewater, fraction (MCF higher value in table III H 1 for Anaerobic deep lagoon; i.e., 1.0)
GWP $_{CH4}$	Global warming potential of methane (value of 21 is used)

$PE_{y, dissolved}$

The following formula is used to calculate **$PE_{y, dissolved}$** as stated in the approved PDD section B.6.1

$$PE_{y, ww, dissolved} = Q_{y,ww} * [CH4]_{y, ww, treated} * GWP_{CH4}$$

Where:

[CH4] $_{y, ww, treated}$	Dissolved methane content in the treated wastewater, default value of 0.0001 (tonnes/m^3)

$PE_{y\ fugitive,ww}$

The following formula is used to calculate **$PE_{y\ fugitive}$** as stated in the approved PDD section B.6.1

$$PE_{y\ fugitive,ww} = (1-CFE_{ww}) * MEP_{y,ww,treatment} * GWP_{CH4}$$

Where:

CFE	Capture and utilization/combustion/flare efficiency of the methane recovery and combustion/utilization equipment in the wastewater treatment (%)
MEP $_{y,ww,treatment}$	Methane emission potential of the wastewater treatment plant in the year y (tonnes)

In accordance to paragraph 10 of the AMS III H methodology version 5, “Emission reduction shall be based on the amount of methane recovered and fuelled or flared that is monitored ex-post” therefore, **MEP $_{y,ww,treatment}$** during project monitoring period have been replaced with the amount of methane recovered and flared.

In the emission reduction calculation the **CFE_{ww}** has been incorporated during calculation of **MD_y** in section G.2.

Section H Summary of Emission Reductions

H.1 Amount of methane destroyed

The total amount of methane destroyed (MDy) for the current monitoring period is shown in Table H.1. Default value of the efficiency of the flaring / combustion process (CFEww) of 90% and periodical methane content (MCbiogas) has already been incorporated within the calculation of Biogas flared (BGP flare). Detailed information on continuous monitoring of the site was made available to and verified by the DOE.

Table H.1. Amount of methane destroyed

Year	Month	Biogas flared (Nm^3)	Biogas Flared (Nm^3) *(Adjusted for efficiency)*	Total Methane destroyed (Tonnes)
		BGP_{Flare}	BGP_{Flare}*CFE_{ww}	
2009	1	0	0	0.00
2009	2	47,644.20	41,231.50	18.01
2009	3	73,914.51	59,517.55	26.00
2009	4	115,429.41	85,428.02	37.31
2009	5	127,210.00	73,242.80	31.99
2009	6	209,332.00	120,705.30	52.72
2009	7	149,089.00	88,885.30	38.82
2009	8	198,585.00	166,375.40	72.67
2009	9	221,668.00	192,289.30	83.99
2009	10	220,554.00	197,136.80	86.11
2009	11	180,907.00	154,590.90	67.52
2009	12	208,017.00	184,472.40	77.22
2010	1	211,452.00	187,088.10	81.72
2010	2	216,432.00	192,769.30	84.20
			Total	**758.27**

Table H.1. Methane destroyed

H.2 Methane Content

The periodical measurement of methane content (MCbiogas) for the current monitoring period is shown in Table H.2. Detailed information on continuous monitoring of the site was made available to and verified by the DOE.

Table H.2. Periodical Methane Content

Quarter	Quarter Period	Sampling Date	CH_4 %	
			Sampling Result (%)	MC_{biogas}
1	Jan - Mar	9-Jan-2009	61.50	62.60
		25-Feb-2009	61.80	
2	Apr - Jun	21-Apr-2009	64.50	
3	Jul - Sept	24-Jul-2009	77.00	
4	Oct - Dec	8-Oct-2009	65.10	
		24-Nov-2009	65.00	
1	Jan - Mar	20-Jan-2010	65.80	
		2-Feb-2010	66.90	

Table H.2. Methane content

H.3 Project emissions

Project emissions during the crediting period are shown in Table H.3.

Table H.3. Project Emissions

Year	Month	Project Emission from Electricity Consumption (tCO2e)	Project Emissions from degradable organic carbon in treated wastewater (tCO2e)	Project Emissions from dissolved methane in treated wastewater (tCO2e)
		$PE_{y,\ power}$	$PE_{y,ww,treated}$	$PE_{y,dissolved}$
2009	1	3.68	8,875.90	563.95
2009	2			
2009	3			
2009	4			
2009	5			
2009	6			
2009	7			
2009	8			
2009	9			
2009	10			
2009	11			
2009	12			
2010	1			
2010	2			
	Total	**3.68**	**8,875.90**	**563.95**

Table H.3. Total project emission

H.4 Total emission reductions during the monitoring period

Emission reductions achieved during the current monitoring period are shown in table H.4.

Table H.4. Emission Reductions

Monitoring Period	Total methane destroyed (tCH_4)	Global warming potential of methane	Total methane destroyed (tCO2e)	Project Emission from Electricity Consumption (tCO2e)	Project Emissions from degradable organic carbon in treated wastewater (tCO2e)	Project Emissions from dissolved methane in treated wastewater (tCO2e)	Emission reduction (t CO2e)
		GWP_{CH4}		$PE_{y,\ power}$	$PE_{y,ww,treated}$	$PE_{y,dissolved}$	ER_y
16 January 2009 - 28 February 2010	758.27	21	15,923.61	3.68	8,875.90	563.95	**6,480**

Table H.4. Emission Reductions

The total emission reductions being requested for this monitoring period is **6,480 tCO_2e.**

Section I Comparison of actual ERs to PDD estimated ERs

I.1 Emission reduction estimated for this monitoring period

Source	Dates		ERs
	From	To	
Registered PDD Estimate	16 Jan 2009	28 Feb 2010	43,838

I.2 Emission reduction actually achieved during this monitoring period

Source	Dates		ERs
	From	To	
Actual emission reductions claimed during this monitoring period	16 Jan 2009	28 Feb 2010	6,480

I.3 Explanation on any significant increase between estimated and claimed emission reductions

There was no significant increase between the registered PDD and claimed emission reductions during this period.

Section J List of supporting documents

The additional documentation listed in the table below was provided to the DOE in support of this monitoring report.

Item	Document	Description	Confidential
1	File: MR01-AIN07-W-04 Monitoring Report VAL Calculation (2009-2010) v6.xlsx	Spreadsheet of calculation of emission reductions	No
2	ID0012WWP-VAL-AMS IIIH v7 POME ER Spreadsheet-2009-2010_MR_V5.xlsx	Operational Spreadsheet for monitoring data collection	Yes