GOLD STANDARD VERIFICATION/CERTIFICATION REPORT

Final Report

"CYY Biopower Wastewater treatment plant including biogas reuse for thermal oil replacement and electricity generation Project, Thailand"
in
Thailand

Monitoring period: 25/05/2008 to 24/03/2009
(both days inclusive)

Report N° 2010-IQ-43-MD

Revision N° 1.1

RINA

GOLD STANDARD VERIFICATION/CERTIFICATION REPORT

Project Title: CYY Biopower Wastewater treatment plant including biogas reuse for thermal oil replacement and electricity generation project, Thailand	**Country:** Thailand	**Estimated VERs (tCO_2e):** 97,468 annual average
GS Registration Reference N°: GS560	**Monitoring period:** 25/05/2008 to 24/03/2009 – both days inclusive	**Certified VERs (tCO2e):** 14,657
Client: South Pole Carbon Asset Management Ltd.	**Client contact:** South Pole Carbon Asset Management Ltd Technoparkstrasse 1, Zurich, Switzerland	
Report No.: 2010-IQ-43-MD	**Revision:** 1.1	**Date of this report:** 09/02/2011
Approved by (Final Report – DCI Director approval): Roberto Cavanna		**Date of approval:** 16/02/2011

Methodology

Number:	Version:	Title:	Scale	SS(s):
AM0022	04 of EB28 valid from 21/12/2006	Avoided Wastewater and On-site Energy Use Emissions in the Industrial Sector	Large	13

RINA Services S.p.A. (RINA), commissioned by South Pole Carbon Asset Management Ltd., has verified the greenhouse gas emission reductions reported for the project activity "CYY Biopower Wastewater treatment plant including biogas reuse for thermal oil replacement and electricity generation project, Thailand" in Thailand, GS Registration Reference No. GS560, for the period 25/05/2008 to 24/03/2009, with regard to the relevant requirements for CDM and GS activities. The verification shall ensure that reported emission reductions are complete and accurate in accordance with applicable CDM requirements in order to be certified. The project was validated by TÜV NORD CERT GmbH (validation report No 8000352987–07/150GS issued on 19/01/2010) and it was registered on 25/03/2010 under the CDM registration reference No 2141 and under the GS registration reference No GS560 dated 24/05/2010. The GHG emission reductions were calculated on the basis of the approved methodology AM0022, version 04, Avoided Wastewater and On-site Energy Use Emissions in the Industrial Sector of EB28 and the monitoring plan included in the registered Project Design Document, version 03 of 09/03/2009.

In conclusion, it is RINA's opinion that the project activity "CYY Biopower Wastewater treatment plant including biogas reuse for thermal oil replacement and electricity generation project, Thailand", in Thailand, as described in the Monitoring Report version 1.3 of 18/11/2010, meets all relevant requirements for CDM and GS activities and all relevant host Party criteria and correctly applies the baseline and monitoring methodology "AM0022", "Avoided Wastewater and On-site Energy Use Emissions in the Industrial Sector", version 04 of EB28. Hence RINA is able to certify that the emission reductions from the project during the monitoring period 25/05/2008 to 24/03/2009 amount to 14,657 tCO_2e.

Work carried out by: Raghavan Nair Reghu Kumar Kizhakke Thazhathuveettil Ramakrishnan Pallipogu Sateesh Kumar	☒ No distribution without permission from the Client or organizational unit responsible ☐ Strictly confidential ☐ Unrestricted distribution
Work verified by (Final Report – CRT person responsible approval) Paolo Teramo	**Keywords:** Climate Change, Kyoto Protocol, Verification, Gold Standard

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Abbreviations

BE	Baseline Emissions
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDM M&P	Modalities and Procedures CDM
CER(s)	Certified Emission Reduction(s)
CH_4	Methane
CR	Clarification Request
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
CRT	Coordination and Technical Control Staff
DCI	Certification Division of RINA Services Spa
DNA	Designated National Authority
DOE	Designated Operational Entity
EB	Executive Board
ER	Emission Reductions
GHG(s)	Greenhouse gas(es)
GS	Gold Standard
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
LoA	Letter of Approval
MoV	Means of Verification
MR	Monitoring Report
NGO	Non-governmental Organization
ODA	Official Development Assistance
PDD	Project Design Document
PE	Project Emission
PP(s)	Project Participant(s)
Ref.	Document Reference
RINA	RINA Services Spa
SS(s)	Sectoral Scope(s)
UNFCCC	United Nations Framework Convention on Climate Change
VVM	Validation and Verification Manual

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1 INTRODUCTION

South Pole Carbon Asset Management Ltd. has commissioned RINA to carry out the verification and certification of emission reductions reported for the registered “CYY Biopower Wastewater treatment plant including biogas reuse for thermal oil replacement and electricity generation project, Thailand” in Thailand, GS Registration Reference No GS560, for the period 25/05/2008 to 24/03/2009.
This report summarizes the findings of the verification of the project, performed on the basis of UNFCCC criteria for CDM and GS, as well as criteria given to provide for consistent project operations, monitoring and reporting.

1.1 Objective

The objective of the verification is to have an independent review ex post determination by a Designated Operational Entity (DOE) of the monitored reductions in GHG emissions that have occurred as a result of the registered GS project activity during a defined monitoring period and to monitor the impact of project activity on sustainable development, throughout the monitoring of the non-neutral Sustainable Development Indicators and moreover to monitor all the mitigation and compensation measures put in place. Certification is the written assurance by the DOE that, during a specific time period, a proposed GS project activity achieved the reductions in anthropogenic emissions by sources of GHGs as verified and that all the defined Sustainable Development Indicators to be monitored have been monitored according to the sustainability monitoring plan and that all the mitigation measures forecast have been correctly and effectively implemented.
The objective of this verification/certification was to verify and certify emission reductions and effective implementation of the monitoring of sustainable development indicators and mitigation measures, reported for the “CYY Biopower Wastewater treatment plant including biogas reuse for thermal oil replacement and electricity generation project, Thailand” project in Thailand for the period 25/05/2008 to 24/03/2009.

1.2 Scope

The verification scope is:

- to verify that actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan;
- to evaluate the GHG emission reduction data and express a conclusion with a reasonable level of assurance about whether the reported GHG emission reduction data is free from material misstatement;
- to verify that reported GHG emission data is sufficiently supported by evidence;
- to evaluate whether all the mitigation measures have been effectively put in place according to the monitoring plan and that all the sustainable development indicators have been correctly monitored.

Verification shall ensure that reported emission reductions are complete and accurate in accordance with applicable UNFCCC criteria for CDM and GS in order to be certified.
UNFCCC criteria for CDM refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures, and the subsequent decisions by the CDM Executive Board.
The GS criteria refer to GS requirements, GS Toolkit and supporting annexes.
Verification is not meant to provide any consultancy towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the monitoring.

2 METHODOLOGY

Verification was conducted using RINA procedures in line with the requirements specified in the GS Requirements, CDM M&P, the latest version of the CDM Validation and Verification Manual, and relevant decisions of the COP/MOP and the CDM EB and applying standard auditing techniques.

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The verification consisted of the following three phases:

- Desk review;
- On-site assessment:
- The resolution of outstanding issues and the issuance of the final verification report and certification.

The following sections outline each step in more detail.

2.1 Desk Review

The monitoring report, dated 15/06/2010 /02/, the revised monitoring report version 1.4 of 20/01/2011 /02/, the emission reduction calculations provided in the form of a spreadsheet, "059_CYY_GSVER_Verification_Ver1.0_100618" version 1.0 of 18/06/2010 /10/ and the revised spreadsheet "059_CYY_GSVER_Verification_Ver1 1_110120" version 1.4 dated 20/01/2011, were assessed as part of the verification. In addition, the Project Design Document (PDD) /01/, in particular the baseline estimations and the monitoring plan, the Gold Standard Annex version 2.1 of 13/05/2010 /08/, the validation report dated 19/01/2010 /13/ for the project were reviewed.
The following table lists the documentation that was reviewed during the verification.

/01/	South Pole Carbon Asset Management Ltd.: CDM-PDD for project activity "CYY Biopower Wastewater treatment plant including biogas reuse for thermal oil replacement and electricity generation Project, Thailand" in Thailand, version 03 of 09/03/2009
/02/	South Pole Carbon Asset Management Ltd.: Monitoring report for project activity "CYY Biopower Wastewater treatment plant including biogas reuse for thermal oil replacement and electricity generation Project, Thailand" in Thailand, dated 15/06/2010, version 1.1 dated 08/10/2010, version 1.2 dated 29/10/2010, version 1.3 dated 18/11/2010 and latest revision version 1.4 dated 20/01/2011 for the monitoring period 25/05/2008 to 24/03/2009.
/03/	The Gold Standard: Requirements, version 1 and version 2.1 of 1 July 2009
/04/	The Gold Standard: Toolkit and related Annexes (A – S), version 2.1 of 1 June 2009
/05/	CDM Executive Board: Validation and Verification Manual, version 01.2 of 30/07/2010
/06/	CDM Executive Board: Baseline and monitoring methodology "AM0022", "Avoided Wastewater and On-site Energy Use Emissions in the Industrial Sector", version 04 of EB28 valid from 21/12/2006.
/07/	The Gold Standard: The Gold Standard Validation & Verification Manual for Voluntary Offset Projects, version 1.0 of June 2007
/08/	South Pole Carbon Asset Management Ltd.: CYY Biopower wastewater treatment plant Gold Standard PDD: Additional PDD Annex as required for Gold Standard validation (GS v. 1), version 2.1 of 13/05/2010
/09/	South Pole Carbon Asset Management Ltd.: Pre CDM GS Monitoring Report, version 1.0 of 15/06/2010
/10/	South Pole Carbon Asset Management Ltd.: Emission Reduction Calculation sheet 059_CYY_GSVER_Verification_Ver1.0_100618, version 1.0 of 18/06/2010 and latest revision 059_CYY_GSVER_Verification_Ver1 1_101118, dated 18/11/2010.
/11/	CYY Bio Power Co Ltd: Operation log sheets for the the current monitoring period from May 2008 to March 2009 and for the non monitoring period from may 2009 to August 2009.
/12/	Calibration certificates for the meters 265DS6600032639: Calibration by DWS dated 5/04/2007 and by Miracle International Technology dated 7/9/2009 265DS6600028458: Calibration by DWS dated 18/04/2008 and by Miracle International Technology dated 7/9/2009 91FA19282639: Calibration by DWS dated 26/04/2007 and by Miracle International Technology dated 7/9/2009 265DS6600032493: Calibration by DWS dated 18/04/2008 and by Miracle International

	Technology dated 7/9/2009 265DS6600028459: Calibration by DWS dated 21/04/2008 and by Miracle International Technology dated 7/9/2009 ARYK-0131: Calibration by Drager safety dated 14/12/2007 and by Miracle International Technology dated 2/10/2009 A004997: Calibration by Power Maintenance and Services dated 21/2/2010 2005352: Certification by Central Bureau of Weights and Measures dated 2/4/2007 070890C64902: Test report of preventive maintenance by EnviScience Company Limited dated 12/11/2010
/13/	TÜV NORD CERT GmbH: Validation report for retroactive Gold Standard registration, Report No: 8000352987– 07/150GS dated 19/01/2010. TÜV NORD CERT GmbH: CDM Validation report, Report No: 8000352987– 07/150GS dated 19/01/2010.
/14/	Ellen May Zanoria (The Gold Standard Foundation): Mail communication dated 27/05/2010 and 07/06/2010 notifying and confirming the PP on the registration date of the project activity with GS Registry.
/15/	CDM Executive Board: Methodological tool “Tool to determine project emissions from flaring gases containing methane”, EB 28 Annex 13.
/16/	Ellen May Zanoria (The Gold Standard Foundation): Mail communication dated and 18/11/2010 confirming the approach used by the PP on the conservative estimation of the methane content value for the period from 25/05/2008 to 24/09/2008 during which the parameter is not monitored.
/17/	Test Tech Co., Ltd.: Water analysis reports for the COD measurement during the samples taken on 20/03/2008, 22/06/2008, 25/09/2008, 20/12/2008 and 28/03/2009
/18/	Global Water Engineering Ltd.: Gas leakage test report conducted on 19/09/2009 and 20/09/2009
/19/	CYY Bio Power Co Ltd: reporting procedure for the Biogas plant dated 04/03/2009
/20/	Retech Energy Co Ltd: Offer for starter motor and pick up dated 09/04/2009
/21/	Technical specifications of following equipments involved in the projecyt activity ABB Ltd.: 2600T Series Pressure Transmitters Model 265DS; DEIF: Designer’s Reference Handbook, multi-line 2 PPU – version 2/GS 4189340354C dated 17/03/2010; Dräger: Dräger Polytron IR Ex Fixed Gas Detector; KROHNE: Electromagnetic Flow Converter - IFC 010; Yokogawa Electric Corporation: EJX110A - Differential Pressure Transmitter
/22/	South Pole Carbon Asset Management Ltd.: Emission Reduction Purchase Aggrements between CYY Bipower Co., Ltd. and South Pole Carbon Asset Management Ltd. dated 29/02/2008. between CYY Bipower Co., Ltd. and Kommunalkredit Public Consulting GmbH represented by South Pole Carbon Asset Management Ltd. dated 14/03/2007
/23/	http://en.wikipedia.org/wiki/Student's_t-distribution in English - for information on Student-t distribution approach; retrieved lastly on 04/12/2010.
/24/	http://www.staff.brad.ac.uk/yysentur/course/dp1008m/Student-t-table.pdf in English - for the values used for Factor A in the Student-t distribution approach; retrieved lastly on 04/12/2010.

/25/	http://webbook.nist.gov/cgi/cbook.cgi?ID=C74828&Units=SI&Mask=1#Thermo-Gas;
	http://webbook.nist.gov/cgi/cbook.cgi?ID=C124389&Units=SI&Mask=1#Thermo-Gas;
	http://webbook.nist.gov/cgi/cbook.cgi?ID=C7732185&Units=SI&Mask=1#Thermo-Gas – in English for NCV Methane value; retrieved lastly on 04/12/2010.

/26/	http://www.springerlink.com/content/9268401qh54n63g1/fulltext.pdf in English - for NCV Methane value ”Measurements of the Calorific Value of Methane with the New GERG Reference Calorimeter” by P. Schley, M. Beck, M. Uhrig, S. M. Sarge, J. Rauch, F. Haloua, J.-R. Filtz, B. Hay, M. Yakoubi, J. Escande, A. Benito and P. L. Cremonesi; retrieved lastly on 04/12/2010.

/27/	CDM Executive Board: The approval for the revision of monitoring plan dated 12/08/2010.
/28/	CYY Bio Power Co Ltd: Employee details for the years 2008, 2009 and 2010.
/29/	CDM Executive Board: Monitoring Report Form (CDM-MR) Version 01 dated 28/05/2010
/30/	IPCC: 1996 Revised Guidelines for National Greenhouse Gas Inventories and 2006 IPCC guidelines for National GHG Inventories
/31/	Pro2 Anlagentechnik GmbH: Minutes of Commissioning for "Gas Engines" dated 08/12/2008
/32/	United Analyst and Engineering Consultant Company., Ltd.: analysis report (combustion efficiency for Gen set and Heating system) dated 31/10/2009
/33/	conversion of litres of HFO to kg: based on national oil statistics for fuel oil category 5 "http://www.dede.go.th/dede/fileadmin/usr/wpd/static/oil_and_thailand_2006/41Table36.pdf"
/34/	CDM Executive Board: Methodological tool "Tool to calculate the emission factor for an electricity system", version 01.1 dated 29/07/2008 and latest version 2.0 dated.16/10/2009
/35	CDM Executive Board: Approved small scale methodology "AMS-I.D", "Grid connected renewable electricity generation", version 13 dated 14/12/2007
/36/	CDM Executive Board: "Guidelines for assessing compliance with calibration frequency requirements", version 01 dated 12/02/2010
/37/	Global Water Engineering Ltd.: "Certificate of Civil/ Mechanical/ Electrical completion" dated 03/11/2007 confirming the commissioning of the UASB

2.2 On-site assessment

On 11/10/2009 to 13/10/2009, RINA visited CYY Bio Power Co., Ltd. plant located at Khamtalesor District, Nakhorn Ratchasima Province in Thailand. During the on-site assessment of the project, RINA assessed the implementation and operation of the proposed project activity, reviewed the information flows for generating, aggregating and reporting the monitoring parameters, interviewed key personnel of the plant to confirm the operational and data collection procedures, cross-checked between information provided in the monitoring report and data plant, checked the monitoring equipment including calibration performance, reviewed calculations and assumptions made in determining the GHG data and emission reductions, checked the quality control and quality assurance procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters. Checked the correct and effective implementation of the mitigation measures foreseen in the sustainability monitoring plan, to prevent violation or the risk of violating a safeguarding principle of the "Do No Harm" Assessment or to "neutralize" a Sustainable Development Indicator.
The key personnel interviewed and the main topics of the interviews are summarized in the table below.

	Date	Name and Role	Organization	Topic
/1/	11/10/2009	Tawatchai Yuenyong (Managing Director)	CYY Bio Power Co.,Ltd	Project conception, financing decisions, purpose of the project activity, Management review
/2/	11/10/2009	Nakorn Prisree (Factory Manager)	CYY Bio Power Co.,Ltd	Project implementation, monitoring, day to day operation of the biogas plant
/3/	11/10/2009	Montree Jingsuntia (Safety officer)	CYY Bio Power Co.,Ltd	Project implementation, monitoring, emergency situations
/4/	11/10/2009	Yupin Amwan (Head of biogas plant)	CYY Bio Power Co.,Ltd	Project implementation, monitoring, day to day operation of the biogas plant, data collection and archiving, reporting structure, ER calculations
/5/	11/10/2009	Harshpreet Singh (Project Manager)	South Pole Carbon Asset Management Ltd.	Project design, monitoring report, monitoring design, data collection and archiving, ER calculations

/6/	11/10/2009	Pathathai Tonsuwonnont (Project Manager)	South Pole Carbon Asset Management Ltd.	Project design, monitoring report, monitoring design, data collection and archiving, ER calculations
/7/	11/10/2009	Suwipa Rukwongtrakool (Project Manager)	South Pole Carbon Asset Management Ltd.	Project design, monitoring report, monitoring design, data collection and archiving, ER calculations

2.3 Resolution of outstanding issues

The objective of this phase of the verification is to resolve any outstanding issues which need to be clarified for RINA's positive conclusion on the monitoring report and emission reductions.
To guarantee transparency a verification protocol has been customized for the project. The protocol shows in a transparent manner the requirements, means of verification and the results from verifying the identified criteria. The verification protocol consists of three tables; the different columns in these tables are described in the figure below (see Figure 1).The completed verification protocol is enclosed in Appendix A to this report.
A corrective action request (CAR) is raised if one of the following occurs:

- Non-conformities with the monitoring plan or methodology are found in monitoring and reporting, or if the evidence provided to prove conformity is insufficient;
- Mistakes have been made in applying assumptions, data or calculations of emission reductions that will impair the estimate of emission reductions;
- Issues identified in a FAR during validation to be verified during verification have not been resolved by the project participants.

A clarification request (CR) is raised if information is insufficient or not clear enough to determine whether the applicable CDM and GS requirements have been met.
CARs, CRs identified are included in the verification protocol in Appendix A of this report.

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Figure 1 Gold Standard Verification protocol tables

Verification Protocol, Table 1 - Requirement checklist					
Checklist Question	Ref.	MoV	Comments	Draft Conclusion	Final Conclusion
Checklist questions organized in seven different sections.	Makes reference to documents where the answer to the checklist question or item is found.	Explain how conformance with the checklist question is investigated. Examples are document review (DR), interview or any other follow-up actions (I), cross checking (CC) with available information relating to projects, (N/A) means not applicable.	The discussion on how the conclusion is arrived at and the conclusion on the compliance with checklist question so far.	OK is used if the information and evidence provided is adequate to demonstrate compliance with CDM requirements. For CAR, CR and FAR see the definitions above.	OK is used if the information and evidence provided is adequate to demonstrate compliance with CDM requirements.

Verification Protocol, Table 2: Resolution of Corrective Action Requests and Clarification			
Corrective action requests and/or clarification requests	Reference to Table 1	Response by project participants	Verification Conclusion
The CAR and/or CRs raised in table 1 are repeated here.	Reference to the checklist question number in Table 1 where the CAR or CR is explained.	The responses given by the project participants to address the CARs and/or CRs.	The verification team's assessment and final conclusion of the CARs and/or CRs.

Verification Protocol, Table 3 - Forward Action Requests		
Forward action request	Reference to Table 1	Response by project participants Verification Conclusion
The FAR raised in table 1 is repeated here.	Reference to the checklist question number in Table 1 where the FAR is explained.	Response by the project participants on how forward action request will be addressed.

2.4 Internal quality control

All the revisions of the verification report, before being submitted to the client, were subjected to an independent internal technical review to confirm that all verification activities had been completed according to the pertinent RINA instructions.
The technical review was performed by a technical reviewer(s) qualified in accordance with RINA's qualification scheme for CDM/GS validation and verification.

2.5 Verification team and the technical reviewer(s)

The verification team and the technical reviewers consist of the following personnel:

Role/Qualification	Last Name	First Name	Country
Team Leader CDM/GS & CDM/GS Verifier	Raghavan Nair	Reghu Kumar	India
Technical Expert CDM/GS	Kizhakke Thazhathuveettil	Ramakrishnan	India
Technical Expert CDM/GS	Pallipogu	Sateesh Kumar	India
Technical Reviewer	Valoroso	Rita	Italy

3 VERIFICATION FINDINGS

The findings of the verification related to the monitoring period from 25/05/2008 to 24/03/2009 as documented and described in the monitoring report dated 15/06/2010 /02/ are stated in the following sections.
The verification requirements, the means of verification and the results from verifying the identified criteria are documented in more detail in the verification protocol in Appendix A.

3.1 Description of the project activity

The main information of the project is summarized in the table below.

Project Participant(s)	CYY Bio Power Co Ltd Kommunalkredit Public Consulting GMBH South Pole Carbon Asset Management Ltd.		
Project Title	CYY Biopower Wastewater treatment plant including biogas reuse for thermal oil replacement and electricity generation project, Thailand		
Location of the project	Thailand		
Methodology(ies)	"AM0022", " Avoided Wastewater and On-site Energy Use Emissions in the Industrial Sector", version 04 of EB28		
Sectoral Scope(s)	13	RINA's Technical Area(s)	C131
Registered PDD	Revision 03 of 09/03/2009		
Date of registration	CDM: 25/03/2009 GS: 24/05/2010	GS Registration Reference N°	GS560
Revised monitoring plan	PP has requested for a revision in the monitoring plan and the same is validated and recommended for approval of UNFCCC on 24/05/2010. The same is approved by the UNFCCC on 12/08/2010 /27/.		

Starting date of the crediting period	GS: 24/05/2010 CDM: 25/03/2009
Project's crediting period	24/05/2010 to 23/05/2020
Monitoring period for Pre CDM VERs	25/05/2008 to 24/03/2009
Project documentation link	https://gs1.apx.com/mymodule/ProjectDoc/EditProjectDoc.asp?id1=560

The purpose of the project activity is to introduce a new biogas reactor (Upflow Anaerobic Sludge Blanket Technology (UASB)) with methane capture and utilization for energy purposes into the existing open anaerobic lagoon based wastewater treatment system.
The project activity involves the following

1. The extraction of methane (biogas) from the wastewater stream through the biogas reactor,
2. The reuse of biogas as fuel in existing thermal oil boilers within the plant for starch drying, and
3. The reuse of biogas as fuel for power generation (using up to 2.72 (1.36 x 2) MWel gas engines to be constructed).

3.2 Remaining issues (FARs) from previous validation or verification

Being the first verification of the project activity, based on the review of the validation report /13/ there were no FARs to be addressed during verification.

3.3 Project implementation

The verification team has performed the on-site assessment from 11/10/2009 to 13/10/2009. During this period, the team found that all the equipments as stated in the registered CDM PDD version 03 dated 09/03/2009 /01/ are installed and the physical implementation of the project activity is also in line with the registered CDM PDD. However the team has observed that the project is yet to start the exporting of electricity to the grid.
The implementation of the project activity started on 04/08/2006 (project start date) i.e. the day on which the purchase order is issued and also on which the proponent has formally started the civil works for the project activity. Further, the UASB and gas engines were commissioned on 03/11/2007 /37/ and 29/11/2008 /31/ respectively.
Based on the on-site observation, interview with the PP and subsequent document review, the team found that the methane analyzer was installed on 25/09/2008 /31/. The verification team has also found that the PP was not monitoring the combustion efficiency of the gas engines, the boiler and the bypass wastewater sent to the lagoon system. However, the monitoring parameter "bypass wastewater sent to the lagoon system" is not being used in any of the emission reduction calculations. Hence, the PP has been requested for a revision of the monitoring plan and the same is validated and recommended for approval of UNFCCC on 24/05/2010. The revision of monitoring plan is approved by the UNFCCC on 12/08/2010 /27/.
It was confirmed during this verification period, through the on site inspection, that the physical implementation of the project activity as described above is in line with the design mentioned in the registered PDD /01/.

3.4 Methodology for determining Emission Reductions.

According to the applied methodology "AM0022", "Avoided Wastewater and On-site Energy Use Emissions in the Industrial Sector", version 04 of EB28, the emission reductions have been calculated as discussed below:

1) Project Emissions

The total project emissions (tCO_2e) are determined as follows:

$E_{project} = E_{CH4\_lagoons} + E_{CH4\_NAWTF} + E_{CH4\_IC+leakss}$

Where:

$E_{CH4\_lagoons}$ are the fugitive methane emissions from lagoons (tCO_2e)

E_{CH4_NAWTF} are the fugitive methane emissions from the new anaerobic waste water treatment facility (tCO_2e)

$E_{CH4\_IC+leakss}$ are the methane emissions from inefficient combustion and leaks (tCO_2e)

Fugitive Methane Emissions from lagoons:

$E_{CH4\_lagoons} = M_{lagoon\ anaerobic} \cdot EF_{CH4.} GWP_{CH4} /1000$

Where:

$M_{lagoon\_anaerobic}$ is the amount of organic material removed by anaerobic processes in the lagoon system (kg COD^3)

EF_{CH4} is the methane emission factor (kg CH_4 / kg COD). A default COD to Methane conversion factor of 0.21kg CH_4/kgCOD is used If the methodology is used for waste water containing materials not akin to simple sugars a CH_4, a different emissions factor different has to be estimated and applied. Where a metric for organic wastewater flows other than COD is to be applied, the developer should set out the case for a relevant carbon emission factor.

GWP_{CH4} is the Global Warming Potential of methane (GWP_{CH4} = 21)

The amount of organic material removed by anaerobic processes in the lagoon system I is calculated as:

$M_{lagoon\_anaerobic}=M_{lagoon\_total}-M_{lagoon\_aerobic}-M_{lagoon\_chemical\_ox}-MI_{agoon\_deposition}$

Where:

M_{lagoon_total} is the total amount of organic material removed in the lagoon system (kg COD)

$M_{lagoon\_aerobic}$ is the amount of organic material degraded aerobically in the lagoon system (kg COD). Surface aerobic losses of organic material in pond based systems equal to 254 kg COD per hectare of pond surface area and per day is assumed to be lost through aerobic processes. For the project activity losses are calculated considering area of the lagoon as 25 ha and the wastewater system operational days as 305 in the current monitoring period.

$M_{lagoon\_chemical\_ox}$ is the amount of organic material lost through chemical oxidation in the lagoon system (kg COD)

$M_{lagoon\_deposition}$ is the amount of organic material lost through deposition in the lagoon system (kg COD)

Input of organic material from the new project anaerobic wastewater treatment

$$M_{lagoon\_input}=M_{input\_total}\cdot(1-R_{NAWTF})$$

Where:

M_{lagoon_input} is the input of organic material from the new project anaerobic wastewater treatment facility into the lagoon system (kg COD)

M_{input_total} is the total amount of organic material fed into the new project wastewater treatment facility (kg COD)

R_{NAWTF} is the total organic material removal efficiency of the new project water treatment facility (-). It is a project specific factor used to estimate the quantity of COD will be removed from the system. This value is calculated for the current monitoring period and the conservative value is taken by comparing it with the Ex-ante value (90%) as determined in the registered PDD/01/. Thus, 85.60% is used for the year 2008 and 87.14% is used for the year 2009.

The total amount of organic material fed into the new project wastewater treatment facility is calculated as:

$$M_{lagoon\_total}=M_{lagoon\_input}\cdot R_{lagoon}$$

Where:
R_{lagoon} is the total organic material removal ratio of the lagoon (-). It is a project specific factor, and is equal to the proportion of organic material removed (through all routes) within the boundaries of the lagoon system under consideration The determined ex-ante value at 98.90% is used for the current monitoring period.

While the amount of organic material lost through deposition in the lagoon system is calculated as:

$$M_{lagoon\_deposition}=M_{lagoon\_input}\cdot R_{deposition}$$

Where:
$R_{deposition}$ is the organic material deposition ratio of the lagoon. It is equal to the proportion of organic material physically sediment in lagoons within the project boundaries. It is a project specific factor derived by assessing the relative ability of COD in the waste water stream to sediment in the project boundaries, through pre project analysis.

Methane emissions from inefficient combustion and leaks

$$E_{CH4\_IC+leaks}=(\Sigma\ V_r\ .\ C_{CH4}\ .\ (1-f_r).\ GWP_{CH4}\ .\ PE_{flare}$$

Where:
The sum is made over two routes *r* for methane destruction (heating and power generation);
V_r is the biogas combustion process volume in route *r* (Nm^3)
C_{CH4} is the methane concentration in biogas (tCH_4/Nm^3) to be measured on wet basis.
f_r is the proportion of biogas destroyed by combustion (-)
PE_{flare} are the project emissions from flaring of the residual gas stream (tCO_2e) calculated following the procedures described in the *"Tool to determine project emissions from flaring gases containing Methane"*. PE_{flare} is calculated on an annual basis or for the required period of time using this tool.

2) Baseline Emissions
The total baseline emissions (tCO_2e) are determined as follows:

$$E_{BL} = E_{CH4\_lagoons\_BL} + E_{CO2\_heat+powers\_BL} + E_{CO2\_grid\_BL}$$

Where:
$E_{CH4\_lagoons\_BL}$ are the fugitive methane emissions from lagoons in the baseline case (tCO_2e). They are calculated with baseline data based on equation for fugitive methane emissions from lagoons.
$E_{CO2\_heat+powers\_BL}$ are the CO_2 emissions from on site fossil heat and/or power generation in the baseline case (tCO_2) that are displaced by generation based on biogas collected in the anaerobic treatment facility.
$E_{CO2\_grid\_BL}$ are the CO_2 emissions related to electricity supplied by the grid in the baseline case (tCO_2) that are displaced by generation based on biogas collected in the anaerobic treatment facility.

CO_2 emissions from on site fossil heat generation in the baseline
E_{Co2_heat} = F* NCV* EF
Where:
F is the corresponding amount of fossil fuel displaced by the use of biogas for the generation of on site heat (unit). This is estimated as product of :(1) Average specific fuel consumption for the output of the facility, estimated using 3 years historical data; and (2) the annual production NCV is the net calorific value of the fossil fuel considered (TJ/unit). In the current monitoring period the IPCC default value of 0.0404 is used for the NCV calorific value of the fossil fuel.
EF is the carbon emission factor of the fossil fuel considered (tCO_2/TJ).

CO_2 emissions from on site fossil power generation in the baseline

E_{Co2_power} = EL . CEF

Where:
EL is the amount of electricity displaced by the electricity generated from the biogas collected from the anaerobic treatment facility. This is estimated as product of: (1) Average specific electricity consumption for the output of the facility, estimated using 3 years historical data; and (2) the annual production.
CEF is the carbon emission factor for the electricity displaced by the electricity generated from the biogas. In the baseline scenario there is only one source of power (i.e. from the grid) that is used. Hence, the CEF which is fixed Ex-ante in the registered PDD/01/ as 0.52 is used for the current monitoring period.

Input of organic material from the new project anaerobic wastewater treatment
$M_{lagoon\_input\_BL}=M_{input\_total}$

Where:
$M_{lagoon\_input\_BL}$ is the input of organic material from the new project anaerobic wastewater treatment facility into the lagoon system (kg COD)
M_{input_total} is the total amount of organic material fed into the baseline water treatment facility (kg COD). It is the same amount as fed into the project water treatment facility.

Emission Reductions:
$ER_y = E_{BL} – E_{project}$
$E_{CH4\_lagoons\_BL} - (E_{CH4\_lagoons} + E_{CH4\_NAWTF} + E_{CH4\_Coll})$

Where:
E_{CH4_coll} is the amount of methane expressed in (tCO_2e) contained in the biogas collected from the anaerobic treatment facility (i.e. the sum of the biogas sent to heaters, the biogas sent to the gen sets and the biogas sent to the flare).

If the result of this equation is positive then the result should be deducted from the equation above in order to obtain the final estimation of the emissions reductions. However the result of the above equation obtained for the current monitoring period for this project activity is found to be negative. Hence it is not deducted from the ER_y equation above.

3) Leakage
According to the methodology AM0022 version 4 of EB 28 /06/ the leakage is considered as negligible.

3.5 Compliance of the monitoring plan with the monitoring methodology

The following are the parameters to be monitored according to the registered monitoring plan /27/ with the UNFCCC and as per approved GS Annex/08/ for the project activity.

Parameters	Description
AM0022 ID1	Wastewater flows entering the project treatment facility.
AM0022 ID2	Wastewater flow leaving the project treatment facility
AM0022 ID3	COD concentration of the wastewater entering the new anaerobic digestion system
AM0022 ID4	COD concentration of the wastewater leaving the new anaerobic digestion system.
AM0022 ID5	Volume of biogas sent to facility heaters
AM0022 ID7	Electricity generated from collected biogas
AM0022 ID8	Fossil fuel volume equivalent required to generate same amount of heat generated from the biogas collected in anaerobic treatment facility.
AM0022 ID9	Biogas sent to flares
AM0022 ID10	Biogas sent to generator set

AM0022 ID11	Methane concentration in biogas
AM0022 ID12	Project emissions from flaring of the residual gas stream
AM0022 ID13	Amount of chemical oxidizing agents entering system boundary
AM0022 ID14	Generator set combustion efficiency (combustion of methane)
AM0022 ID15	Heating system combustion efficiency (combustion of methane)
AM0022 ID16	Volume of flow of wastewater directly to the current wastewater treatment system
AM0022 ID17	Loss of biogas from pipeline
AM0022 ID18	Organic material removed from wastewater facility
AM0022 ID19	Biogas calorific value
-	Flame detection period
-	Period of biogas being sent to the flare

GS Parameters:

Air quality: Odour from the wastewater treatment plant	Volume of biogas production and combustion
Employment (numbers)	Number of employed staffs and the level of income generation
Monitoring of sludge application	Removal and application of sludge leaving the reactor.

PP has referred all the parameters in the monitoring report as mentioned in the registered PDD. The verification team has found that the PP was not monitoring the bypass wastewater sent to the lagoon system. However, since the parameter “bypass wastewater sent to the lagoon system” is not being used in any of the emission reduction calculations, the PP has requested for a revision in the monitoring plan and the same is validated by RINA and recommended for approval of UNFCCC on 24/05/2010. The revised monitoring plan is approved by the UNFCCC on 12/08/2010 /27/.
The team hereby confirms that monitoring plan in the registered PDD /01/ is in accordance with approved methodology applied by the project activity for the monitoring period 25/05/2008 to 24/03/2009.

3.6 Compliance of monitoring with monitoring plan

The monitoring plan in the monitoring report version 1.4 of 20/01/2011 /02/ complies with the monitoring in the registered PDD /08/ and the revised monitoring plan approved by the UNFCCC on 12/08/2010 /27/ and the methodology AM0022 version 4 /06/ has been properly implemented and followed. Al the parameters, as listed in the following sections have been monitored according the applied methodology and the relevant CDM EB decision and GS requirements. The sustainability indicators in the monitoring report /02/ comply with the sustainability indicators established by version 1 of the Gold Standard Requirements and as per approved GS Annex /08/.
The combustion efficiency of the boiler and gas engines were not monitored during the current monitoring period. The ex-ante value estimated during the validation of the project activity is used conservative value in the emission reductions calculations. Apart from this the measurement of methane was measured continuously for the period starting from 25/05/2008 to 24/09/2008. Continuous measurement of methane content by using continuous methane analyzer is started on 25/09/2008 onwards. The conservative value for this parameter is accepted for the above period in accordance with the clarification provided by the GS board on 18/11/2010, which is also evident in the table 2 of this document. Further to this the PP has applied for a revision of monitoring plan with UNFCCC for excluding the monitoring parameter “bypass waste water to the lagoon system” from the registered monitoring plan as this parameter is not having any effect on baseline and project emissions of project activity. The revision of monitoring plan was subsequently approved by UNFCCC on 12/08/2010.
RINA can thus confirms that the project monitoring has been carried out in accordance with the monitoring plan contained in the approved registered GS PDD, revised monitoring plan and monitoring report. The following parameters have been monitored in accordance with the monitoring plan in the registered PDD /01/ and the monitoring report /02/.

3.6.1.1 Data fixed ex-ante

DATA/ PARAMETER	Source of data	Reported value for the project period	Assessment/ Observation
EF_{CH4}	IPCC Default Value /30/, which is also, established by the approved methodology AM0022 version 4 /06/.	0.210 $kgCH_4/kgCOD$	The verification team has cross checked the value with registered PDD/01/, Approved methodology AM0022 version 4 /06/ and found to be in line with the value provided in 2006 IPCC guidelines for National GHG Inventories/30/.
GWP_{CH4}	IPCC Default Value /30/, which is also, established by the approved methodology AM0022 version 4 /06/.	21 tCO_{2e}/tCH_4	The verification team has cross checked the value with registered PDD/01/, Approved methodology AM0022 version 4 /06/ and found to be in line with the value provided in 2006 IPCC guidelines for National GHG Inventories/30/.
R_{lagoon}	Fixed ex-ante as per registered PDD /01/, The value is determined in accordance with AM0022 version 4 /06/ using historical COD data of wastewater entering and leaving the open anaerobic lagoon treatment system.	98.90%	The value used in the calculations are checked with the registered PDD/01/ and found to be correct and consistent.
$R_{deposition}$	Fixed ex-ante as per registered PDD/01/. The value is determined in accordance with AM0022 version 4 /06/ as the ratio of $M_{lagoon\ deposition}$ and $M_{lagoon\ Input}$.	7.05%	The value used in the calculations are checked with the registered PDD/01/ and found to be correct and consistent.
E_{CH4_NAWTF}	Fixed ex-ante as per registered PDD/01/. The value is taken as 1% to be on the conservative side though the actual physical leakage due to proportion of methane emitted from the UASB as estimated by the technology provider is less than 1%.	1%	The value used in the calculations are checked with the registered PDD/01/ and found to be correct and consistent.
R_{NAWTF}	Fixed ex-ante as per registered PDD/01/. The value is provided by the technology provider/21/.	90%	The value used in the calculations are checked with the registered PDD/01/ and found to be correct and consistent.
$p_{CH4,\ n}$	Fixed ex-ante as per registered PDD/01/ the value is established by the "tool to determine project emissions from flaring gases containing methane"/15/.	0.716 kg/Nm^3	The value used in the calculations are checked with the registered PDD/01/, tool to determine project emissions from flaring gases containing

			methane/15/ and found to be correct and consistent.
Density of HFO	Fixed ex-ante as per registered PDD/01/. The value was established in the registered PDD/01/ based on Thailand national oil statistics for fuel oil category 5/33/	0.995 Kg/l	The value used in the calculations are checked with the registered PDD/01/ and found to be correct and consistent.
Surface area of treatment system after discharge	Fixed ex-ante as per registered PDD/01/. The value is obtained from the PP which is validated by the DOE during site visit and confirmed in the validation report/13/.	25.18 ha	The value used in the calculations are checked with the registered PDD/01/, validation report/13/ and found to be correct and consistent.
Surface Aerobic Losses Factor	Fixed ex-ante as per registered PDD/01/. The value is established by the approved methodology/06/ applied for the project activity.	254 kgCOD/ha/day	The verification team has cross checked the value with registered PDD/01/, approved methodology AM0022 version 4 /06/ and found to be correct and consistent.
CEF	Fixed ex-ante as per registered PDD/01/. The value is calculated in accordance with the "Tool to calculate the emission factor for an electricity system" /34/ as determined by approved small scale methodology AMS-I.D version 13 dated 14/12/2007 /35/.	0.52 tCO_2/MWh	The verification team has cross checked the value with registered PDD/01/, approved methodology AMS-I.D" version 13 dated 14/12/2007 /35/, tool to calculate the emission factor for an electricity system /34/ and found to be correct and consistent.
EF_{HFO}	Fixed ex-ante as per registered PDD/01/. This is default valus as per 2006 IPCC guidelines for National GHG Inventories /30/.	77.4 tCO_2/TJ	The verification team has cross checked the value with registered PDD/01/ and found to be in line with the value provided in 2006 IPCC guidelines for National GHG Inventories /30/.
NCV_{HFO}	IPCC Default Value/30/. The methodology/06/ also refers to the IPCC default value in case the site specific local NCV values are not available.	0.0404 TJ/t	The verification team found that there is no site specific local NCV value available. Hence the default value provided in 2006 IPCC guidelines for National GHG Inventories/30/ is accepted.
$COD_{loss\ chem\ ox}$	Fixed ex-ante as per registered PDD/01/. The value is determined in accordance with AM0022 version 4 /06/.	0.651 kgCOD/kgQox	The verification team has cross checked the value with registered PDD/01/ and found to be correct and consistent.

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3.6.1.2 Monitored data

DATA/PARAMETER	*AM0022 ID1*
Data Unit	*m^3*
Description	*Wastewater flows entering the project treatment facility*
Source of data to be used	*Daily and monthly logbook from SCADA*
Value data for the monitoring period	*512,659 m^3*
Measuring frequency	*Continuously by flow meter*
Reporting frequency and recording procedure	*The readings were recorded and reported on a daily basis.*
Type of monitoring equipment	*Flow meter is of make Krohne and magnetic flow meter type with serial no. A0642633.*
Is accuracy of the monitoring equipment as stated in the PDD?	*The accuracy class of the meter is ±0.3% as obtained from technical specification of the equipment/21/. The registered PDD does not refer to any accuracy.*
Calibration frequency/interval	*The calibration of the equipment is carried out once in 3 years.*
Is the calibration interval in line with the monitoring plan of the PDD?	*The calibration shall be carried out subjecting to the appropriate industry standards. However there are no industrial standards available in Thailand for the calibration of the meter. However, the flow meter was calibrated on 20/9/2006 by Krohne and on 10/9/2009 by Miracle International Technology.*
How were the values in the monitoring report verified and cross-checked?	*The values that are provided in the ER calculation sheet /10/ and monitoring report /02/ were cross checked with the plant records /11/ during the onsite inspection and also with the soft copy of the plant records submitted by the PP.*
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions?	*The monitored data is recorded in both hard and soft copy on a daily basis which is then compiled together and sent to the consultant for the preparation of the ER sheet/10/.*
If only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	*The data is available for the whole monitoring period.*

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DATA/PARAMETER	*AM0022 ID2*
Data Unit	*m^3*
Description	*Wastewater flow leaving the project treatment facility*
Source of data to be used	*Daily and monthly logbook from SCADA*
Value data for the monitoring period	*512,659 m^3*
Measuring frequency	*Calculated using AM0022 ID 1 and hydrological balance*
Reporting frequency and recording procedure	*The readings were recorded and reported on a daily basis.*
Type of monitoring equipment	-
Is accuracy of the monitoring equipment as stated in the PDD?	-
Calibration frequency/interval	-
Is the calibration interval in line with the monitoring plan of the PDD?	-
How were the values in the monitoring report verified and cross-checked?	*The values that are provided in the ER calculation sheet/10/ and monitoring report/02/ were cross checked with the plant records during onsite inspection and also with soft copy of plant records/11/ submitted by PP.*
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions?	*The monitored data is recoded in both hard and soft copy on a daily basis which is then compiled together and sent to the consultant for preparation of the ER sheet.*
If only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	*The data is available for the whole monitoring period.*

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DATA/PARAMETER	*AM0022 ID3*
Data Unit	*kg COD/ m^3*
Description	*COD concentration of the wastewater entering the new anaerobic digestion system*
Source of data to be used	*Onsite measurement by using COD analyzer*
Value data for the monitoring period	*Average of 18.45 kg COD/ m^3 and 14.53 kg COD/ m^3 for the years 2008 and 2009 respectively.*
Measuring frequency	*Twice a day /11/*
Reporting frequency and recording procedure	*The readings were recorded and reported on a daily basis.*
Type of monitoring equipment	*Colori meter of make Hach and portable colori meter type with serial no. 070890C64902.*
Is accuracy of the monitoring equipment as stated in the PDD?	*The accuracy of the equipment is ±1%. The registered PDD does not refer to any accuracy.*
Calibration frequency/interval	*Annual*
Is the calibration interval in line with the monitoring plan of the PDD?	*As per the registered PDD, The Standard Solution Method is used for accuracy check of the onsite measurements. Periodic tests will be carried out by accredited laboratory (ISO/IEC 17025) in order to provide quality assurance. Test report of preventive maintenance by EnviScience Company Limited dated 12/11/2010 /12/.*
How were the values in the monitoring report verified and cross-checked?	*The values that are provided in the ER calculation sheet /10/ and monitoring report /02/ were cross checked with the plant records /11/ during the onsite inspection and also with the soft copy of the plant records submitted by the PP. The values were also cross checked with the periodic test reports /17/ carried out by a third party and found to matching. However since the calibration is not done annually, as per the guidelines for calibration requirements, (EB 52, Annex 60) /36/, the correction is applied to the values before accounting for the ER calculations.*
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions?	*The monitored data is recoded in both hard and soft copy on a daily basis which is then compiled together and sent to the consultant for preparation of the ER sheet/10/.*
If only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	*The data is available for the whole monitoring period.*

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DATA/PARAMETER	*AM0022 ID4*
Data Unit	*kg COD/ m^3*
Description	*COD concentration of the wastewater leaving the new anaerobic digestion system*
Source of data to be used	*Onsite measurement by using COD analyzer*
Value data for the monitoring period	*Average of 2.67 kg COD/ m^3 and 1.88 kg COD/ m^3 for the years 2008 and 2009 respectively.*
Measuring frequency	*Twice a day /11/*
Reporting frequency and recording procedure	*The readings were recorded and reported on a daily basis.*
Type of monitoring equipment	*Colori meter of make Hach and portable colori meter type with serial no. 070890C64902*
Is accuracy of the monitoring equipment as stated in the PDD?	*The accuracy of the equipment is ±1%. The accuracy of the equipment is not stated in the registered PDD*
Calibration frequency/interval	*Annual*
Is the calibration interval in line with the monitoring plan of the PDD?	*As per the registered PDD, The Standard Solution Method is used for accuracy check of the onsite measurements. Periodic tests will be carried out by accredited laboratory (ISO/IEC 17025) in order to provide quality assurance. Test report of preventive maintenance by EnviScience Company Limited dated 12/11/2010 /12/.*
How were the values in the monitoring report verified and cross-checked?	*The values that are provided in the ER calculation sheet/10/ and monitoring report/02/ were cross checked with the plant records/11/ during the onsite inspection and also with the soft copy of the plant records submitted by the PP. The values were also cross checked with the periodic test reports/17/ carried out by a third party and found to matching.* *However since the calibration is not done annually, as per the guidelines for calibration requirements, (EB 52, Annex 60) /36/, the correction is applied to the values before accounting for the ER calculations*
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions?	*The monitored data is recoded in both hard and soft copy on a daily basis which is then compiled together and sent to the consultant for preparation of the ER sheet/10/.*
If only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	*The data is available for the whole monitoring period.*

GOLD STANDARD VERIFICATION/CERTIFICATION REPORT

DATA/PARAMETER	*AM0022 ID5*
Data Unit	*Nm^3*
Description	*Volume of biogas sent to facility heaters*
Source of data to be used	*Daily and monthly logbook from SCADA*
Value data for the monitoring period	*1,834,812 Nm^3*
Measuring frequency	*Continuously by flow meter*
Reporting frequency and recording procedure	*The readings were recorded and reported on a daily basis.*
Type of monitoring equipment	*Flow meter of make Yokogawa/ Differential Pressure Transmitter type with serial no. 91FA19282639*
Is accuracy of the monitoring equipment as stated in the PDD?	*The accuracy of the equipment is ±0.4%. The accuracy of the equipment is not stated in the registered PDD*
Calibration frequency/interval	*Once in two years*
Is the calibration interval in line with the monitoring plan of the PDD?	*As per the registered PDD, the calibration shall be carried out subjecting to the appropriate industry standards. However there are no industrial standards available for the calibration of the meter. The flow meter was calibrated/12/ on 26/04/2007 by DWS and on 7/9/2009 by Miracle International Technology.*
How were the values in the monitoring report verified and cross-checked?	*The values that are provided in the ER calculation sheet/10/ and monitoring report/02/ were cross checked with the plant records/11/ during the onsite inspection and also with the soft copy of the plant records/11/ submitted by the PP.*
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions?	*The monitored data is recoded in both hard and soft copy on a daily basis which is then compiled together and sent to the consultant for preparation of the ER sheet/10/.*
If only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	*The data is available for the whole monitoring period.*

GOLD STANDARD VERIFICATION/CERTIFICATION REPORT

DATA/PARAMETER	*AM0022 ID7*
Data Unit	*MWh*
Description	*Electricity generated from collected biogas*
Source of data to be used	*Daily and monthly logbook from SCADA*
Value data for the monitoring period	*249 MWh and 1023 MWh in the years 2008 and 2009 respectively.*
Measuring frequency	*Continuously by electricity meter*
Reporting frequency and recording procedure	*The readings were recorded and reported on a daily basis.*
Type of monitoring equipment	*Flow meter of make DEIF and Multi – Line PPU/2/GS type with serial no. A004997*
Is accuracy of the monitoring equipment as stated in the PDD?	*As per the technical specifications/21/ of DEIF: Designer's Reference Handbook, multi-line 2 PPU – version 2/GS 4189340354C dated 17/03/2010 the accuracy of the equipment is Class 1.0 according to IEC 688. The accuracy of the equipment is not stated in the registered PDD.*
Calibration frequency/interval	*Annual*
Is the calibration interval in line with the monitoring plan of the PDD?	*As per the registered PDD, the calibration shall be carried out subjecting to the appropriate industry standards. However there are no industrial standards available for the calibration of the meter. The electricity meter after initial calibration and installation on 08/12/2008 was calibrated/12/ again on 21/02/2010 by Power Maintenance and Services.*
How were the values in the monitoring report verified and cross-checked?	*The values that are provided in the ER calculation sheet/10/ and monitoring report/02/ were cross checked with the plant records/11/ during the onsite inspection and also with the soft copy of the plant records/11/ submitted by the PP.*
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions?	*The monitored data is recoded in both hard and soft copy on a daily basis which is then compiled together and sent to the consultant for preparation of the ER sheet/10/.*
If only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	*The data is available for the whole monitoring period.*

GOLD STANDARD VERIFICATION/CERTIFICATION REPORT

DATA/PARAMETER	*AM0022 ID8*
Data Unit	*m^3*
Description	*Fossil fuel volume equivalent required to generate same amount of heat generated from the biogas collected in anaerobic treatment facility.*
Source of data to be used	*Calculated based on amount of biogas sent to the boilers and crosschecked using historic specific heavy fuel oil consumption.*
Value data for the monitoring period	*730 m^3 and 339 m^3 for the years 2008 and 2009 respectively.*
Measuring frequency	*Not Applicable as no equipment is involved*
Reporting frequency and recording procedure	*The readings were reported on a daily basis.*
Type of monitoring equipment	*Not Applicable as no equipment is involved*
Is accuracy of the monitoring equipment as stated in the PDD?	*Not Applicable as no equipment is involved*
Calibration frequency/interval	*Not Applicable as no equipment is involved*
Is the calibration interval in line with the monitoring plan of the PDD?	*Not Applicable as no equipment is involved*
How were the values in the monitoring report verified and cross-checked?	*The values that are provided in the ER calculation sheet/10/ and monitoring report/02/ were cross checked with the plant records/11/ (from where the input values are taken for calculation of this parameter) during the onsite inspection and also with the soft copy of the plant records submitted by the PP.*
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions?	*The parameter is recoded in both hard and soft copy on a daily basis which is then compiled together and sent to the consultant for preparation of the ER sheet/10/.*
If only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	*The data is available for the whole monitoring period.*

GOLD STANDARD VERIFICATION/CERTIFICATION REPORT

DATA/PARAMETER	*AM0022 ID9*
Data Unit	*Nm^3*
Description	*Biogas sent to flares*
Source of data to be used	*Daily and monthly logbook from SCADA*
Value data for the monitoring period	*2,558,994 Nm^3*
Measuring frequency	*Continuously by flow meter*
Reporting frequency and recording procedure	*The readings were recorded and reported on a daily basis.*
Type of monitoring equipment	*Flow meter of make ABB and Differential Pressure Transmitter type with serial no. 265DS6600028458*
Is accuracy of the monitoring equipment as stated in the PDD?	*The accuracy of the equipment is ±0.04%. The accuracy of the equipment is not stated in the registered PDD*
Calibration frequency/interval	*Annual*
Is the calibration interval in line with the monitoring plan of the PDD?	*As per the registered PDD, the calibration shall be carried out subjecting to the appropriate industry standards. However there are no industrial standards available for the calibration of the meter. The flow meter was calibrated/12/ on 18/04/2008 by DWS and on 07/09/2009 by Miracle International Technology.*
How were the values in the monitoring report verified and cross-checked?	*The values that are provided in the ER calculation sheet/10/ and monitoring report/02/ were cross checked with the plant records/11/ during the onsite inspection and also with the soft copy of the plant records submitted by the PP.*
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions?	*The monitored data is recoded in both hard and soft copy on a daily basis which is then compiled together and sent to the consultant for preparation of the ER sheet/10/.*
If only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	*The data is available for the whole monitoring period.*

GOLD STANDARD VERIFICATION/CERTIFICATION REPORT

DATA/PARAMETER	*AM0022 ID10*
Data Unit	*m^3*
Description	*Biogas sent to gen Ritva OK sets A and B*
Source of data to be used	*Daily and monthly logbook from SCADA*
Value data for the monitoring period	*718,736 Nm^3*
Measuring frequency	*Continuously by flow meters*
Reporting frequency and recording procedure	*The readings were recorded and reported on a daily basis.*
Type of monitoring equipment	*Genset A: Flow meter of make ABB and Differential Pressure Transmitter type with serial no. 265DS6600032493 and accuracy class of ±0.04%* *Genset B: Flow meter of make ABB and Differential Pressure Transmitter type with serial no. 265DS6600028459 and accuracy class of ±0.04%*
Is accuracy of the monitoring equipment as stated in the PDD?	*The accuracy of the both the equipments is ±0.04%. The accuracy of the equipment is not stated in the registered PDD*
Calibration frequency/interval	*Annual*
Is the calibration interval in line with the monitoring plan of the PDD?	*As per the registered PDD, the calibration shall be carried out subjecting to the appropriate industry standards. However there are no industrial standards available for the calibration of the meter.* *Flow meter with serial no. 265DS6600032493 was calibrated/12/ on 18/04/2008 by DWS and on 07/09/2009 by Miracle International Technology.* *Flow meter with serial no. 265DS6600028459 was calibrated/12/ on 21/04/2008 by DWS and on 07/09/2009 by Miracle International Technology.*
How were the values in the monitoring report verified and cross-checked?	*The values that are provided in the ER calculation sheet/10/ and monitoring report/02/ were cross checked with the plant records/11/ during the onsite inspection and also with the soft copy of the plant records submitted by the PP.*
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions?	*The monitored data is recoded in both hard and soft copy on a daily basis which is then compiled together and sent to the consultant for preparation of the ER sheet/10/.*
If only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	*The data is available for the whole monitoring period.*

GOLD STANDARD VERIFICATION/CERTIFICATION REPORT

DATA/PARAMETER	*AM0022 ID11*
Data Unit	*%*
Description	*Methane concentration in biogas*
Source of data to be used	*Daily and monthly logbook from SCADA*
Value data for the monitoring period	*Period from 25/05/2008 to 24/09/2008 (Non measuring period): 62.718% for baseline and 66.349% for project emissions* *Period from 25/09/2008 to 31/12/2008: 64.56%* *Period from 01/01/2009 to 24/03/2009: 67.35%*
Measuring frequency	*Continuously by methane analyzer*
Reporting frequency and recording procedure	*The readings were recorded and reported on a daily basis.*
Type of monitoring equipment	*Methane analyzer with serial no. ARYK-0131 and accuracy class of ±1%*
Is accuracy of the monitoring equipment as stated in the PDD?	*The accuracy of the equipment is not stated in the registered PDD*
Calibration frequency/interval	*Once in two years*
Is the calibration interval in line with the monitoring plan of the PDD?	*As per the registered PDD, the calibration shall be carried out subjecting to the appropriate industry standards. However there are no industrial standards available for the calibration of the meter. The analyzer was calibrated/12/ on 14/12/2007 by DWS and on 02/10/2009 by Miracle International Technology.*
How were the values in the monitoring report verified and cross-checked?	*The values that are provided in the ER calculation sheet/10/ and monitoring report/02/ were cross checked with the plant records/11/ during the onsite inspection and also with the soft copy of the plant records submitted by the PP.*
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions?	*The monitored data is recoded in both hard and soft copy on a daily basis which is then compiled together and sent to the consultant for preparation of the ER sheet/11/.*
If only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	*The parameter was not measured from 25/05/2008 to 24/09/2008 till the installation of the continuous methane analyzer. The PP has applied student-t approach/23/ /24/ for arriving at the conservative value for this period. In this approach PP has estimated the data by applying 99% confidence level /16/ to the monitored data for the rest of monitoring period (25/09/2008 to 24/03/2009) and also to the monitored data in the next year for the same monitoring period (25/05/2009 to 24/09/2009). The resultant values were then compared and the most conservative value of these values was then used in the ER calculations. This approach is in accordance to the clarification provided by GS board to PP in this regard through an email dated 18/11/2010 /16/.*

GOLD STANDARD VERIFICATION/CERTIFICATION REPORT

DATA/PARAMETER	*AM0022 ID12*
Data Unit	*tCO_2e*
Description	*Project emissions from flaring of the residual gas stream*
Source of data to be used	*Calculated base on calculation procedure provided in the Tool to determine project emissions from flaring gases containing methane.*
Value data for the monitoring period	*12,675.50 tCO_2e*
Measuring frequency	*Not Applicable as the parameter is calculated*
Reporting frequency and recording procedure	*The estimations were reported on daily basis.*
Type of monitoring equipment	-
Is accuracy of the monitoring equipment as stated in the PDD?	-
Calibration frequency/interval	-
Is the calibration interval in line with the monitoring plan of the PDD?	-
How were the values in the monitoring report verified and cross-checked?	*Since this parameter is calculated based on the monitoring parameters AM0022 ID9 and AM0022 ID11 in accordance with the Tool to determine project emissions from flaring gases containing methane, the calculations were checked and found to be correct.*
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions?	*The parameter is recoded in both hard and soft copy on a daily basis which is then compiled together and sent to the consultant for preparation of the ER sheet/10/*
If only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	*The data is available for the whole monitoring period.*

GOLD STANDARD VERIFICATION/CERTIFICATION REPORT

DATA/PARAMETER	*AM0022 ID13*
Data Unit	*Tonnes/m^3*
Description	*Amount of chemical oxidizing agents entering system boundary*
Source of data to be used	*Daily and monthly logbook from SCADA*
Value data for the monitoring period	*Tonnes/m^3*
Measuring frequency	*Continuously monitored whether oxidative chemical species are utilized in the process.*
Reporting frequency and recording procedure	*The readings were recorded and reported on a regular basis.*
Type of monitoring equipment	*Colorimeter of make Hach and portable colori meter type with serial no. 070890C64902.*
Is accuracy of the monitoring equipment as stated in the PDD?	*The accuracy of the equipment is ±1%. The accuracy of the equipment is not stated in the registered PDD*
Calibration frequency/interval	*Annual*
Is the calibration interval in line with the monitoring plan of the PDD?	*As per the registered PDD, The Standard Solution Method is used for accuracy check of the onsite measurements. Periodic tests will be carried out by accredited laboratory (ISO/IEC 17025) in order to provide quality assurance. Test report of preventive maintenance by EnviScience Company Limited dated 12/11/2010 /12/.*
How were the values in the monitoring report verified and cross-checked?	*The values that are provided in the ER calculation sheet/10/ and monitoring report/02/ were cross checked with the sample test reports/17/ carried out regularly.* *However since the calibration is not done annually, as per the guidelines for calibration requirements, (EB 52, Annex 60) /36/, the correction is applied to the values before accounting for the ER calculations*
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions?	*The sample test reports are compiled together and sent to the consultant for preparation of the ER sheet/10/.*
If only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	*The data is available for the whole monitoring period.*

GOLD STANDARD VERIFICATION/CERTIFICATION REPORT

DATA/PARAMETER	*AM0022 ID14*
Data Unit	*%*
Description	*Gen set combustion efficiency (combustion of CH_4)*
Source of data to be used	*Not Monitored*
Value data for the monitoring period	*99%*
Measuring frequency	*The parameter was not measured hence not applicable*
Reporting frequency and recording procedure	-
Type of monitoring equipment	-
Is accuracy of the monitoring equipment as stated in the PDD?	-
Calibration frequency/interval	-
Is the calibration interval in line with the monitoring plan of the PDD?	-
How were the values in the monitoring report verified and cross-checked?	*The parameter was not measured in the current monitoring period. The ex-ante value in registered PDD is used in the ER calculations.*
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions?	-
If only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	*As per the registered monitoring plan, the parameter is to be Measured during regular O&M cycle (minimum annually). However, the measurement of the parameter was carried out after the current monitoring period/11/. The measured values/32/ after the monitoring period (99.99%) were crosschecked with that of the ex-ante value (99%) used in the registered PDD and found that the ex-ante value is conservative. Hence the ex-ante value is considered for the current monitoring period.*

GOLD STANDARD VERIFICATION/CERTIFICATION REPORT

DATA/PARAMETER	*AM0022 ID15*
Data Unit	*%*
Description	*Heating system combustion efficiency (combustion of methane)*
Source of data to be used	*Not Monitored*
Value data for the monitoring period	*99%*
Measuring frequency	*The parameter was not measured hence not applicable*
Reporting frequency and recording procedure	-
Type of monitoring equipment	-
Is accuracy of the monitoring equipment as stated in the PDD?	-
Calibration frequency/interval	-
Is the calibration interval in line with the monitoring plan of the PDD?	-
How were the values in the monitoring report verified and cross-checked?	*The parameter was not measured in the current monitoring period. The ex-ante value in registered PDD is used in the ER calculations.*
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions?	-
If only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	*As per the registered monitoring plan the parameter is to be Measured during regular O&M cycle (min annually). However the measurement of the parameter was carried out after the current monitoring period. Measured values/32/ after the monitoring period (99.99%) were crosschecked with that of the ex-ante (99%) value used in registered PDD and found that ex-ante value is conservative. Hence ex-ante value is considered for current monitoring period.*

GOLD STANDARD VERIFICATION/CERTIFICATION REPORT

DATA/PARAMETER	*AM0022 ID17*
Data Unit	*m^3*
Description	*Loss of biogas from pipeline*
Source of data to be used	*Estimated, spot checks using mobile leak detector. Noticed instantly on SCADA screen.*
Value data for the monitoring period	*-*
Measuring frequency	*spot checks on daily basis using mobile leak detector*
Reporting frequency and recording procedure	*The readings were recorded and reported as and when basis.*
Type of monitoring equipment	*mobile leak detector*
Is accuracy of the monitoring equipment as stated in the PDD?	*The accuracy of the equipment is not stated in the registered PDD*
Calibration frequency/interval	*Calibration is required only when the device indicates error. No specific interval is established for calibration of the equipment.*
Is the calibration interval in line with the monitoring plan of the PDD?	*The PP has not committed for any calibration interval. The lifetime/21/ of the equipment is 2 years and no calibration is required unless or otherwise the device indicates error. The calibration was not required to be carried out for the current monitoring period.*
How were the values in the monitoring report verified and cross-checked?	*The values that are provided in the ER calculation sheet/10/ and monitoring report/02/ were cross checked with the gas leakage test report/18/ carried out by Global Water Engineering Ltd. Hong Kong, on 19/09/2009 and 20/09/2009 submitted by the PP.*
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions?	*The monitored data is recoded in both hard and soft copy on a daily basis which is then compiled together and sent to the consultant for preparation of the ER sheet/10/.*
If only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	*The data is available for the whole monitoring period.*

GOLD STANDARD VERIFICATION/CERTIFICATION REPORT

DATA/PARAMETER	*AM0022 ID18*
Data Unit	*t COD*
Description	*Organic material removed from wastewater facility*
Source of data to be used	*On site measurement using the weigh bridge available at the project site*
Value data for the monitoring period	*0*
Measuring frequency	*Recorded as and when the organic material is removed from the reactor*
Reporting frequency and recording procedure	*The readings shall be recorded and reported as and when the organic material is removed from the reactor*
Type of monitoring equipment	*weigh bridge with serial number 2005352*
Is accuracy of the monitoring equipment as stated in the PDD?	*The accuracy of the equipment is not stated in the registered PDD*
Calibration frequency/interval	*Once in every two years/02/*
Is the calibration interval in line with the monitoring plan of the PDD?	*The PP has not committed for any calibration interval*
How were the values in the monitoring report verified and cross-checked?	*Not applicable as the event is not occurred during the current monitoring period and hence the parameter is not monitored.*
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions?	*Not applicable as the parameter is not monitored.*
If only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	*The data is available for the whole monitoring period.*

GOLD STANDARD VERIFICATION/CERTIFICATION REPORT

DATA/PARAMETER	*AM0022 ID19*
Data Unit	*J/Nm^3*
Description	*Biogas calorific value*
Source of data to be used	*Measured/ calculated through ID11 and using perfect gas equation, assuming that only the methane content contributes to the NCV of the biogas*
Value data for the monitoring period	-
Measuring frequency	*Not Applicable as the parameter is not measured*
Reporting frequency and recording procedure	-
Type of monitoring equipment	-
Is accuracy of the monitoring equipment as stated in the PDD?	-
Calibration frequency/interval	-
Is the calibration interval in line with the monitoring plan of the PDD?	-
How were the values in the monitoring report verified and cross-checked?	*The ex-ante value provided in the registered PDD was used in the ER calculations for the current monitoring period.*
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions?	*Not Applicable as the ex-ante value of the parameter is used for the ER calculations.*
If only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	*The data is available for the whole monitoring period.*

GOLD STANDARD VERIFICATION/CERTIFICATION REPORT

DATA/PARAMETER	*Flame detection period*
Data Unit	*min*
Description	*Flame detection period*
Source of data to be used	*The flare detection signal is recorded via an automated system, which is integral part of flare system*
Value data for the monitoring period	-
Measuring frequency	*Continuous*
Reporting frequency and recording procedure	*The readings were recorded and reported on a regular basis.*
Type of monitoring equipment	*The monitoring of the parameter is done by an automated system, which is integral part of flare system*
Is accuracy of the monitoring equipment as stated in the PDD?	*The accuracy of the equipment is not stated in the registered PDD*
Calibration frequency/interval	*Since it is an integral part of the flare system, no calibration of the equipment is required.*
Is the calibration interval in line with the monitoring plan of the PDD?	*The PP has not committed for any calibration interval*
How were the values in the monitoring report verified and cross-checked?	*The system operates on automatic logic which ensures flare operation at times, and stops the gas supply to flare in case flame is not detected by the system. Hence the flare efficiency is fixed at 50% as per the methodology /06/ and tool/15/. The team has crosschecked the operation of the flare system during the onsite inspection.*
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions?	*The monitored data is recorded on a regular basis which is then compiled together and sent to the consultant for preparation of the ER calculations.*
If only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	*The data is available for the whole monitoring period.*

GOLD STANDARD VERIFICATION/CERTIFICATION REPORT

DATA/PARAMETER	*Period of biogas being sent to the flare*
Data Unit	*min*
Description	*Period of biogas being sent to the flare*
Source of data to be used	*minute to minute flame detection record available in SCADA*
Value data for the monitoring period	-
Measuring frequency	*Continuous*
Reporting frequency and recording procedure	*The readings were recorded and reported on a daily basis.*
Type of monitoring equipment	*The monitoring of the parameter is done by an automated system, which is an integral part of flare system*
Is accuracy of the monitoring equipment as stated in the PDD?	*The accuracy of the equipment is not stated in the registered PDD*
Calibration frequency/interval	*Since it is an integral part of the flare system, no calibration of the equipment is required.*
Is the calibration interval in line with the monitoring plan of the PDD?	*The PP has not committed for any calibration interval*
How were the values in the monitoring report verified and cross-checked?	*The system operates on automatic logic which ensures flare operation at times, and stops the gas supply to flare in case flame is not detected by the system. Hence the flare efficiency is fixed at 50% as per the methodology/06/ and tool/15/. The team has crosschecked the operation of the flare system during the onsite inspection.*
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions?	*The monitored data is recoded on a regular basis which is then compiled together and sent to the consultant for preparation of the ER calculations.*
If only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	*The data is available for the whole monitoring period.*

3.6.1.3 Gold standard monitoring parameters

Data variable	*Source of data*	*Reported value for the project period*	*Assessment*
Number of employed staffs and the level of income generation.	The records/28/ of the payments made to the employees.	2008: 14 nos 2009:13 nos	The project activity has provided the employment to the local personnel in terms of temporary and permanent employment. This is in line with what is committed by the PP during the validation of the project activity. Hence there is no change in the GS indicator.
Amount of sludge removed and type of application	Plant records /11/	0 – as there is no sludge removal from the reactor is taken place for the current monitoring period.	There is no change in the GS indicator as there is no sludge removal has taken place in the current monitoring period.
Volume of biogas production and combustion (Nm^3) Air quality	AM0022 ID 5 – Volume of biogas sent to facility heater AM0022 ID 9 – Volume of biogas sent to flare AM0022 ID 10 – Volume of biogas sent to generation	Biogas combusted for the years 2008: 3,583,489 Nm^3 2009: 1,529,053 Nm^3	All the gas that is produced in the wastewater treatment system is being destroyed either in the boiler or sent to the de-suplharization system from which the biogas is diverted to the gas engine. Hence the total biogas combusted in the boiler, flare and engines is equal to the total biogas generated. This particular parameter is measured for analysing the reduction of odour due to project activity in the surrounding areas. This is in line with what is committed by the PP during the validation of the project activity. Hence there is no change in the GS indicator.

3.7 Accuracy of emission reduction calculations

The emission reduction calculations provided in the spreadsheet/10/ have been verified to be correct and in line with the registered PDD /01/.
The emission reductions from the project for the monitoring period as reported in the monitoring report revision 1.3 of 18/11/2010 /02/ is equivalent to 14,657 tCO_2e. The reported emission reductions are 81.95% lower than the estimated emission reduction of 81,179 tCO_2e for the period as per the registered PDD/01/. The PP has informed that the variation is due to the fact that the electricity generated is not yet connected to the grid and the biogas consumption is lower that what is estimated. This is also confirmed by checking the data logs of the central SCADA monitoring system /11/.
The data presented in the monitoring report /02/ were assessed by reviewing in detail project documentation, collection of monitored data, observation of established monitoring and reporting practices and assessment of the reliability of monitoring equipment. Sufficient evidence was presented and verified by RINA for the reported emission reductions as listed in the above Section 3.4.2.2.

3.8 Management system and quality control

The management has identified a separate team for effective monitoring of the parameters as per the registered monitoring plan and reporting of actual emission reductions achieved to the management. The following are the details of the identified team and their responsibilities.
Head of Quality Control
Checks the completeness of the parameters monitored recorded into the log books and provides the daily report based on the reporting procedures for the biogas plant
Sends the daily report to the plant manager and managing director
Sends aggregated reports to the project consultant on a regular basis
Transfers all of the parameters monitored in log books into the electronic log file on daily basis
Ensures the timely calibrations of the monitoring equipment
Regularly backs up the data from the electronic reports
Quality Control Staff
Takes samples and analyzes characteristics of wastewater based on the reporting procedures for the biogas plant
Biogas system controller
Fills in the data monitored for biogas system from the process control unit to the log books based on the reporting procedures for the biogas plant
Power system controller
Fills in the data monitored for power system from the process control unit to the log books based on the reporting procedures for the biogas plant
Plant Manager
Supervises and signs off the daily report
The reporting of monitored parameters is done on a daily basis by the plant staff in form of daily log reports. The data is then transferred into the soft copy, which is used for the calculation of emission reductions and the daily reporting, respectively. The head of QC team updates the summary daily report to the plant manager and the compiled data to the managing director. The data is further sent to the project consultants for detailed emission reduction analysis. The managing director and project consultant interact on regular basis to discuss emission reduction reporting.
QA / QC Procedures:
The QC team ensures the timely calibrations of the monitoring devices, data acquisition and storage of data for the entire crediting period. Further, the data is stored for a period of 2 years after the completion of the crediting period.
During the onsite verification by RINA, it was noticed that the procedures are followed as per the management plan /27/.

The calculation of GS VERs for the first verification period is carried out through the spreadsheet “059_CYY_GSVER_Verification_Ver1 1_101118, dated 18/11/2010”. The on site visit at CYY Biopower wastewater treatment plant confirmed that the monitoring and reporting is carried out consistently and in line with the established procedures.

4 VERIFICATION AND CERTIFICATION OPINION

RINA Services SpA (RINA) has performed verification of the emission reductions reported for the project activity "CYY Biopower Wastewater treatment plant including biogas reuse for thermal oil replacement and electricity generation project, Thailand", in Thailand, GS Registration Reference N° 560, for the period 25/05/2008 to 24/03/2009 – both days inclusive, with regard to the relevant requirements for GS activities.
The project participants of the "CYY Biopower Wastewater treatment plant including biogas reuse for thermal oil replacement and electricity generation project, Thailand" project are responsible for:

- the preparation of greenhouse gas emissions data and the reported greenhouse gas emission reductions from the project on the basis set out in the monitoring plan contained in the registered project design document version 03 of 09/03/2009
- the development and maintenance of records and reporting procedures in accordance with that plan, including the calculation and determination of greenhouse gas emission reductions of the project

It is the responsibility of RINA to express an independent verification opinion about the project's conformity with the requirements of paragraph 62 of the CDM modalities and procedures, GS requirements and on the reported greenhouse gas emission reductions from the project.

Based on documented evidence and corroborated by an on-site assessment RINA can confirm that:

- the project has been implemented and operated as per the registered PDD and Passport;
- the monitoring report and other supporting documents provided are complete and verifiable and in accordance with the applicable CDM and GS requirements;
- monitoring is in place as per the applied baseline and monitoring methodology;
- monitoring complies with the monitoring plan in the registered PDD and Passport;
- the monitoring plan in the registered PDD and Passport is as per the applied baseline and monitoring methodology.

It is RINA's opinion that the GHG emission reductions stated in the monitoring report version 1.4 of 20/01/2011 for the "CYY Biopower Wastewater treatment plant including biogas reuse for thermal oil replacement and electricity generation project, Thailand" project in Thailand for the period 25/05/2008 to 24/03/2009 – both days inclusive are fairly stated. The GHG emission reductions were calculated correctly, the sustainability development indicators were correctly monitored, on the basis of the approved monitoring methodology "AM0022", "Avoided Wastewater and On-site Energy Use Emissions in the Industrial Sector", version 4 of EB28 and the monitoring plan contained in the registered PDD.

Hence RINA is able to certify that the emission reductions from the project during the monitoring period 25/05/2008 to 24/03/2009 amounting to 14,657 tCO_2e as follows:

Year 2008: for the period 25/05/2008 to 31/12/2008 - 5,976 tCO_2e and

Year 2009: for the period 01/01/2009 to 24/03/2009 - 8,681 tCO_2e.

Chennai, 09/02/2011

R. Reghu Kumar

CDM/GS Team Leader
RINA India Private Limited.

Genova, 16/02/2011

Paolo Teramo

Authorized officer signing for the DOE
RINA Services S.p.A.

APPENDIX A

GOLD STANDARD VERIFICATION PROTOCOL

TABLE 1 REQUIREMENTS CHECKLIST

Checklist Question		Reference	MoV[1]	Comments	Draft Conclusion	Final Conclusion
A	**Description of Project Activity**					
A.1	Title of the project activity, revision number and date of Monitoring Report	/01/, /02/, /03/, /07/, /10/	DR	The title of the project activity is "CYY Biopower Wastewater treatment plant including biogas reuse for thermal oil replacement and electricity generation Project, Thailand" dated 15/06/2010. The title of the project activity is cross checked with the registered PDD and confirmed. 1. The monitoring period of the pre CDM VERs for the project activity is from 25/05/2008 to 24/03/2009. As per the GS requirements version 2.1 PP can choose the monitoring period for the pre CDM VERs either one year prior to the CDM registration or two years prior to the GS registration of the project activity. PP has opted for the second option i.e. two years prior to the GS registration. 2. The GS registration date of the project activity mentioned by the PP is 24/05/2010 where as the GS registry website is showing the registration date as 01/06/2010. However PP has submitted the mail communications from GS foundation to PP dated 27/05/2010 and 07/06/2010 as the evidences supporting the GS registration date of project activity as 24/05/2010. The verification team has cross checked the same and confirmed the GS registration date as 24/05/2010. The CDM registration date of the project activity is 25/03/2009 which is confirmed from the UNFCCC website under the project reference number 2141. Hence as such there is no double counting. 3. Hence the chosen monitoring period is in line with the GS requirements. However the revision number of the monitoring report and the credits availed for the project activity for the various vintages are not transparent in the monitoring report. 4. PP is requested to compare the estimated and actual VERs in the monitoring report. 5. PP is also requested to revise the monitoring report addressing the minimum requirements of the EB template for	~~**CAR 1**~~	**OK**

[1] MoV: DR document review, I interview, CC cross checking

Checklist Question		Reference	MoV[1]	Comments	Draft Conclusion	Final Conclusion
				monitoring report.		
A.2	Is the actual implementation and operation of the proposed project activity in accordance with the project activity in the registered PDD?	/01/, /10/	DR, I	The implementation and operation of the project activity is in line with the description provided in the registered PDD. The same is confirmed during the site visit on 11/10/2009 and noted that the PP has implemented the anaerobic UASB biogas reactor and the recovered biogas is being utilised for the generation of electricity in the biogas engines (2 x 1.36 MW capacities each). Further it is noticed that part of the gas is utilised in the boilers installed for starch drying. During site visit, it is also noticed that the generated electricity is being utilised in the starch plant itself since the grid connectivity is not effected at that point in time. PP is requested to intimate the current status of the grid connectivity and to furnish supporting evidence for the date on which the connection to grid is effected	~~**CR 1**~~	**OK**
A.3	Methodology applied for the registered project activity	/01/, /06/, /10/	DR, I	The project activity applied the approved methodology AM0022 "Avoided Wastewater and On-site Energy Use Emissions in the Industrial Sector" version 04, EB28 Annex 8. The project activity also applies the following tools "Tool to determine project emissions from flaring gases containing methane" of EB 28 and "Tool to calculate the emission factor for an electricity system" version 1 dated 17/07/2009.	**OK**	**OK**
B	**Monitoring**					
B.1	**Monitoring plan**					
B.1.1	Does the monitoring plan included in the registered GS project activity comply with the applied methodology?	/01/, /06/, /08/, /10/	DR, I	The monitoring plan provided in the registered GS project activity is in line with the approved methodology AM0022 applied to the project activity.	**OK**	**OK**
B.1.2	Does the monitoring comply with the monitoring plan in the registered PDD?	/01/, /06/, /08/, /09/, /10/, /11/	DR, I	No, there is a deviation in implementing the monitoring plan for the current monitoring period. 1. As per the registered PDD the Methane percentage in the biogas has to be monitored continuously using the online methane whereas it was determined by establishing 95% confidence analyzer. Interval for the available data before the installation of continuous analyzer (i.e. from 25/05/2008 to 24/09/2008). The explanation provided by the PP for the conservativeness of the value taken for this period is not	~~**CAR 2**~~	**OK**

Checklist Question		Reference	MoV[1]	Comments	Draft Conclusion	Final Conclusion
				justified as the methane percentage in the biogas is a crucial parameter which has a great impact on the calculation of emission reductions achieved by the project activity. 2. As per the registered PDD the Combustion efficiency of gas engine and the boiler are measured during the monitoring period. PP is requested to clarify why the combustion efficiencies of both boiler and Gen set are not monitored during the current monitoring period. Moreover it is contradicting with the statement given by PP in Annex 2 of the monitoring report. Further the explanation provided by the PP for the conservativeness of the value taken for this period is not justified. 3. As per the registered PDD the bypass wastewater to the lagoon system has to be monitored. This parameter is not monitored in the current monitoring period. However as the parameter has no effect on either baseline or project emissions of project activity, Project proponent has applied for a revision in CDM Monitoring plan. The revision of monitoring plan is approved by the UNFCCC on 12/08/2010. 4. The Plant operation log sheets submitted by the PP are not complete. The log sheets are missing for some of the days.		
B.1.3	Do the sustainability indicators included in the monitoring report comply with the minimum contents specified in paragraph 4.1 of the GS toolkit?	/01/, /06/, /08/, /10/	DR, I	Yes. The sustainable indicators included in the monitoring report are reduction in odour from the wastewater treatment plant, Monitoring of sludge application and employment (numbers) due to the project activity. These parameters are represented in a table as per the form used in GS Annex. The volume of biogas production and combustion are used as the tools to demonstrate the status of the odour. The monitoring data of these tools are also provided through the data entry sheets (log sheets). The monitoring report states that there is no sludge removal has taken place during the current monitoring period. However the monitoring report is not transparent on the number of employed staffs and the level of income generation which is used as a tool for demonstrating the status of the employment. PP is requested to submit the same. Also the monitoring report is not transparent on the scoring of the indicators compared to the	~~**CAR 3**~~	**OK**

Checklist Question		Reference	MoV[1]	Comments	Draft Conclusion	Final Conclusion
				baseline indicator situation.		
B.1.4	Have any changes been made to the key sustainable development indicators?	/01/, /06/, /08/, /10/	DR, I	The key sustainable development indicators identified in the GS Annex to be monitored are odour from the wastewater treatment plant (Air Quality), monitoring of sludge application and employment (numbers) provided by the project activity. These parameters were monitored for the current crediting period. Hence there is no change made to the key sustainable development indicators. However the monitoring report is not transparent on number of employed staffs and the level of income generation which is used as a tool for demonstrating the status of the employment. PP is requested to submit the same. Refer section B.1.3 above	~~CAR 3~~	**OK**
B.2	**Data and parameters that are available at validation and that are not monitored**					
B.2.1	Which parameters were available at validation and how were they verified?	/01/, /06/, /08/, /10/	DR, I	There were 18 parameters available at the time of validation for the calculation of emission reductions that can be achieved by the project activity. All these parameters are listed below along with its value applied at the time of validation and their sources. 1. Methane emission factor (EF_{CH4}) – the value taken was 0.21 kg CH_4 / kg COD, which is a IPCC default value 2. Organic material removal ratio (R_{lagoon}) – 98.90 % which is derived from the historical COD data wastewater entering and leaving the open anaerobic lagoon treatment system as per the approved methodology AM0022 3. Surface Aerobic Losses Factor - 254 kg COD/ha/day which is a default value as per approved methodology AM0022 4. Chemical Oxidation Losses Factor - 0.0494 kg COD/m^3 which is a default value as per approved methodology AM0022 5. Organic material deposition ratio ($R_{deposition}$) - 7.05 % which is a comparison of total COD concentration vs. soluble COD concentration of wastewater entering the open lagoon treatment system as per the approved methodology AM0022 6. Proportion of methane emitted from UASB digesters (E_{CH4_NAWTF}) – 1% which is provided by provided by technology provider 7. Total organic material removal efficiency of the new project wastewater facility (R_{NAWTF}) - 90% which is provided by	~~CAR 4~~	**OK**

Checklist Question	Reference	MoV[1]	Comments	Draft Conclusion	Final Conclusion
			provided by technology provider 8. Proportion of biogas destroyed by combustion in the boilers used for heat generation (f_{boiler}) – 98.5%, which is taken based on technical literature and manufacturer's specifications of similar boilers. This is a conservative value compared to that of IPCC default value (100%) 9. Proportion of biogas destroyed by combustion in the engine used for electricity generation (f_{engine}) – 99% which is taken based on technical literature and manufacturer's specifications of similar engines. This is a conservative value compared to that of IPCC default value (100%) 10. Carbon emission factor for the electricity displaced by the electricity generated from the biogas (CEF) – 0.52 tCO_2/ MWh, which is calculated as per the Tool to calculate the emission factor for an electricity system by using the data obtained from Electricity Generation Authority of Thailand (EGAT). 11. Carbon emission factor of heavy fuel oil (EF) - 77.40 tCO_2/MWh, which is a default value taken from IPCC guidelines for National GHG Inventories 12. Net calorific value of heavy fuel oil (NCV) - 0.0404 Tj/t, which is a default value taken from IPCC guidelines for National GHG Inventories 13. Density of methane (CH_4) - 0.716 kg CH_4 / Nm^3 CH_4, which is a default value as per the tool to determine project emissions from flaring gases containing methane 14. Lagoon surface area – 25.18 ha which is obtained based on the layout of the lagoon 15. Flare efficiency for open flare – 0% & 50% which is determined as per Tool to determine project emissions from flaring gases containing methane 16. Specific heavy fuel oil consumption – 0.033 t HFO/t starch which is the Historic average heavy fuel oil consumption per ton of output (ton of dry starch) for the year 2006/07 obtained from publicly available http://www.dede.go.th/dede/fileadmin/usr/wpd/static/oil_and_thailand_2006/41Table36.pdf 17. Specific electricity consumption 0.222 MWh/t starch, which is obtained from the Historic average electricity consumption per		**OK**

Checklist Question		Reference	MoV[1]	Comments	Draft Conclusion	Final Conclusion
				ton of output (ton of dry starch) for the year 2006 and 2007 The team verified all the ex-ante values with the IPCC and the values as stated as default in the applied methodology and noted that PP uses all the values as fixed ex-ante and there is no inconsistency on usage of the ex-ante fixed values. However, the point no 28 in page no. 13 of the monitoring report is not transparent. PP is requested to clarify the same.		
B.3 Data and parameters monitored						
B.3.1	Data/Parameter monitored / Data unit / Description / Source of data to be used / Value data for the monitoring period	/01/, /06/, /08/, /10/	DR, I	The data/ parameter to be monitored, its data unit, description and the sources of data are as follows: 1. Data/ parameter : AM0022 ID1 Unit: m^3 Description: Wastewater flows entering the project treatment facility. Source of Data: On-site measurement Value applied for the monitoring period: 512,659 2. Data/ parameter : AM0022 ID2 Unit: m^3 Description: Wastewater flow leaving the project treatment facility Source of Data: Based on ID1 and the hydrological balance Value applied for the monitoring period: 299,106 3. Data/ parameter : AM0022 ID3 Unit: kg COD/ m^3 Description: COD concentration of the wastewater entering the new anaerobic digestion system Source of Data: On-site measurement Value applied for the monitoring period: 4,833.23 4. Data/ parameter : AM0022 ID4 Unit: kg COD/ m^3 Description: COD concentration of the wastewater leaving the new anaerobic digestion system. Source of Data: On-site measurement	~~**CR 2**~~	**OK**

Checklist Question	Reference	MoV[1]	Comments	Draft Conclusion	Final Conclusion
			Value applied for the monitoring period: 689.34 5. Data/ parameter : AM0022 ID5 Unit: m^3 Description: Volume of biogas sent to facility heaters Source of Data: On-site measurement Value applied for the monitoring period: 1,834,812 6. Data/ parameter : AM0022 ID7 Unit: MWh Description: Electricity generated from collected biogas Source of Data: On-site measurement - Meters available. Value applied for the monitoring period: 1,271.54 7. Data/ parameter : AM0022 ID8 Unit: m^3 Description: Fossil fuel volume equivalent required to generate same amount of heat generated from the biogas collected in anaerobic treatment facility. Source of Data: Calculated based on amount of biogas sent to the boilers Value applied for the monitoring period: 0 8. Data/ parameter : AM0022 ID9 Unit: Nm^3 Description: Biogas sent to flares Source of Data: On-site measurement Value applied for the monitoring period: 2,558,994 9. Data/ parameter : AM0022 ID10 Unit: Nm^3 Description: Biogas sent to gen set Source of Data: On-site measurement. Value applied for the monitoring period: 718,736 10. Data/ parameter : AM0022 ID11 Unit: % Description: Methane concentration in biogas		**OK**

Checklist Question	Reference	MoV[1]	Comments	Draft Conclusion	Final Conclusion
			Source of Data: On-site measurement. Installed on 25th Sep 2008. Value applied for the monitoring period: 107.86 11. Data/ parameter : AM0022 ID12 Unit: tCO_2e Description: Project emissions from flaring of the residual gas stream Source of Data: Calculated based on calculation procedure determined in the Tool to determine project emissions from flaring gases containing methane Value applied for the monitoring period: 12,588.56 12. Data/ parameter : AM0022 ID13 Unit: Tonnes/m3 Description: Amount of chemical oxidising agents entering system boundary Source of Data: On-site measurement Value applied for the monitoring period: 2,710.00 13. Data/ parameter : AM0022 ID14 Unit: % Description: Gen set combustion efficiency (combustion of methane) Source of Data: On-site measurement Value applied for the monitoring period: 99.999995% 14. Data/ parameter : AM0022 ID15 Unit: % Description: Heating system combustion efficiency (combustion of methane) Source of Data: On-site measurement Value applied for the monitoring period: 99.999663% 15. Data/ parameter : AM0022 ID16 Unit: m^3 Description: Volume of flow of wastewater directly to the current wastewater treatment system Source of Data: On-site measurement		

Checklist Question	Reference	MoV[1]	Comments	Draft Conclusion	Final Conclusion
			Value applied for the monitoring period: Year 2008: 299,106 & Year 2009: 213,553 16. Data/ parameter : AM0022 ID17 Unit: % Description: Loss of biogas from pipeline Source of Data: Estimated, spot checks using mobile leak detector Value applied for the monitoring period: 0% 17. Data/ parameter : AM0022 ID18 Unit: t COD Description: Organic material removed from wastewater facility Source of Data: On-site measurement Value applied for the monitoring period: 2008 - 5,096.746 & 2009 - 3,062.680 18. Data/ parameter : AM0022 ID19 Unit: J/Nm^3 Description: Biogas calorific value Source of Data: Measured/calculated through ID11 and calculation using perfect gas equation, assuming that only the methane content contributes to the NCV of the biogas. Value applied for the monitoring period: 19. Data/ parameter : Flame detection period Unit: min Source of Data: flame detection signals by flare. Value applied for the monitoring period: 20. Data/ parameter : Period of biogas being sent to the flare Unit: min Source of Data: Measured/ Calculated based on SCADA records of biogas flow meter at the entrance of the flare. Value applied for the monitoring period: However monitored data of the ID02 for the year 2009 is not transparent in the spreadsheet. It is observed from the ER calculation sheet that nearly 58% of the		

Checklist Question		Reference	MoV[1]	Comments	Draft Conclusion	Final Conclusion
				biogas that was generated in the year 2008 was flared. PP is requested to clarify/ justify the same.		
B.3.2	Is the measurement equipment described? Is the accuracy of the measurement equipment addressed and deemed appropriate?	/01/, /06/, /08/, /10/	DR, I	The measurement equipment/sampling used for the monitoring of the parameters are listed below 1. Data/ parameter : AM0022 ID1 Measurement Equipment: Flow meter Serial Number of the equipment: A06 42633 2. Data/ parameter : AM0022 ID2 Measurement Equipment: Not Applicable as no equipment is involved. 3. Data/ parameter : AM0022 ID3 Measurement Equipment: Not Applicable as no equipment is involved. 4. Data/ parameter : AM0022 ID4 Measurement Equipment: Not Applicable as no equipment is involved. 5. Data/ parameter : AM0022 ID5 Measurement Equipment: Flow meter Serial Number of the equipment: 91FA19282 639 6. Data/ parameter : AM0022 ID7 Measurement Equipment: Electricity meter Serial Number of the equipment: - PP is also requested to furnish the serial number of the electricity meter 7. Data/ parameter : AM0022 ID8 Measurement Equipment: Not Applicable as no equipment is involved. 8. Data/ parameter : AM0022 ID9 Measurement Equipment: Flow meter Serial Number of the equipment: 265DS6600028458	~~**CR 1**~~ ~~**CR 2**~~	**OK** **OK**

Checklist Question	Reference	MoV[1]	Comments	Draft Conclusion	Final Conclusion
			9. Data/ parameter : AM0022 ID10 Measurement Equipment: Flow meters Serial Number of the equipment: To engine A - 265DS6600032493 & To engine B - 265DS6600028459 10. Data/ parameter : AM0022 ID11 Measurement Equipment: Infrared spectrometry Serial Number of the equipment: ARYK-0131 11. Data/ parameter : AM0022 ID12 Measurement Equipment: Not Applicable as no equipment is involved. 12. Data/ parameter : AM0022 ID13 Measurement Equipment: Not Applicable as no equipment is involved. 13. Data/ parameter : AM0022 ID14 Measurement Equipment: Not Applicable as no equipment is involved. 14. Data/ parameter : AM0022 ID15 Measurement Equipment: Not Applicable as no equipment is involved. 15. Data/ parameter : AM0022 ID16 Measurement Equipment: electromagnetic flow meter Serial Number of the equipment: - 16. Data/ parameter : AM0022 ID17 Measurement Equipment: mobile leak detector Serial Number of the equipment: - 17. Data/ parameter : AM0022 ID18 Measurement Equipment: Not Applicable as no equipment is involved. 18. Data/ parameter : AM0022 ID19		**OK** **OK**

<table>
<tr><th colspan="2">Checklist Question</th><th>Reference</th><th>MoV[1]</th><th>Comments</th><th>Draft Conclusion</th><th>Final Conclusion</th></tr>
<tr><td></td><td></td><td></td><td></td><td>Measurement Equipment: Not Applicable as no equipment is involved.

19. Data/ parameter : Flame detection period
Measurement Equipment: Flame detection signals by flare.

20. Data/ parameter : Period of biogas being sent to the flare
Measurement Equipment/ sampling: Measured/ calculated based on SCADA

However neither the monitoring report nor the registered PDD is transparent on the measuring equipments used for the monitoring of the parameters ID13 and ID18.

Moreover the flow meter GM3 is referring to the parameter ID5 in the registered PDD whereas in the monitoring report it is referring to the parameter ID6. PP is requested to clarify the same. PP is also requested to provide the details of parameter ID6, since there is no parameter is referred in the registered PDD with ID6.

The monitoring report is not transparent on the accuracy class of any of the meters used for monitoring the parameters. PP is requested to clarify the same.</td><td></td><td></td></tr>
<tr><td>B.3.3</td><td>Are the requirements for maintenance and calibration of measurement equipment described and deemed appropriate?</td><td>/01/, /06/, /08/, /10/, /12/</td><td>DR, I</td><td>As per the registered PDD the flow meters shall undergo maintenance/ calibration subject to appropriate industry standards. PP has submitted the calibration certificates for the flow meters. The calibration details for each flow meter is as follows
<table>
<tr><th>Gas meter – S. no</th><th>Parameter</th><th>Calibration record</th></tr>
<tr><td rowspan="2">265DS6600 032639</td><td rowspan="2">AM0022 ID1</td><td>Calibration by DWS dated 5/04/2007</td></tr>
<tr><td>Calibration by Miracle International Technology dated 7/9/2009</td></tr>
</table></td><td><s>CR 4</s></td><td>OK</td></tr>
</table>

<table>
<tr><th colspan="2">Checklist Question</th><th>Reference</th><th>MoV[1]</th><th>Comments</th><th>Draft Conclusion</th><th>Final Conclusion</th></tr>
<tr><td></td><td></td><td></td><td></td><td>
<table>
<tr><td></td><td></td><td>Calibration by Miracle International Technology dated 7/9/2009</td></tr>
<tr><td rowspan="2">91FA19282639</td><td rowspan="2">AM0022 ID5</td><td>Calibration by DWS dated 26/04/2007</td></tr>
<tr><td>Calibration by Miracle International Technology dated 7/9/2009</td></tr>
<tr><td rowspan="2">265DS6600032493</td><td rowspan="2">AM0022 ID10</td><td>Calibration by DWS dated 18/04/2008</td></tr>
<tr><td>Calibration by Miracle International Technology dated 7/9/2009</td></tr>
<tr><td rowspan="2">265DS6600028459</td><td rowspan="2">AM0022 ID10</td><td>Calibration by DWS dated 21/04/2008</td></tr>
<tr><td>Calibration by Miracle International Technology dated 7/9/2009</td></tr>
<tr><td rowspan="2">ARYK-0131</td><td rowspan="2">AM0022 ID11</td><td>Calibration by Drager safety dated 14/12/2007</td></tr>
<tr><td>Calibration by Miracle International Technology dated 2/10/2009</td></tr>
<tr><td>A004997</td><td>AM0022 ID7</td><td>Calibration by Power Maintenance and Services dated 21/2/2010</td></tr>
</table>
From the above table it is noted that the calibration frequency of the flow meters are inconsistent and are calibrated once in 1, 2 and 3 years. PP is requested to clarify the difference in calibration frequency for the flow meters. PP is also requested to provide the local industrial standards on calibration requirements.
</td><td></td><td></td></tr>
<tr><td>B.3.4</td><td>Is the monitoring frequency adequate for all monitoring parameters? Is it in line with the registered monitoring plan?</td><td>/01/, /06/, /08/, /09/, /10/, /11/</td><td>DR, I</td><td>Yes, the monitoring/ recording frequencies for all the monitoring parameters are adequate and are also in line with the monitoring plan in the registered PDD. However there is some deviation occurred in the current monitoring period in monitoring of the parameters AM0022 ID11: Methane percentage in the biogas, AM0022 ID14: Combustion efficiency of gas engine, AM0022</td><td><s>CAR 2</s>
<s>CR 2</s></td><td>OK
OK</td></tr>
</table>

Checklist Question		Reference	MoV[1]	Comments	Draft Conclusion	Final Conclusion
				ID15: Combustion efficiency of the boiler and AM0022 ID16: The bypass waste water to the lagoon system. Refer section B.1.2. above. The PP is requested to provide the periodic test reports for the parameters ID3 and ID4. ID 17: The PP has committed in the registered PDD that the parameter is measured according to the international standards. However the PDD is not transparent neither on what standard exactly it complies nor the exact frequency to be adopted in measuring this parameter. ID 18: The PP has not committed for any frequency of measurement. Further the PDD states that the removal of is not expected to take place. PP is requested to clarify on how this parameter shall be monitored, in case if any removal of the organic material is taken place during the crediting period.		
B.3.5	Is the recording frequency adequate for all monitoring parameters? Is it in line with the registered monitoring plan?	/01/, /06/, /08/, /09/, /10/, /11/	DR, I	Refer section B.1.2 & B.3.4 above	~~CAR 2~~	OK
B.3.6	Does data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions?	/01/, /06/, /08/, /09/,	DR, I	During site visit it is noted that data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions. Roles and responsibilities are defined and are being followed. However, the monitoring report is not transparent on the transfer of data and reporting of emission reductions.	~~CAR 5~~	OK
B.4 Monitoring of sustainable development indicators/environmental impacts						
B.4.1	Is the monitoring of sustainable development indicators/ environmental impacts warranted by legislation in the host country?	/08/, /09/	DR, I	The monitoring report is not transparent on whether the sustainable development indicators/ environmental impacts are warranted by the legislation of the host party. PP is requested to clarify the same.	~~CR 5~~	OK
B.4.2	Have the mitigation/compensation measures been achieved and implemented?	/08/, /09/	DR, I	The monitoring report is not transparent on whether the mitigation or compensation measures have been implemented or not. PP is requested to clarify the same.	~~CR 5~~	OK

Checklist Question		Reference	MoV[1]	Comments	Draft Conclusion	Final Conclusion
B.4.3	Does the monitoring report provide for the collection and archiving of relevant data concerning environmental, social and economic impacts?	/08/, /09/	DR, I	No, the monitoring report is not transparent on the collection and archiving of the data monitored for the environmental, social and economical impacts. PP is requested to provide the same in the monitoring report.	~~**CR 5**~~	**OK**
B.5 Management, quality assurance and quality control						
B.5.1	How has it been assessed that the monitoring arrangements described in the monitoring plan are feasible within the project design?	/01/, /06/, /08/, /09/,	DR, I	All the monitoring/ measuring equipments as defined in the registered PDD for monitoring the project activity are installed at the site and are being operational. The verification team also confirmed that the measuring equipments were installed and are being operational in the site as described in the registered PDD. Hence the monitoring arrangements described in the monitoring plan are found to be feasible within the project design.	**OK**	**OK**
B.5.2	Are procedures identified for day-to-day record handling (including what records to keep, storage area of records and how to process performance documentation)?	/01/, /06/, /08/, /09/,	DR, I	The monitoring report is not transparent on the record handling procedures being followed at the site for the project activity. PP is requested to provide the same.	~~**CAR 5**~~	**OK**
B.5.3	Are the data management and quality assurance and quality control procedures sufficient to ensure that the emission reductions achieved by/resulting from the project can be reported ex post and verified?	/01/, /06/, /08/, /09/,	DR, I	The monitoring report is not transparent on the data management and QA/QC procedures that are adopted during the current crediting period. PP is requested to provide the same transparently in the monitoring report. However during site visit it is noted that the data management and quality assurance procedures are in place and sufficient to ensure verifiable reporting of emission reductions.	~~**CAR 5**~~	**OK**
B.5.4	Will all monitored data required for verification and issuance be kept for two years after the end of the crediting period or the last issuance of CERs, for this project activity, whichever occurs later?	/01/, /06/, /08/, /09/,	DR, I	The monitoring report is not transparent about the archival of the data monitored for the verification and issuance. Also PP is requested to clarify whether the data will be kept available for a period of 2 years after the crediting period or the last issuance of VERs.	~~**CAR 5**~~	**OK**

TABLE 2: RESOLUTION OF CORRECTIVE ACTION REQUESTS AND CLARIFICATION REQUESTS

Corrective action and/ or clarification requests	Reference to Table 1	Response by project participants	Verification conclusion
CAR 1 The revision number of the monitoring report and the credits availed for the project activity for the various vintages are not transparent in the monitoring report. 1. PP is requested to compare the estimated and actual VERs in the monitoring report. PP is also requested to revise the monitoring report addressing the minimum requirements of the EB template for monitoring report.	A.1	1. The cover page of MR is revised to include version number and credits availaed during the monitoring period. The Emission Reductions for the vintage years is added clearly to the last page of monitoring report. 2. The comparison between expected emission reductions is included in the section 3.1 of the Monitoring Report. 3. The minimum requirements of the new template of monitoring report as per the EB template are included in the monitoring report and revised excel calculation sheet for the project activity. We believe the information is sufficient and shall satisfy the requirements as suggested. Response on 29/10/2010 2. The expected volumes are calculated wrongly in the previous version are revised.	The version number of the monitoring report is included in the cover page of the monitoring report. This part of the CAR 1 is closed. As per the revised monitoring report, the expected emission reductions is 90,084 tCO_{2e}. PP is requested to clarify how is this figure arrived at, as the emission reductions for 1 year is 97,468 tCO_{2e}. This part of the CAR 1 is open. The minimum requirements of the new templateof the monitoring report provided by the CDM EB /29/ are covered in the current monitoring report and the ER calculation sheet. This part of the CAR 1 is closed. DOE Comments As per the revised monitoring report, the emission reductions for this time period according to regisetered PDD is expected to be 81,179 tCO_{2e}. This figure is arrived at on the pro rata basis for the 304 operational days of a year. Hence it is accepted. The CAR 1 closed.
CAR 2 The explanation provided by the PP for the conservativeness of the value taken for the period 25/05/2008 to 24/09/2010 is not justified as the methane percentage in the biogas is a crucial parameter which has a great impact on the	B.1.2	1. The MR is revised to include the explanation on the approach used for estimation of methane percentage for the days when no data is available. This is in line with EB guiding principles. The approach is based on the student-t distribution, which is a statistical approach	The explanation provided by the PP for the estimation of methane percentage for the period where it is not measured is not acceptable. As the methane percentage in the biogas is a crucial parameter, which has a great impact on the calculation of emission reductions achieved by the

Corrective action and/ or clarification requests	Reference to Table 1	Response by project participants	Verification conclusion
calculation of emission reductions achieved by the project activity.		to determine the confidence interval for data when limited number of values are available. The upper bound of the 95% interval is used to determine the project emissions from flare emissions and unburnt methane emissions in gas engine and boiler. For the baseline emisisons lower value of the interval is used. This is a conservative approach and in line with EB guidelines EB-50 Annex – 30, which requires 90% confidence and 10% error margin.	project activity, PP is requested to justify the conservativeness of the approach. Further, PP is requested to clarify how the reference document provided as the foot-note no 4 in page 22 of the revised monitoring report version 1.2 dated 29/10/10 is related to the project activity. Also, the reference details provided in the footnote no 5 is not complete. This part of the CAR 2 is open. ----------
PP is requested to clarify why the combustion efficiencies of both boiler and Gen set are not monitored during the current monitoring period. Moreover it is contradicting with the statement given by PP in Annex 2 of the monitoring report. Further the explanation provided by the PP for the conservativeness of the value taken for this period is not justified.		2. The Monitoring report is revised in deviation 2 of annex – 2. The combustion efficiency test is transparaently explained in the deviation. This is based on the fact that there is no change in gas engine and boiler at the project activity since the project start date. The efficiency used for calculation purposes is the same value as per validated PDD. This value is more conservative than the values obtained from efficiency tests after the current monitoring period.	The explanation provided by the PP is not justifying the conservativeness of the approach for the value considered in the current monitoring period. Further, the PP is not considering the methane content in the biogas captured in the calculation, which also influences the combustion efficiency of the boiler and gen set. This part of the CAR 2 is open.
The Plant operation log sheets submitted by the PP are not complete. The log sheets are missing for some of the days.		3. The plant operation log sheet are scanned and submitted with revised version of the monitoring report and calculation sheet. Response on 29/10/2010 1. The time period for which methane percentage values are not available, the value is determined based on 99% confidence interval by comparison of data	The operation log sheets /11/ were submitted by the PP. This part of the CAR 2 is closed PP is also requested to update the monitoring report as per the revision of monitoring plan approved by the UNFCCC /27/. This part of the CAR 2 is open.

Corrective action and/ or clarification requests	Reference to Table 1	Response by project participants	Verification conclusion
		from same monitoring period and next year. This is a conservative approach as higher value of interval is used for project emissions and lower value is used for baseline emissions. 2. The test results carried out after the monitoring period indicate the content of unburnt methane in the exhaust of gas engine and boiler at very low levels (reports submitted already). The value assumed for the moniotring period is the value assumed ex-ante n the PDD, which is many folds higher than values from actual tests. Thereby PP believes that the approach employed is conservative. The daily methane content based on conservative approach as per the Deviation -1, Annex -2 is applied to determine the project emissions on daily basis. 4. The monitoring report is updated to include the revision for monitoring plan. Response on 18/11/2010 1. The general explanation of the deviation approach as well as the justification of the applicability of the student-t distribution have been further improved in the monitoring report. The applicability of the approach has also been confirmed in more detail by the Gold Standard as a follow up on the previous clarification. The revised monitoring report and the latest clarification by the Gold Standard is provided along with this reply	DOE Comments The PP's response is not transparent. PP is requested to explain in detail and trasparent manner. PP is also requested to justify the applicability of Student-t distribution approach for the current scenario with supporting evidences. Further, the approach used by the PP for arriving at the conservative value of methane content in the biogas for period in which the monitoring is not carried out is not in line with that of the clarification provided by the GS board in this regard. PP is requested to revise the monitoring report and ER calculation sheet as per the approach specified by the GS board. This part of CAR 2 is open. --- The monitoring plan is revised in the monitoring report as per the UNFCCC approval. This part of CAR 2 closed. DOE Comments The reponse provided by the PP and the information modified in the monitoring report are in line with that of the clarification provided by the GS board, hence accepted. However, PP is requested to submit the plant records of methane content monitored for the same period of next year (25/05/2009 to 24/09/2009). Neither the monitoring report nor the ER calculation sheet is transparent on how

Corrective action and/ or clarification requests	Reference to Table 1	Response by project participants	Verification conclusion
		to the DOE. 2. The latest clarification from the Gold Standard is provided as supporting evidence to the approach followed in the revised monitoring report. The approach confirmed by the Gold Standard compares the 99% confidence interval of the available data during the monitoring period with the 99% confidence interval in the following year for the same months as the missing data in the monitoring period. The smaller value of the two lower limits is used for the baseline emissions and the higher of the two upper limits is used for the project emissions. The final calculation of emission reductions based on this approach has also been confirmed by the Gold Standard. Response on 23/11/2010 1. The plant records for the methane concentration are provided for the months of May to August. The plant does not operate during the month of September. 2. The formula and theory for determination of 99% confidence interval is already a part of Annex-2, Deviation1. The value of factor A is taken from standard statistical tables available at one of the links provided as reference in Deviation 1 of Annex-2. In the revised version of MR and excel the determintation of value of Factor A is further detailed out. 3. The link provided in the monitoring report as footnote 8 is further detailed in	the value's for "Factor A" is arrived at??? PP is also requested to furnish the details of the source for the same. The reference link provided in the footnote 8 in page 23 of the revised monitoring report is not fully supporting the statement provided by the PP. The CAR 2 is open ---------- DOE Comments: The plant records /11/ for the months of May, June, July and August were provided by the PP. The methane content value used in the ER calculation sheet is crosschecked with the plant records and found to be in line. Hence accepted. The source for the values taken for the Factor A is provided in the ER Calculation sheet and found that values taken in the ER sheet is in line with the values available in the source /24/. Hence accepted. The explanation provided by the PP in the monitoring report is accepted. The CAR 2 is closed.

Corrective action and/ or clarification requests	Reference to Table 1	Response by project participants	Verification conclusion
		the deviation to give clear indication on the applicability of proosed approach. The link provided explains about the applicability of student t distribution in situation where random samples ae monitored but data sets are smaller.	
CAR 3 The monitoring report is not transparent on the number of employed staffs and the level of income generation which is used as a tool for demonstrating the status of the employment. PP is requested to submit the same. Also the monitoring report is not transparent on the scoring of the indicators compared to the baseline indicator situation.	B.1.3 and B.1.4	1. The Monitoring report is revised to include the information on the employed number of staff in detail. However the details related to the income level of the employees is submitted as separate documents for confidential reasons. 2. As per the section 4 of the Validation and Verification Manual, the project shall be checked for overall changes which can impact on GS qualification of the project. Also it shall be ensured that project proponents have initiated measures that secure overall scores of three sustainable indicators. In line with same, the project proponent had identified key monitoring parameters to ensure the overall scores of the sustainable indcators. These parameters are monitored in line with monitoring plan in the GS annex and included in the monitorng report. Response on 29/10/2010 1. The document is already translated and is provided to DOE with last submission. 2. The MR is made more transparent inline with the suggestion made.	The employment details are updated in the monitoring report. The supporting documents are also provided by the PP. however the PP is requested to provide the supporting documents translated in English version. This part of the CAR 3 is open. --- The sustainable development indicator parameters selected for the project activity are Odour from wastewater treatment, monitoring of sludge application and Employment oppportunities. However, the scroing of the indicators for the parameters odour and employment are not required to be provided as they are not having any impact neither in the emission reductions nor in the GS qualification of the project actvity. Further,as it is observed that the scoring of the sludge application parameter is not changed during the current monitoring period as there is not sludge removal taken place. PP is requested to make it transparent in Monitoring report also. This part of the CAR 3 is open. --- DOE Comments The PP has not yet submitted the translated copy of the document.

Corrective action and/ or clarification requests	Reference to Table 1	Response by project participants	Verification conclusion
		Response on 18/11/2010 1. A new version of the translated document containing a full English translation of the original document is provided. Response on 23/11/2010 1. The MR is revised and the information about the employeed staff is detailed out.	This part of CAR 3 is open. The changes made in the monitoring report are found to be in line with the earlier response. Hence accepted. This part of CAR 3 is closed. --- DOE Comments PP has submitted the employee details /28/ document translated version in English. According to these documents there were totally 14 employees in the year 2008 out of which 3 are permanent employees and 13 employees in the year 2009, out of which, 5 are permanent employees. The staffs for the years 2008 and 2009 include: Head of quality Control - 1 Biogas system controllers - 3 and 4 Power system controllers - 0 and 2 Quality control - 10 and 6 respectively. However the values provided in the monitoring report are not matching with these values. The CAR 3 is open. DOE Comments: The details of the employees provided in the revised monitoring value is in line with that of the details provided in the supporting evidences. Hence accepted. The CAR 3 is closed.
CAR 4 The point no 28 in page no. 13 of the monitoring	B.2.1	The MR is revised and the point no. 28 is	The explanation provided by the PP in the point no 28 of the monitoring report is not

Corrective action and/ or clarification requests	Reference to Table 1	Response by project participants	Verification conclusion
report is not transparent. PP is requested to clarify the same.		corrected. The point 28 signifies the emission reduction estimate from direct measurement of methane captured and combusted. Response on 29/10/2010 The point 28 is revsed to make it more transparent and be in line with the calculation approach. The calculation is now done on daily basis. Response on 18/11/2010 1. The methane values used for project emissions and baseline emissions is in line with the latest confirmation received from the Gold Standard as a follow up to the initial request for clarification. Please refer to CAR 2 for more details. Response on 23/11/2010 1. The response to CAR2 is provided in relation to the methane percentage data.	transparent. PP is requested to clarify the same. The CAR 4 is open. --- DOE Comments The PP's response in the monitoring report is transparent. However the methane content values used in the calculation of the emission reductions for the period in which the values are not monitored is not conservative. PP is requested to apply the conservative values in the calculations. This part of CAR 4 is open. DOE Comments Refer to the CAR 2 above. The CAR 4 is open. DOE Comments: The CAR 4 is closed.
CAR 5 The monitoring report is not transparent on the transfer of data and reporting of emission reductions. The monitoring report is not transparent on the record handling procedures being followed at the site for the project activity. The monitoring report is not transparent on the data management and QA/QC procedures that are adopted during the current crediting period. PP is requested to provide the same transparently in the monitoring report. The monitoring report is not transparent about the	B.3.6 B.5.2 B.5.3 B.5.4	1. The Monitoring report is revised to include the information on transfer of data. 2. The monitoring report is revised to reflect the data handling and recording procedures. 3. The QA QC procedures are in line with the monitoring plan and the calibrations for the monitoring equipments are available. The monitoring report is revised to include QA / QC procedures. 4. The procedure for archiving of data is	The revised monitoring report includes the details of transfer of data. However, PP is requested to clarify the statement "The data management is done in line with the registered PDD from the plant operation software" provided in the revised monitoring report. Further, the monitoring report is not transparent on reporting of emission reductions. This part of the CAR 5 is open. The revised monitoring report is transparent on the record handling procedures adopted in the project activity. This part of the CAR 5 is closed.

Corrective action and/ or clarification requests	Reference to Table 1	Response by project participants	Verification conclusion
archival of the data monitored for the verification and issuance. PP is requested to clarify whether the data will be kept available for a period of 2 years after the crediting period or the last issuance of VERs.		included in the revised monitoring report. 5. The data will be kept till 2 years after the end of the crediting period in line with CDM guidelines as a safe approach. Response on 29/10/2010 1. The data management procedures are not very detailedin PDD as well. Thereby PP has revised the section and listed all the procedures that are followed at the project site. PP believes that all the relevant information is provided either as part of Monitoring report or in the supporting excel sheet. The emission reductions are calculated in a very transparent manner in the MR and supporting excel sheet. PP would request DOE to consider the revised version of the documents. 3. The calibration standards for each calibration are mentioned in the calibration report, but are not presented in detail in the MR or excel sheet. PP believes that all calibrations are done by reputed companies with strong local presence and relevant standards are followed. Response on 18/11/2010 1. The information on the transfer of data and reporting of emission reductions is provided. This document defines the procedures for reporting of the monitored data. These reports are compiled by the	The revised monitoring report includes the QA/ QC procedures adopted in the project activity for the current monitoring period. However it is not transparent on the calibration standards and procedures adopted for the equipments. This part of the CAR 5 is open. The revised monitoring report includes the details archival of data. This part of the CAR 5 is closed. As per the revised monitoring report, the data will be archived in the form of soft copies for a period of 2 years after the end of the crediting period. This part of the CAR 5 is closed. DOE Comments The revised monitoring report is updated by addressing the error mentioned in previous round of clarifications. However, the response provided by the PP is not accepted as it is not answering the clarification sought. Further the monitoring report is still not transparent on the reporting of status of actual emission reductions achieved by the project activity and the subsequent actions taken by the management. This part of CAR 5 is open. The response provided by the PP is not accepted as it is not answering the clarification sought. Further, PP is requested to justify the statement “The QC team ensures the timely calibrations of the monitoring devices” with supporting

Corrective action and/ or clarification requests	Reference to Table 1	Response by project participants	Verification conclusion
		plant manager to obtain emisison reduction estimates, which are then sent to the managing director and the CDM consultant for further action. 2. The calibration schedule for the project activity is provided. The QC team uses this schedule to ensure that calibrations are carried out in a timely manner. Response on 23/11/2010 1. A further explanation to the query is presented here in line with the information included in the monitoring report. The reporting of monitored parameters is done on a daily basis by the plant staff in form of daily log reports. The data is compiled and inserted by the responsible staff into an excel report template and daily report format, which is used for calculation of emission reductions and daily reporting respectively. Head of QC team sends the printout of daily report to the plant manager and the compiled data to the managing director via email. The compiled excel report is further sent to the project consultants for detailed emission reduction analysis. The managing director and project consultant interact on regular basis to discuss emission reduction reporting.	evidences. This part of CAR 5 is open. DOE Comments The details of reporting procedures for the actual emission reductions achieved during the course of the monitoring period that is followed at the site are provided in the monitoring report. However, response provided by the PP is not transparent. This part of CAR 5 is open The calibration schedule followed for the monitoring equipments during the current monitoring period is provided by the PP. Further, the technical specifications of the monitoring equipments /21/ used in the project activity were also provided by the PP. It is found that there was no specification provided by the manufacturers for these equipments on the frequency of calibration. Hence accpeted. This part of CAR 5 is closed DOE Comments: The response provided by the PP is in line with the information provided in the monitoring report. Hence accepted. The CAR 5 is closed.
CR 1 PP is requested to intimate the current status of the grid connectivity and to furnish supporting evidence for the date on which the connection to grid is effected. PP is also requested to furnish the serial number of the electricity meter.	A.2 B.3.2	1. The contract with local power authorities for grid connection is still under process and is expected to be completed over a period of next 6 months. 2. Since there is not connection with the grid yet, the meter details are not available yet.	FAR 1 The details of the grid connectivity have to be verified during the next verification period.

Corrective action and/ or clarification requests	Reference to Table 1	Response by project participants	Verification conclusion
CR 2 The monitored data of the ID02 for the year 2009 is not transparent in the spreadsheet. It is observed from the ER calculation sheet that nearly 58% of the biogas that was generated in the year 2008 was flared. PP is requested to clarify/ justify the same. The PP is requested to provide the periodic test reports for the parameters ID3 and ID4. ID 17: PDD is not transparent neither on what standard exactly it complies nor the exact frequency to be adopted in measuring this parameter. ID 18: PP is requested to clarify on how this parameter shall be monitored, in case if any removal of the organic material is taken place during the crediting period	B.3.1 B.3.4	1. ID02 is corrected for 2009 in the revised excel file. As per the registered PDD, this value is equal to ID1, assuming hydrological balance. 2. The gas engine at project activity are not utilized to the full potential due to many maintenance issues and underwent some repairs which decreased the biogas consumption ratio for gainful use in comparison to flare in a drastic manner. 3. The periodic test reports done by the third party are already provided with the revised version of monitoring report and excel sheet. 4. The check of the loss of biogas in the pipeline is part of regular operation procedure for plant staff. The plant staff is provided with device to detect gas leakages if any, The automated control system at project sites enables instatneous detection of volume losses over pipe sections if any leaks happen. All such events are recorded as special events in log sheets. However, the project proponent has not reported such occurance during the monitoring period. 5. In case there is any removal of any sludge from the reactor it shall be monitored using the weigh bridge available at the project site. The same is included in the revised Monitoring report. Response on 29/10/2010 2. The Monitoring report is improved to include the reason of lower consumption of biogas for gainful energy purpose.	The ID02 values were found to be corrected in the revised ER calculation sheet version 1.1 dated 29/10/10 and it is inline with the registered PDD. Hence accpeted. This part of the CR 2 is closed. The explanation provided by the PP is not accpeted. However PP is requested to make it transparent in the monitoring report also and provide the supporting evidences for the same. This part of the CR 2 is open. The PP has submitted the periodic test reports /17/. The data used in the spread sheet is found to be almost matching to that of the test report values. Hence accepted. This part of the CR 2 is closed. The response provided by the PP is not accpetable as it is not answering the clarification sorted. This part of the CR 2 is open. The monitoring details of the ID 18 in case any removal of organic material is taken place is provided in the revised monitoring report and the same accepted. This part of the CR 2 is closed. FAR 2 The DOE is requested to check this for the subsequent monitoring periods. DOE Comments The revised monitoring report is updated with the justification for the less

Corrective action and/ or clarification requests	Reference to Table 1	Response by project participants	Verification conclusion
		4. In addition to the portable devices for detecting gas leakages, a pipe leakage test was conducted during the commisisoning period and the test report is provided. Response on 18/11/2010 2. The gas engine had operational problems during initial months of operation. PP has provided the supporting evidence in form of gas engine log records (indicating none or limited electrcity generation during the monitoring period) and further evidence related to a spare parts order due to malfunctioning of the engine during the monitoring period. The gas engine log records demonstrate that the gas engine had problems such as frequent restart.	consumption of biogas in the gas engines. However PP is requested to provide the supporting evidences for the same. This part of CR 2 is open. The response provided by the PP is accepted as it is being the actual practice followed at the site. The supporting evidence i.e. gas leakage test report carried out by Global Water Engineering Ltd. Hongkong, on 19/09/2009 and 20/09/2009 /18/. This part of CR 2 is closed. DOE Comments The supporting evidences for the less consumption of the biogas in the gas engines duroing the current monitoring period is provided by the PP. Hence accpeted. The CR 2 is closed
CR 3 Neither the monitoring report nor the registered PDD is transparent on the measuring equipments used for the monitoring of the parameters ID13 and ID18.	B.3.2	ID13 is the regular testing of the chemical oxidising agents entering the project bonundary and is monitored using colorimeter. ID 18 is the removal of sludge from the waste water treatment system, which does not happen during this monitoring period. The sludge removal is meausred using weigh bridge available at project site. The flow meter GM3 corresponds to the	The ID 18 shall be monitored by using the weigh bridge. The details of the same is provided in the monitoring report also. Hence it is accepted. The ID 13 is monitored by using the colorimeter. PP is requested to make it transparent in the monitoring report also. This part of the CR 3 is open. The GM3 corresponding to ID 5 in both

Corrective action and/ or clarification requests	Reference to Table 1	Response by project participants	Verification conclusion
The flow meter GM3 is referring to the parameter ID5 in the registered PDD whereas in the monitoring report it is referring to the parameter ID6. PP is requested to clarify the same. PP is also requested to provide the details of parameter ID6, since there is no parameter is referred in the registered PDD with ID6. The monitoring report is not transparent on the accuracy class of any of the meters used for monitoring the parameters. PP is requested to clarify the same.		parameter ID5 as per the registered PDD, and the mistake in the monitoring report is corrected. There is no parameter ID6 in the registred PDD and the monitoring report. The typing error has been corrected (see point CR2.9 above). The accuracy class of equipments is included in the data table provided for the measuring intruments. Response on 29/10/2010 1.The monitoring report is revised to include the monitoring method for parameter ID13. 3. The explanation is already added to the Monitoring report.	the registered PDD and also the revised monitoring report. Hence accepted. This part of the CR 3 is closed. The ID6 parameter is deleted in the revised monitoring report. However, PP is requested to provide the reference for point CR2.9. This part of the CR 3 is open The accuracy class of the monitoring equipments are provided in the monitoring report. Hence it is accepted. This part of the CR 3 is closed DOE Comments The revised monitoring report is updated with the monitoring method used for the ID13. The response provided by the PP is accepted. The CR 3 is closed.
CR 4 PP is requested to clarify the difference in calibration frequency for the flow meters. PP is also requested to provide the local industrial standards on calibration requirements.	B.3.3	1. The calibration intervals for different meter are defined by the registered monitoring plan. This monitoring report refers to the period prior to the registration of project activity and the calibration frequency was decided by project proponent and technology supplier based on their experience. There are no guidelines from technology supplier or industry sector on calibration frequency. The project proponent shall ensure a regular calibration in future in accordance with the registered monitoring plan or relevant CDM guidelines.	The explanation provided by the PP is accepted considering the fact that there is no calibration frequency defined by the technology provider. However, PP is requested to provide the evidences for the same. This part of the CR 4 is open The the explanation provided by the PP is accepted considering the fact that there is no industrial standard defining the calibration frequency for the equipments used in the project activity. This part of the CR 4 is closed.

Corrective action and/ or clarification requests	Reference to Table 1	Response by project participants	Verification conclusion
		2. The project activity is not regulated or mandated by any government legislation or policy. The operation and maintenance of project activity is responsibility of the project owner. There is no local industiral standard available on calibration requirements. The calibration of the equipment for project activity shall be in accordance with the registered monitoring plan or relevant CDM guidelines. Response on 29/10/2010 1. The evidence to non-availability of the calibration frequency is that the technical specifications of the monitoring equipment provide no details of the calibration frequency. There are no national calibration frequency guidleines. Project proponent follows general guidelines from EB for the calibration frequency of the monitoring equipments. Response on 18/11/2010 1. The technical specifications of the monitoring equipment are provided along. A summary table of the calibration information included in these technical specifications is also provided to give an overview. As explained earlier the technical specifications for the applied monitoring equipment provide no explicit recommendations regarding the interval of calibration.	DOE Comments The PP is requested to submit the technical specifications of all the monitoring equipments. The CR 4 is open. DOE Comments The calibration schedule followed for the monitoring equipments during the current monitoring period is provided by the PP. Further, the technical specifications of the monitoring equipments /21/ used in the project activity were also provided by the PP. It is found that there was no specification provided by the manufacturers for these equipments on the frequency of calibration. Hence accpeted. The CR 4 is closed

Corrective action and/ or clarification requests	Reference to Table 1	Response by project participants	Verification conclusion
CR 5 PP is requested to clarify and incorporate in the monitoring report, whether the sustainable development indicators/ environmental impacts are warranted by the legislation of the host party. PP is requested to clarify and incorporate in the monitoring report, whether the mitigation or compensation measures have been implemented or not. The monitoring report is not transparent on the collection and archiving of the data monitored for the environmental, social and economical impacts. PP is requested to provide the same in the monitoring report.	B.4.1 B.4.2 B.4.3	1. The environmental impacts warranted by the local legislations are not scored as positive or negative in the SD indicator matrix. Only the indicators which score positive and negative are monitored to justify the sustainable and environmental impact. These paramters are included in the monitoring report. 2. The mitigation and compensation measures shall be in place for any sustainable indicator which has scored negative during the project validation, or any occurance which impacts the GS validity of the project actvity. In this project activity no sustainable indicator has scored on negative scale. Thereby in the absence of any such occurance during the monitoring period, no mitigation or compenation measures are deemed necessary. 3. The data monitoring related to the environmental, social and economic parameters is done in line with the GS Annex. The parameters which are directly related to CDM parameters are monitored in the same way as that specific CDM parameter for e.g. Air Quality monitored in terms of biogas combusted (depends on ID5, ID9 and ID10). The employment record and payments are monitored on monthly basis. The sludge monitoring is event-based and is recorded into log sheets whenever	The response provided by the PP is not accepted as it is not answering the specific clarification sorted. This part of the CR 5 is open. The response provided by the PP is accepted. However, PP is requested to make it transparent in the monitoring report also. This part of the CR 5 is open. The data shall be archived for a period of 2 years after the completion of the crediting period. This part of the CR 5 is closed.

Corrective action and/ or clarification requests	Reference to Table 1	Response by project participants	Verification conclusion
		sludge is removed from the system. All these data parameters shall be archived for a period of 2 years after the end of the crediting period. Response on 29/10/2010 1. This point was discussed with the verifictaion team and clairified. The sustainable development indicators/ environmental impacts that are warranted by the legislation of the host party are not part of monitoring procedures. 2. The MR is revised to include comments on the paramters in GS monitoring, relating to the score of sustainable indicators.	DOE Comments As per the revised monitoring report the SD indicators are not warranted by any local legislations. Moreover there is no change in the score of the indicators compared to that of the validation stage. Refer the response above. The CR 5 is closed.

TABLE 3 FORWARD ACTION REQUEST

Forward action request	Reference to Table 1	Response by project participants Verification conclusion
FAR 1 The details of the grid connectivity have to be verified during the next verification period.	A.2 B.3.2	
FAR 2 The DOE is requested to check the monitoring details of the ID 18 in case any removal of organic material is taken place in the subsequent monitoring periods.	B.3.1 B.3.4	