

VERIFICATION REPORT OF THE “CHOL CHAROEN GROUP WASTEWATER TREATMENT WITH BIOGAS SYSTEM I (KHONKAEN)” IN THAILAND



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Summary:

Germanischer Lloyd Certification GmbH (GLC) has performed the VCS verification of the project “Chol Charoen Group Wastewater Treatment with Biogas System I (Khonkaen)” with regard to the relevant requirements for VCS project activities.

The project was validated and registered with reference no. 427 under VCS (Verified Carbon Standard) program on 19-05-2010. This is the first verification of this project which covers the period from 03-12-2009 to 31-12-2011. The project is verified against the VCS Version 3 ^{/2/}.

The project activity involves the installation and operation of a methane recovery and utilization system (an open anaerobic effluent treatment system) at Kean Charoen (1) Co., Ltd., a tapioca starch factory in Khonkaen, Thailand. The recovered biogas is used in boilers to generate heat required for starch drying process and in gas engines to produce electricity. Surplus gas, if any, is flared in an enclosed flaring system from safety point of view.

The project is a small scale project activity and there are three methodologies applied to estimate the GHG emission reductions.

- AMS III.H, version 13: Methane recovery in wastewater treatment
- AMS I.D, version 14: Grid connected renewable electricity generation
- AMS I.C, version 15: Thermal energy production with or without electricity

A risk based approach has been followed in this verification. In the course of verification, 17 Corrective Action Requests (CAR) and 1 Clarification Request (CL) have been raised. All the CARs and CLs have been closed out successfully. The verification is based on the monitoring plan of registered VCS Project Description document (VCS PD). The project document is found at VCS registry under the reference number 427 <https://vcsprojectdatabase2.apx.com/myModule/Interactive.asp?Tab=Projects&a=2&i=427&lat=16%2E8083&lon=103%2E0858&bp=1>., Monitoring report (MR), Project Description (VCS PD), and other supporting documents are made available to the verification team by project participants.

As a result of the verification, the verifiers confirm that:

The GHG emission reduction in the verification period (from 03-12-2009 to 31-12-2011, including both the days) is: **71,593 tCO₂e**.

Emission reductions in 2009:	2,153	t CO ₂ e
Emission reductions in 2010:	14,959	t CO ₂ e
Emission reductions in 2011:	54,481	t CO ₂ e
Total Emission Reductions during monitoring period:	71,593	t CO ₂ e

GLC does not assume any responsibility towards the issuance and utilization of VCUs hereby verified and certified. Request for issuance of VCUs shall be made by the project proponent to an approved VCS Program Registry based on the requirements set out under the most recent version of the VCS Program Guidelines clause on VCS Registration. The verification of reported emission reductions is based on the information made available to GLC and the engagement conditions detailed in this report. Hence, GLC cannot be held liable by any party for decisions made or not made based on this report.

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1 INTRODUCTION

South Pole Carbon Asset Management Ltd. has commissioned Germanischer Lloyd Certification GmbH (GLC) to carry out the 1st verification of the emission reductions reported for the VCS project activity “Chol Charoen Group Wastewater Treatment with Biogas System I (Khonkaen)” with regard to the relevant requirements for VCS program as per the VCS version 3⁽²⁾.

This verification report summarizes:

- (i) The findings from the VCS verification for the current monitoring period from 03-12-2009 to 31-12-2011; and
- (ii) VCU certification statement for the emission reductions.

1.1 Objective

VCS Verification is the independent review and ex post determination by a Verification Entity or Designated Operational Entity (DOE) (which is approved/registered as a verifier by VCSA) of the monitored reductions in GHG emissions that have occurred as a result of the registered VCS project activity during the defined verification period.

VCS Certification is the written assurance by a Certification Entity (which is approved/ registered as a certifier by VCSA) that, during a specific period in time, a project activity achieved the emission reductions as verified.

The objective of this verification was to verify and certify emission reductions reported for the “Chol Charoen Group Wastewater Treatment with Biogas System I (Khonkaen)” for the monitoring period covering from 03-12-2009 to 31-12-2011.

One of the objectives is also to confirm that the monitoring system is implemented and fully functional to generate Verified Carbon Units (VCUs) without any double counting

1.2 Scope and Criteria

The scope of the verification is:

- To ensure that the project activity has been implemented and operated as per the latest version of the VCS PD and that all physical features (technology, project equipment, and monitoring and metering equipment) of the project are in place.
- To verify that actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan as per the latest version of the VCS PD⁽³⁾.
- 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 significant misstatement.
- To verify that the reported GHG emission data is sufficiently supported by evidence.

The verification shall ensure that reported emission reductions are complete and accurate in order to be certified.

The verification team has focused on the identification of significant reporting risks and verifying the mitigation measures for these risks based on the recommendations in the “Validation and Verification Manual”^{1/}, “ISO 14064-3 Greenhouse gases – Part 3: Specification with guidance for the validation and verification of greenhouse gas assertions and employed a risk-based approach”^{8/}.

According to the requirements and guidance of VCS Version 3, the criteria of this verification include the relevant applicable rules and steps for CER verification under the CDM excluding the following:

- The public availability of the VER/VCS Monitoring Report;
- Confirmation of contribution of the project activity towards sustainable development in the country where the project is located
- The public availability of the Verification Report and VCU Certification Statement.

1.3 Level of assurance

As the VCS Version 3 only recognizes verified emission reductions, GLC has focused on providing a reasonable level of assurance that the emission reduction calculation methodology used is appropriate and correctly applied, and that emission reductions have been accurately monitored.

In accordance with the recommendation in the Validation and Verification Manual, GLC may “discount verified emission reductions or requests a discount of these by using conservative assumptions for uncertainties in emission reduction calculations that cannot be fully quantified or that cannot give a desired level of assurance”. For verifying/certifying VCUs, the desired level of assurance was based on the combined quantitative assessment of the accuracy of monitoring project performance and the identification of material risks. For this verification, GLC is able to give a reasonable level of assurance.

1.4 Summary Description of the Project

The project activity involves the installation and operation of a methane recovery and utilization system (closed anaerobic lagoon treatment system) at Kean Charoen (1) Co., Ltd., a tapioca starch factory which has been in operation since 2nd October 2006.

This starch factory has a mean daily production capacity of 175 tones of dried starch, generating 2,000 m³ of wastewater per operational day. Prior to project implementation, wastewater released from the starch plant was treated in cascading open anaerobic lagoons. With the depth of these ponds being greater than 2 m from the water surface, and the mean temperature of the area being in the region of 27°C, there was a suitable anaerobic environment within the ponds, with the anaerobic bacteria, that breakdown the organic compounds in the wastewater. This consequently lead to methane generation from the organic content (characterized by chemical oxygen demand or COD) of the wastewater.

The project activity involves the installation of two anaerobic covered lagoon facilities (converted from open lagoons) to complement the existing anaerobic open lagoon based system. The two covered lagoon digesters, together, were designed with volumetric capacity of around 177,375 m³ of wastewater. The covered lagoon system facilitates capturing of methane rich biogas released from wastewater. The captured biogas is utilised as a fuel in onsite boilers and gas engines (or electricity generators). Excess biogas (if any) will then be flared in an open flare system. Therefore, the project results into emission reduction by avoiding methane release into the atmosphere, replacing part of fossil fuel burnt in onsite boilers and generating renewable electricity.

The wastewater from the covered lagoons is sent for the secondary treatment. The secondary treatment consists of series of 11 open lagoons. The treated wastewater from the last lagoon is recycled back to the starch factory for cassava root washing.

The total emission reduction for the 1st verification period (from 03-12-2009 to 31-12-2011) is 71,593 tCO₂e. The emission reductions are calculated conservatively as per the applied methodologies.

Further background information on the project activity can be found in the VCS Project Design Document (VCS PD) as well as the Validation Report ^{/6/} which are available on the VCS website (Project Id: 427):

<https://vcsprojectdatabase2.apx.com/myModule/Interactive.asp?Tab=Projects&a=2&i=427&lat=16%2E8083&lon=103%2E0858&bp=1>

The project characteristics are as per below:

Item	Data
Title of the project activity	Chol Charoen Group Wastewater Treatment with Biogas System I (Khonkaen)
Project Location (specific Address, Country)	Address: No. 261 Moo 4, Huanakhum, Kranuan, Khonkaen, 40170, Thailand Country : Thailand Latitude: 16° 48.498' N Longitude: 103° 05.148' E
Project proponents	Kaen Charoen Co. Ltd.
	South Pole Carbon Asset Management Ltd.
Project Entities	Kaen Charoen Co. Ltd., 1004/201 Rama 3 Road, Bangpongpan, Yannawa, Bangkok, 10120 Thailand
	South Pole Carbon Asset Management Ltd., Technoparkstrasse 1 Zurich -8005 Switzerland
Applied Methodology	AMS III.H., Version 13: "Methane Recovery in Wastewater Treatment", AMS I.C., Version 15: "Thermal energy production with or without electricity" and AMS I.D., Version 14: "Grid Connected Renewable Electricity Generation".
Sectoral Scope	Sectoral Scope 13 : Waste handling and disposal Sectoral Scope 01 : Energy industries (Renewable/Non-

	Renewable sources)
Project crediting period	10 years (from 15-07-2009 to 14-07-2018)
Period verified in this verification	From 03-12-2009 to 31-12-2011 (Due to insufficient monitoring equipments, the operational period till 2 nd December 2009 has been neglected from the claim of emission reduction)

2 VALIDATION PROCESS, FINDINGS AND CONCLUSION

2.1 Validation Process

Not applicable

2.2 Validation Findings

2.2.1 Gap Validation

Not applicable

2.2.2 Methodology Deviations

Not applicable

2.2.3 New Project Activity Instances

Not applicable since this is not a grouped project

2.3 Validation Conclusion

Not applicable

3 VERIFICATION PROCESS

The verification process is based on the guidelines described in the Validation and Verification Manual.^{/1/} In addition to that standard auditing techniques have been applied. The verification team performed first a desk review, followed by an on-site visit to review the project realization.

The verification process was based on assessment of the validated VCS Project Description document (VCS PD)^{/3/}, the monitoring report^{/4/}, emission reduction calculation spreadsheet,^{/5/} supporting documents made available to the verification team and information collected through performing interviews during the on-site assessment. Furthermore publicly available information was considered as far as available and required.

3.1 Method and Criteria

The verification was carried out on the basis of the following requirements, applicable for this project activity:

- Requirements and guidance of VCS Version 3 ^{/2/}.
- Applicable CDM guidelines and requirements, including applicable relevant methodological decisions made by the CDM Executive Board.
- Other relevant rules, including the host country legislation,
- CDM Validation and Verification Manual ^{/1/},
- Monitoring plan as given in the registered VCS PD ^{/3/},
- Approved CDM Methodologies AMS III.H., Version 13: “Methane Recovery in Wastewater Treatment”, AMS I.C., Version 15: “Thermal energy production with or without electricity” and AMS I.D., Version 14: “Grid Connected Renewable Electricity” ^{/7/}.

3.2 Document Review

During the desk review all documents initially provided by the client and publicly available documents relevant for the verification were reviewed. The main documents are listed below:

- The validated VCS PD ^{/3/}, including the monitoring plan and the corresponding validation report ^{/6/};
- Monitoring Report ^{/4/} & Emission reduction calculation sheet ^{/5/};
- The applied monitoring methodology ^{/7/};
- Requirements and guidance of VCS ^{/2/} as well as applicable methodological relevant decisions, clarifications and guidance from the CDM Executive Board;
- Any other information and references relevant to the project activity’s resulting emission reductions (e.g., IPCC reports, data on electricity generation in the national grid or laboratory analysis and national regulations).
- Addressing of FARs identified during validation

3.3 Interviews

Representatives of Kaen Charoen (1) Co., Ltd. including operational staff of the plant and South Pole Carbon Asset Management Ltd. (project consultant) were interviewed to confirm selected information and to resolve issues identified in the document review.

The main topics of the interviews are summarized in below table:

Interview Topic	Interviewed persons
• General aspects of the project	Ms. Nattaya Lonawan, M&V Project Manager, South Pole Carbon Asset Management Ltd.

Interview Topic	Interviewed persons
• Technical equipment and operation • Changes since validation • Monitoring and measurement equipment • Remaining issues from validation • Calibration procedures • Quality management system • Involved personnel and responsibilities • Training and practice of the operational personnel • Implementation of the monitoring plan • Monitoring data management • Data uncertainty and residual risks • GHG calculation • Procedural aspects of the verification • Maintenance • Environmental aspects	Ms. Ponjun Phootongpan, Biogas Supervisor, Kaen Charoen Co., Ltd. Mr. Juggargorn Cheornchaiyaphum, Engineer, Kaen Charoen Co., Ltd. Ms. Oronec Sanpresert, Lab Supervisor, Kaen Charoen Co., Ltd.

3.4 Site Inspections

From 29-02-2012 to 01-03-2012, GLC carried out an on-site visit to Kean Charoen (1) Co., Ltd site where the project was implemented. During the visit, GLC verified that the actual implementation of the project was as described in the VCS PD.

On-site inspection included review of data and records, interviews with biogas plant supervisor, operators, operations and maintenance personnel, confirming all data sources and constants used in the Monitoring Report.

The main tasks covered during the on-site visit included, but were not limited to:

- Verified whether the project was implemented as per the description in the VCS PD
- Confirmation that all monitoring equipments have been installed and operated as per the monitoring plan in the VCS PD.
- The operating staff was interviewed and observed in order to check the risks of inappropriate operation and data collection procedures.
- Information processes for generating, aggregating and reporting the selected monitored parameters were reviewed.
- Calibration records of all metering equipment were checked.
- Auditing of the monitoring processes, routines and documentations were audited.
- The monitored data was checked completely.

3.5 Resolution of Any Material Discrepancy

On the basis of the desk review, the on-site visit, follow-up interviews and further background investigation the verification report is completed.

Findings established during the verification may be that:

- i) The verification is not able to obtain sufficient evidence for the reported emission reductions or part of the reported emission reductions. In this case these emission reductions shall not be verified and certified;
- ii) The verification has identified material misstatements in the reported emission reductions.

A detailed list of verification findings form the draft verification report, which is sent to the client for resolution of raised CARs, CLs and FARs.

Nonconformities raised during the verification can either be seen as a non-fulfilment of criteria ensuring the proper implementation of a project or where a risk to deliver high quality emission reductions is identified.

Corrective Action Requests (CARs) are issued, if:

- the project participants have made mistakes that will influence the ability of the project activity to achieve real, measurable additional emission reductions;
- the CDM requirements have not been met;
- There is a risk that emission reductions cannot be monitored or calculated.

Forward Action Requests (FAR) indicate essential risks for further periodic verifications. Forward Action Requests are issued, if:

- The actual status requires a special focus on this item for the next consecutive verification, or an adjustment of the monitoring plan is recommended.

The verification team uses the term Clarification Request (CL), which is issued if:

- Information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

For a detailed list of all CARs, CLs and FARs raised in the course of the verification please refer to Annex 3.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

Implementation of the project activity has been assessed during the on-site visit. The project activity involves the installation and operation of a methane recovery and utilization system (covered lagoon system). The captured methane (biogas) is utilized as fuel in dual fire boilers replacing fossil fuel (i.e. HFO) and gas engines for electricity generation. As per the registered VCS PD, there are two dual fired boilers of 3.488 MW_{th} and 3.78 MW_{th} capacities. However, during the onsite verification, the boiler capacities were to be 4.070 MW_{th} and 3.78 MW_{th} respectively. During the onsite interviews it was revealed that the boiler with 3.488 MW_{th} was replaced with a new boiler of 4.070 MW_{th}. Therefore, a CAR was raised (please refer to CAR 2 in the enclosed Annex 3). In response to the CAR, the emission reduction on account of biogas utilisation in new boiler has not been included. According to the VCS PD, the captured biogas is also utilised in two gas engines each having a capacity of 952 kWe. From the onsite verification, the capacity of gas engines is confirmed to be correct. However, two additional gas engines of 450 kWe have also been installed. The baseline emissions on account of biogas utilisation in these two gas engines have not been included in the emission reduction calculation. This is confirmed based on the review of ER sheet and onsite interviews.

The crediting period start date as per the validated VCS PD is 15 July 2009. From the onsite interviews, it was learnt that the project implementation was completed by the mid of 2009. However, sufficient monitoring equipments were not in place till 2 December 2009. Therefore, the period from 15 July 2009 to 2 December 2009 has not been considered for claiming emission reduction. This is considered to be appropriate. Hence, the 1st monitoring period starts from 3 December 2009.

As part of the verification GLC has also assessed that all eligibility criteria of the project under VCS previously assessed by DOE (Report No. 53208409-09/309 issued on 17 November 2009) are still valid along the monitoring period from 03-12-2009 to 31-12-2011:

- The project activity has not created or attempted to create another form of environmental or carbon credit.
- CDM is a GHG Program approved by the VCS Board and currently there are no time or geography limitations in the application of the CDM baseline and monitoring methodologies; AMS III.H, version 13: "Methane Recovery in Wastewater Treatment", AMS I.C., version 15: "Thermal energy production with or without electricity" and AMS I.D., version 14: "Grid Connected Renewable Electricity" under VCS.
- The project has neither been presented nor rejected to/by any other GHG program.

Implementation status of the monitoring plan and the completeness of monitoring

The verification team has followed two steps to assess the completeness of the monitoring. The first step is document review and the second one is on-site interviews and observations. As a part of the step 1, the verification team has reviewed the submitted documents such as MR ^{/4/}, ER sheets ^{/5/} and supporting documents stated in Annex 2. The monitoring parameters have been monitored with calibrated monitoring equipment as described in the monitoring plan of the registered VCS PD ^{/3/}. It is confirmed that the monitoring mechanism is effective and reliable.

Therefore, from the document review and onsite verification, it is confirmed that all the parameters were monitored in accordance with the registered monitoring plan during the monitoring period. Following are the details of monitoring in accordance with the monitoring plan of the registered VCS PD:

	Assessment/ Observation	
Data / Parameter: (as in monitoring plan of the VCS PD):	Q _{y,ww} Volume of wastewater treated in the year y (m ³)	
Measuring frequency:	Continuous The parameter is measured on a continuous basis and recorded by the flow meter FM1. The measured data is logged in on a daily basis. The verification team has cross checked the log books and interviewed site personnel and found that the log book data is consistent with the data provided in the final ER sheet and the plant operating personnel are proficient.	
Reporting frequency:	Daily From the onsite verification it is confirmed that the parameter is recorded by the operators once every shift in the log sheets. The biogas supervisor collects the log sheet date from the operators on a daily basis. The supervisor checks the value recorded by the operators, calculate daily quantity of wastewater treated and enters into excel sheet.	
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. The measuring and reporting frequencies are inline with the monitoring plan of the registered VCS PD.	
Type of monitoring equipment:	Type of meter	Magnetic flow meter (FM1)
	Serial Number	ZAP0573
	Accuracy	0.20 % ^{/10/}
Is accuracy of the monitoring equipment as stated in the VCS PD? If the VCS PD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practice?	VCS PD does not specify the accuracy of monitoring equipment. However, the PP has installed magnetic flow meter with an accuracy class of 0.20%. GLC understands that the accuracy of the meters represents good monitoring practice.	
Calibration frequency /interval:	The flow meter is calibrated at least once every 3 years. The flow meter, FM1, was calibrated on 24-02-2009, 08-04-2010 and again on 29-11-2011 ^{/9/} which shows there is a good practice for calibration of the meter.	

Is the calibration interval in line with the monitoring plan of the VCS PD? If the VCS PD does not specify the frequency of calibration, does the selected frequency represent good monitoring practice?	Yes. As per the registered VCS PD, the flow meters would undergo calibration once every 3 year. The actual calibration frequency during the monitoring period was less than 3 years, which represents a good practice.
Company performing the calibration:	The calibration was carried out by instrument manufacturer "Euromag International" ^{/9/} .
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes. The calibration reports were checked and the meter was found functioning properly.
Is (are) calibration(s) valid for the whole reporting period?	Yes. The calibration is valid for the whole reporting period.
If applicable, has the reported data been cross-checked with other available data?	NA
How were the values in the monitoring report verified?	The values mentioned in the monitoring report have been verified during the site visit with the log sheets ^{/12/} .
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and the necessary QA/QC procedures are in place.

	Assessment/ Observation	
Data / Parameter: (as in monitoring plan of the VCS PD):	COD _{ww, untreated, y} COD of water entering the covered lagoon reactor system (mg/l)	
Measuring frequency:	Daily Wastewater samples are collected and the COD measurement is carried out three times on every operational day and the average value of the three is reported in the ER sheet.	
Reporting frequency:	Daily COD analysis is carried out three times a day by the laboratory in-charge and the values are reported to the biogas supervisor on a daily basis. The biogas supervisor checks the values and transfers the data into electronic format (Excel sheets) and stores.	
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. The measuring and reporting frequency is inline with the monitoring plan.	
Type of monitoring equipment:	Type of meter	Spectrophotometer

		(CS)
	Serial number	HI 83214
	Accuracy	10 mg/l (HR) ^{/10/} 01 mg/l (LR)
Is accuracy of the monitoring equipment as stated in the VCS PD? If the VCS PD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practice?	VCS PD does not specify the accuracy of monitoring equipment. However, the PP has installed latest Spectrophotometer with an accuracy class of 10 mg/l (HR) & 1 mg/l (LR). GLC is of the opinion that the accuracy of the meter represents good monitoring practice.	
Calibration frequency /interval:	The spectrophotometer is calibrated at least once every 3 years The spectrometer was calibrated on 18-03-2008 and again on 14-07-2010 ^{/9/} .	
Is the calibration interval in line with the monitoring plan of the VCS PD? If the VCS PD does not specify the frequency of calibration, does the selected frequency represent good monitoring practice?	In the registered VCS PD, calibration frequency has not been clearly specified. The calibration frequency is defined as 3 year as per the monitoring report. However, from the above mentioned calibration dates, it is conformed that the calibration frequency represents a good monitoring practice.	
Company performing the calibration:	The calibration was carried out by instrument manufacturer "Hanna Instruments (Thailand) Ltd." ^{/9/}	
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes. The calibration certificates were checked and the meter was found functioning properly.	
Is (are) calibration(s) valid for the whole reporting period?	Yes. Calibration is valid for the whole reporting period.	
If applicable, has the reported data been cross-checked with other available data?	Yes. The wastewater samples are sent to an external laboratory once in a year as per the monitoring plan. The reports from external laboratory "Environmental Engineering Laboratory Faculty of Engineering, KKU" ^{/19/} were provided to the verification team. The verification team based on the reports dated 21-10-2010 and 17-08-2011 ^{/19/} confirms that the COD values determined by the internal laboratory are close to that of external laboratory results.	
How were the values in the monitoring report verified?	The values mentioned in the monitoring report and ER sheet were verified during the site visit with the log sheets. The values were 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 and are necessary QA/QC processes in place?	Yes, from the document review and onsite verification, it is confirmed that the data management ensures correct transfer of data and reporting of emission reductions and the necessary QA/QC procedures are in place.	

	Assessment/ Observation	
Data / Parameter: (as in monitoring plan of the VCS PD):	COD _{out,lagoon,PJ,y} COD of water coming out of the last lagoon (tonnes/m ³)	
Measuring frequency:	Daily Wastewater samples are collected and the COD measurement is carried out three times on every operational day and the average value of the three is reported in the ER sheet.	
Reporting frequency:	Daily COD analysis is carried out three times a day by the laboratory in-charge and the values are reported to the biogas supervisor on a daily basis. The biogas supervisor checks the values and transfers the data into electronic format (Excel sheets) and stores.	
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. The measuring and reporting frequency is inline with the monitoring plan.	
Type of monitoring equipment:	Type of meter	Spectrophotometer (CS)
	Serial number	HI 83214
	Accuracy	10 mg/l (HR) ^{/10/} 01 mg/l (LR)
Is accuracy of the monitoring equipment as stated in the VCS PD? If the VCS PD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practice?	VCS PD does not specify the accuracy of monitoring equipment. However, the PP has installed latest Spectrophotometer with an accuracy class of 10 mg/l (HR) & 1 mg/l (LR). GLC is of the opinion that the accuracy of the meter represents good monitoring practice.	
Calibration frequency /interval:	The spectrophotometer is calibrated at least once every 3 years The spectrometer was calibrated on 18-03-2008 and again on 14-07-2010 ^{/9/} .	
Is the calibration interval in line with the monitoring plan of the VCS PD? If the VCS PD does not specify the frequency of calibration, does the selected frequency represent good monitoring practice?	In the registered VCS PD, calibration frequency has not been clearly specified. The calibration frequency is defined as 3 year as per the monitoring report. However, from the above mentioned calibration dates, it is conformed that the calibration frequency represents a good monitoring practice.	
Company performing the calibration:	The calibration was carried out by instrument manufacturer "Hanna Instruments (Thailand) Ltd." ^{/9/}	
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes. The calibration certificates were checked and the meter was found functioning properly.	

Is (are) calibration(s) valid for the whole reporting period?	Yes. Calibration is valid for the whole reporting period.
If applicable, has the reported data been cross-checked with other available data?	Yes. The wastewater samples are sent to an external laboratory once in a year as per the monitoring plan. The reports from external laboratory "Environmental Engineering Laboratory Faculty of Engineering, KKU" ^{/19/} were provided to the verification team. The verification team based on the reports dated 21-10-2010 and 17-08-2011 ^{/19/} confirms that the COD values determined by the internal laboratory are close to that of external laboratory results.
How were the values in the monitoring report verified?	The values mentioned in the monitoring report and ER sheet were verified during the site visit with the log sheets. The values were 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 and are necessary QA/QC processes in place?	Yes, from the document review and onsite verification, it is confirmed that the data management ensures correct transfer of data and reporting of emission reductions and the necessary QA/QC procedures are in place.

	Assessment/ Observation	
Data / Parameter: (as in monitoring plan of the VCS PD):	COD _{out,CL,y} COD of water coming out of the cover lagoon (tonnes/m ³)	
Measuring frequency:	Daily Wastewater samples are collected and the COD measurement is carried out three times on every operational day and the average value of the three is reported in the ER sheet.	
Reporting frequency:	Daily COD analysis is carried out three times a day by the laboratory in-charge and the values are reported to the biogas supervisor on a daily basis. The biogas supervisor checks the values and transfers the data into electronic format (Excel sheets) and stores.	
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. The measuring and reporting frequency is inline with the monitoring plan.	
Type of monitoring equipment:	Type of meter	Spectrophotometer

		(CS)
	Serial number	HI 83214
	Accuracy	10 mg/l (HR) ^{/10/} 01 mg/l (LR)
Is accuracy of the monitoring equipment as stated in the VCS PD? If the VCS PD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practice?	VCS PD does not specify the accuracy of monitoring equipment. However, the PP has installed latest Spectrophotometer with an accuracy class of 10 mg/l (HR) & 1 mg/l (LR). GLC is of the opinion that the accuracy of the meter represents good monitoring practice.	
Calibration frequency /interval:	The spectrophotometer is calibrated at least once every 3 years The spectrometer was calibrated on 18-03-2008 and again on 14-07-2010 ^{/9/} .	
Is the calibration interval in line with the monitoring plan of the VCS PD? If the VCS PD does not specify the frequency of calibration, does the selected frequency represent good monitoring practice?	In the registered VCS PD, calibration frequency has not been clearly specified. The calibration frequency is mentioned as 3 year in the monitoring report. However, from the above mentioned calibration dates, it is conformed that the calibration frequency represents a good monitoring practice.	
Company performing the calibration:	The calibration was carried out by instrument manufacturer "Hanna Instruments (Thailand) Ltd." ^{/9/}	
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes. The calibration certificates were checked and the meter was found functioning properly.	
Is (are) calibration(s) valid for the whole reporting period?	Yes. Calibration is valid for the whole reporting period.	
If applicable, has the reported data been cross-checked with other available data?	Yes. The wastewater samples are sent to an external laboratory once in a year as per the monitoring plan. The reports from external laboratory "Environmental Engineering Laboratory Faculty of Engineering, KKU" ^{/19/} were provided to the verification team. The verification team based on the reports dated 21-10-2010 and 17-08-2011 ^{/19/} confirms that the COD values determined by the internal laboratory are close to that of external laboratory results.	
How were the values in the monitoring report verified?	The values mentioned in the monitoring report and ER sheet have been verified during the site visit with the log sheets. The values have been 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 and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and the necessary QA/QC procedures are in place.	

	Assessment/ Observation		
Data / Parameter: (as in monitoring plan of the VCS PD):	BG _{combusted, y} Amount of biogas combusted for gainful use (Nm ³)		
Measuring frequency:	Continuous The parameter is measured on a continuous basis by the flow meters (GM1, GM3 & GM4). The amount of biogas combusted for gainful use is the sum of biogas consumption for boilers and for gas engines.		
Reporting frequency:	Daily. The parameter is monitored continuously by the flow meters and the flow meters indicate the cumulative flow value on the meter display. The biogas operators record the value for each operating shift in the log sheet. The biogas supervisor collects the log sheets on a daily basis, calculates the daily consumption of biogas and enters the data in Excel sheet. The verification team has checked the log books and interviewed the site personnel and found that the log book data is consistent with the data provided in the ER sheet and plant operating personnel are competent.		
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. The measuring and reporting frequency is inline with the monitoring plan.		
Type of monitoring equipment:	Type of meter	Serial Number	Accuracy
	Gas flow meter (GM1)	N1-TD02-9544958	0.075% ^{/10/}
	Gas flow meter (GM3)	7569	1% of Reading +0.2% of Full Scale ^{/10/}
	Gas flow meter (GM4)	N1-T905-9663007	0.075% ^{/10/}
Is accuracy of the monitoring equipment as stated in the VCS PD? If the VCS PD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practice?	VCS PD does not specify the accuracy of monitoring equipment. However, based on GLC's experience of verifying similar other projects, it is confirmed that the accuracy of the meters represents good monitoring practice.		
Calibration frequency /interval:	The gas flow meters are calibrated at least once every 3 years.		
	Flow meter	Latest Calibration ^{/9/}	Previous Calibration ^{/9/}

	<table><tr><td>GM1</td><td>30-11-2011</td><td>25-06-2010 25-09-2009</td></tr><tr><td>GM3</td><td>29-11-2011</td><td>28-05-2009</td></tr><tr><td>GM4</td><td>25-06-2010</td><td>25-09-2009</td></tr></table>	GM1	30-11-2011	25-06-2010 25-09-2009	GM3	29-11-2011	28-05-2009	GM4	25-06-2010	25-09-2009
GM1	30-11-2011	25-06-2010 25-09-2009								
GM3	29-11-2011	28-05-2009								
GM4	25-06-2010	25-09-2009								
Is the calibration interval in line with the monitoring plan of the VCS PD? If the VCS PD does not specify the frequency of calibration, does the selected frequency represent good monitoring practice?	As per the registered VCS PD, the gas flow meters would be calibrated once in three years according to the equipment specifications and applicable industry standards. From the verified calibration reports, it is conformed that the calibration frequency is inline with the VCS PD and represents good monitoring practice									
Company performing the calibration:	The calibration was carried out by MIRACLE INTERNATIONAL TECHNOLOGY CO., LTD., Thailand									
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes. The calibration certificates were checked and the meter was found functioning properly.									
Is (are) calibration(s) valid for the whole reporting period?	Yes. Calibration is valid for the whole reporting period.									
If applicable, has the reported data been cross-checked with other available data?	NA									
How were the values in the monitoring report verified?	The values mentioned in the monitoring report and ER sheet have been verified during the site visit with the log sheets. The values have been 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 and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and the necessary QA/QC procedures are in place.									

	Assessment/ Observation
Data / Parameter: (as in monitoring plan of the VCS PD):	W _{CH4} Methane content in biogas (%)
Measuring frequency:	Continuous The methane content in biogas is continuously measured by inline gas analysers.
Reporting frequency:	Daily Methane content from the gas analyser display is recorded on hourly basis in log sheets. The values

	are reported to the Biogas Supervisor on a daily basis. The Supervisor calculates the daily average value and transfers the data into electronic format.	
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. The measuring and reporting frequency is inline with the monitoring plan. The gas analyser has been installed on biogas line that goes for gas engines. Therefore, the %CH₄ (methane content) was not monitored when the gas engines were stopped. Nevertheless, it is observed from the ER sheet that there was a consumption of biogas for boilers and for flare even though the gas engines were stopped on some of the days. As it is not appropriate to use the average value of the available measured %CH₄ for calculation of emission reduction on account of biogas consumption in boilers and flare, a CAR was raised (please refer to CAR 12 in Annex 3). The CAR was closed upon addressing it appropriately.	
Type of monitoring equipment:	Type of meter	Gas analyser
	Serial number	27391
	Accuracy	1% ^{/10/}
Is accuracy of the monitoring equipment as stated in the VCS PD? If the VCS PD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practice?	VCS PD does not specify the accuracy of monitoring equipment. However, the PP has installed Gas Analyzer with an accuracy of 1 %. GLC based on its experience confirms that the accuracy of the meter represents good monitoring practice.	
Calibration frequency /interval:	The gas analyzer is calibrated at least once every 3 years The gas analyser was calibrated on 15-12-2009 and again on 14-03-2011 ^{/9/}. Though the monitoring period starts from 03-12-2009, the generators (or gas engines) were not in operation from 03-12-2009 to 20-12-2009. Therefore monitoring of methane content was started only from 21-12-2009 since the gas analyser was installed on biogas line that goes for gas engines. A CAR was raised pertaining to this issue (please refer to CAR 12 in Annex 3). The methane content (%CH₄) value has been considered conservatively and the emission reduction calculation has been revised in response to the CAR. The deviated approach is inline with Para 36 of the applied methodology, AMS III.H., version 13 and the approach has been transparently described in the monitoring report.	

Is the calibration interval in line with the monitoring plan of the VCS PD? If the VCS PD does not specify the frequency of calibration, does the selected frequency represent good monitoring practice?	As per the registered VCS PD, it was mentioned that the gas analyzer would undergo calibration once in three years. From the verified calibration reports, it is conformed that the calibration frequency is inline with the VCS PD and represents good monitoring practice.
Company performing the calibration:	The gas analyser was calibrated by Jaimphattana Energy International Co., Ltd. ^{/9/}
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes. The calibration certificates were checked and the meter was found functioning properly.
Is (are) calibration(s) valid for the whole reporting period?	Yes. Calibration is valid for the whole reporting period.
If applicable, has the reported data been cross-checked with other available data?	NA
How were the values in the monitoring report verified?	The values mentioned in the monitoring report and ER sheet have been verified during the site visit with the log sheets. The values have been 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 and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and the necessary QA/QC procedures are in place.

	Assessment/ Observation
Data / Parameter: (as in monitoring plan of the VCS PD):	BG _{TOFlare, y} Amount of biogas flared (Nm ³)
Measuring frequency:	Continuous The parameter is measured on a continuous basis by gas flow meter (GM2).
Reporting frequency:	Daily The measured data by the flow meter is logged in on a daily basis by the operators. The biogas supervisor collects the log sheets on a daily basis, calculates the daily consumption of biogas and enters the data in Excel sheet. The verification team has checked the log books and interviewed the site personnel and found that the log book data is consistent with the data provided in the ER sheet and plant operating personnel are competent.
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. The measuring and reporting frequency is inline with the monitoring plan.

Type of monitoring equipment:	<table> <tr> <td>Type of meter</td><td>Gas flow meter (GM2)</td></tr> <tr> <td>Serial number</td><td>7568</td></tr> <tr> <td>Accuracy</td><td>1% of Reading +0.2% of Full Scale ^{/10/}</td></tr> </table>	Type of meter	Gas flow meter (GM2)	Serial number	7568	Accuracy	1% of Reading +0.2% of Full Scale ^{/10/}
Type of meter	Gas flow meter (GM2)						
Serial number	7568						
Accuracy	1% of Reading +0.2% of Full Scale ^{/10/}						
Is accuracy of the monitoring equipment as stated in the VCS PD? If the VCS PD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practice?	VCS PD does not specify the accuracy of monitoring equipment. However, based on GLC's experience of verifying similar other projects, it is confirmed that the accuracy of the meter represents good monitoring practice.						
Calibration frequency /interval:	The gas flow meter is to be calibrated at least once every 3 years as per VCS PD. The calibration dates of GM2 are 28-05-2009 and 29-11-2011 ^{/9/}.						
Is the calibration interval in line with the monitoring plan of the VCS PD? If the VCS PD does not specify the frequency of calibration, does the selected frequency represent good monitoring practice?	As per the registered VCS PD, it was mentioned that the gas flow meter would undergo calibration once in every 3 year. The calibration frequency is mentioned as 3 year in the monitoring report. It is confirmed based on the calibration reports that the calibration frequency is inline with the VCS PD which represents good monitoring practice.						
Company performing the calibration:	The calibration was carried out by instrument manufacturer FOX, California in 2009 & by Miracle International Technology Co. Ltd. in 2011. ^{/9/}						
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes. The calibration certificates were checked and the meter was found functioning properly.						
Is (are) calibration(s) valid for the whole reporting period?	Yes. Calibration is valid for the whole reporting period.						
If applicable, has the reported data been cross-checked with other available data?	NA						
How were the values in the monitoring report verified?	The values mentioned in the monitoring report and ER sheet have been verified during the site visit with the log sheets. The values have been 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 and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and the necessary QA/QC procedures are in place.						

	Assessment/ Observation
Data / Parameter: (as in monitoring plan of the VCS PD):	q _{FO, y}

	Quantity of fossil fuel used in boiler in year y (Liters)											
Measuring frequency:	Continuous The parameter is measured continuously using flow meter.											
Reporting frequency:	Daily The parameter is recorded in log sheets on a shift basis and reported to Supervisor on a daily basis. The supervisor after checking the value, transfers the daily quantity of fuel oil into electronic files. The verification team has checked the log books and interviewed the site personnel and found that the log book data is consistent with the data provided in the ER sheet and plant operating personnel are competent.											
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. The measuring and reporting frequency is inline with the monitoring plan.											
Type of monitoring equipment:	<table><tr><td>Type of meter</td><td>Oil flow meter (OM1)</td><td>Oil flow meter (OM2)</td></tr><tr><td>Serial number</td><td>4546871</td><td>4126168</td></tr><tr><td>Accuracy</td><td>1% ^{/10/}</td><td>1% ^{/10/}</td></tr></table> There are two boilers and each boiler has been provided with a flow meter. However, the emission reduction on account of fossil fuel displacement in boiler-2 has not been accounted in the final emission reduction calculation (please refer to CAR 2 in Annex 3).			Type of meter	Oil flow meter (OM1)	Oil flow meter (OM2)	Serial number	4546871	4126168	Accuracy	1% ^{/10/}	1% ^{/10/}
Type of meter	Oil flow meter (OM1)	Oil flow meter (OM2)										
Serial number	4546871	4126168										
Accuracy	1% ^{/10/}	1% ^{/10/}										
Is accuracy of the monitoring equipment as stated in the VCS PD? If the VCS PD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practice?	VCS PD does not specify the accuracy of monitoring equipment. However, the PP is using oil flow meters (OM) with an accuracy class of 1 %. GLC, based on experience of verifying similar other projects, confirms that the accuracy of the meter represents good monitoring practice.											
Calibration frequency /interval:	The fuel oil flow meter is calibrated at least once every 3 years. Both the oil flow meters were calibrated on 29-11-2011 ^{/9/} .											
Is the calibration interval in line with the monitoring plan of the VCS PD? If the VCS PD does not specify the frequency of calibration, does the selected frequency represent good monitoring practice?	In the registered VCS PD, calibration frequency has not been clearly specified. The calibration frequency is mentioned as 3 year in the monitoring report, which is inline with the General Guidelines to SSC CDM methodologies (version 17) ^{/14/} .											

	The oil flow meters were calibrated within 3 years from the start date of the crediting period.
Company performing the calibration:	The calibration was carried out by Miracle International Technology Co. Ltd., Thailand ^{/9/}
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes. The calibration certificates were checked and the meter was found functioning properly.
Is (are) calibration(s) valid for the whole reporting period?	Yes. Calibration is valid for the whole reporting period.
If applicable, has the reported data been cross-checked with other available data?	Yes. The reported data was cross checked with the oil purchase records maintained at the project site. The information was found to be consistent.
How were the values in the monitoring report verified?	The values mentioned in the monitoring report and ER sheet have been verified during the site visit with the log sheets ^{/12/} . The values have been 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 and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and the necessary QA/QC procedures are in place.

	Assessment/ Observation
Data / Parameter: (as in monitoring plan of the VCS PD):	$Q_{starch, y}$ Quantity of dry starch produced (Tonnes)
Measuring frequency:	Daily Starch production is monitored continuously and daily production is recorded in log sheets.
Reporting frequency:	Daily The starch production details are reported to the plant manager on a daily basis.
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. The measuring and reporting frequency is inline with the monitoring plan.
Type of monitoring equipment:	NA
Is accuracy of the monitoring equipment as stated in the VCS PD? If the VCS PD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practice?	NA
Calibration frequency /interval:	NA
Is the calibration interval in line with the monitoring plan of the VCS PD? If the VCS PD	NA

does not specify the frequency of calibration, does the selected frequency represent good monitoring practice?	
Company performing the calibration:	NA
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	NA
Is (are) calibration(s) valid for the whole reporting period?	NA
If applicable, has the reported data been cross-checked with other available data?	The starch production details were crosschecked with the sales records during the site visit. The reported information was found to be appropriate.
How were the values in the monitoring report verified?	The reported starch production values in the MR and ER sheet were verified with the daily plant log sheets.
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and the necessary QA/QC procedures are in place.

	Assessment/ Observation
Data / Parameter: (as in monitoring plan of the VCS PD):	EG _y Net electricity production by the generators during year y (MWh/y)
Measuring frequency:	Continuous The parameter is measured on a continuous basis and recorded by electricity meters (EM1 & EM2) installed at the generator sets.
Reporting frequency:	Daily The generated power is supplied to the starch processing plant. The cumulative value of electricity generation is displayed on the meter panel. The parameter is recorded in the log sheets by the operators during each operating shift (3 times a day). The values are reported to the Biogas Supervisor on a daily basis. The Supervisor checks the values and transfers into electronic files and stores. The verification team has checked the log books and interviewed the site personnel and found that the log book data is consistent with the data provided in the ER sheet and plant operating personnel are competent.

Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. The measuring and reporting frequency is inline with the monitoring plan.		
Type of monitoring equipment:	Type of meter	EM1	EM2
	Serial Number	62560100N0030	62560100N0034
	Accuracy	0.50 % ^{/10/}	0.50% ^{/10/}
Is accuracy of the monitoring equipment as stated in the VCS PD? If the VCS PD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practice?	VCS PD does not specify the accuracy of monitoring equipment. However, GLC is of the opinion that an accuracy of 0.50 % represents good monitoring practice.		
Calibration frequency /interval:	The calibration frequency of electricity meters was defined as 'at least once every 3 years'.		
Is the calibration interval in line with the monitoring plan of the VCS PD? If the VCS PD does not specify the frequency of calibration, does the selected frequency represent good monitoring practice?	As per the registered VCS PD, it was mentioned that the electricity meters would undergo calibration according to the equipment's specifications and applicable industrial standards (generally on a once in three year basis). However, the electricity meters were not calibrated since installation in 2008. Therefore, a CAR has been raised. PPs have addressed the CAR by applying calibration guidelines of EB52, Annex 60^{/14/}. Please refer to CAR 11 in Annex 3 for details.		
Company performing the calibration:	The meters were not calibrated during the monitoring period		
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	NA		
Is (are) calibration(s) valid for the whole reporting period?	No, the meters were not calibrated during the monitoring period		
If applicable, has the reported data been cross-checked with other available data?	NA		
How were the values in the monitoring report verified?	The values mentioned in the monitoring report and ER sheet have been verified during the site visit with the log sheets. The reported values have been 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 and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and the necessary QA/QC procedures are in place.		

	Assessment/ Observation
Data / Parameter: (as in monitoring plan of the VCS PD):	EC _y Electricity consumption by wastewater treatment plant in year y (MWh)
Measuring frequency:	The parameter is calculated based on the maximum rated capacity of auxiliary equipments and multiplying with a factor of 1.1.
Reporting frequency:	Yearly
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	The calculation approach is inline with the approach described in the registered VCS PD. The total electrical capacity of auxiliary equipments installed in the project activity was 277 kW as per the VCS PD. However, the value has been updated to 458 kW based on the actual capacity of the installed equipments during the monitoring period. Furthermore, total annual hours of 8760 has been used in calculating the annual electricity consumption. The approach is considered to be correct as it results in higher project emissions and lower emission reductions.
Type of monitoring equipment:	NA
Is accuracy of the monitoring equipment as stated in the VCS PD? If the VCS PD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practice?	NA
Calibration frequency /interval:	NA
Is the calibration interval in line with the monitoring plan of the VCS PD? If the VCS PD does not specify the frequency of calibration, does the selected frequency represent good monitoring practice?	NA
Company performing the calibration:	NA
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	NA
Is (are) calibration(s) valid for the whole reporting period?	NA
If applicable, has the reported data been cross-checked with other available data?	NA

How were the values in the monitoring report verified?	The installed capacity of auxiliary equipments were verified
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and the necessary QA/QC procedures are in place.

	Assessment/ Observation
Data / Parameter: (as in monitoring plan of the VCS PD):	Sludge removed and its application The quantity of organic material / sludge removed from the covered lagoon system and its application. (Tonnes / and type of application)
Measuring frequency:	Recorded every time sludge is removed from the system However, sludge was not removed during the monitoring period. This is confirmed based on onsite interviews.
Reporting frequency:	NA
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	NA
Type of monitoring equipment:	Weighing machine available at the plant is used to measure the quantity of sludge whenever it is removed. However, the event has not occurred during the monitoring period. Therefore, weighing machine details have not been provided.
Is accuracy of the monitoring equipment as stated in the VCS PD? If the VCS PD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practice?	NA
Calibration frequency /interval:	NA
Is the calibration interval in line with the monitoring plan of the VCS PD? If the VCS PD does not specify the frequency of calibration, does the selected frequency represent good monitoring practice?	NA
Company performing the calibration:	NA
Did calibration confirm proper functioning of	NA

monitoring equipment? (Yes / No):	
Is (are) calibration(s) valid for the whole reporting period?	NA
If applicable, has the reported data been cross-checked with other available data?	NA
How were the values in the monitoring report verified?	NA
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	NA

	Assessment/ Observation
Data / Parameter: (as in monitoring plan of the VCS PD):	$\eta_{\text{flare-h}}$ Flare efficiency (%)
Measuring frequency:	The parameter is calculated according to the “Tool to determine project emissions from flaring gases containing methane” It is required to monitor the flame detection period in order to consider the default value of 50% as per the tool. However, no evidence for monitoring of the flame detection period was provided to the verification team. Therefore, a CAR was raised (please refer to CAR 16 in Annex 3). In response to the CAR, the PPs have corrected the flare efficiency to 0% which is more conservative.
Reporting frequency:	NA
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes, the monitoring approach is inline with the description of the monitoring plan. The monitoring plan of the VCS PD states, ““The default factor of 50% might be only applied if a flame is detected at the flare for more than 20 minutes in hour h, whenever biogas is sent to the flare system. If the biogas is sent to the flare for a period shorter than one hour, the flare detection signal shall be available for at least 1/3 of this period, following the same logic of the flaring tool (20 minutes out of 1 hour). If these conditions are not met, 0% default value should be used for this period.” Therefore, considering the flare efficiency as 0% is appropriate and it results in conservative emission reduction.

Type of monitoring equipment:	NA
Is accuracy of the monitoring equipment as stated in the VCS PD? If the VCS PD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practice?	NA
Calibration frequency /interval:	NA
Is the calibration interval in line with the monitoring plan of the VCS PD? If the VCS PD does not specify the frequency of calibration, does the selected frequency represent good monitoring practice?	NA
Company performing the calibration:	NA
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	NA
Is (are) calibration(s) valid for the whole reporting period?	NA
If applicable, has the reported data been cross-checked with other available data?	NA
How were the values in the monitoring report verified?	NA
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	NA

	Assessment/ Observation
Data / Parameter: (as in monitoring plan of the VCS PD):	$Q_{\text{biogas, flare, h}}$ Biogas sent to flare during a particular hour h (Nm^3/hour)
Measuring frequency:	Continuously The parameter is measured on a continuous basis by gas flow meter (GM2).
Reporting frequency:	Daily The measured data by the flow meter is logged in on a daily basis by the operators. The biogas supervisor collects the log sheets on a daily basis, calculates the daily consumption of biogas and

	enters the data in Excel sheet.	
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	As per the monitoring plan, it is required to maintain a log record on an hourly basis to ascertain the net amount of biogas sent to flare during a particular hour. However, the value was not monitored in the hourly format and therefore the total quantity of biogas sent to flare measured by GM2 has been used for calculating the project emissions. This is a conservative approach as it results in higher project emissions and lower emission reductions.	
Type of monitoring equipment:	Type of meter	Gas flow meter (GM2)
	Serial number	7568
	Accuracy	1% of Reading +0.2% of Full Scale ^{/10/}
Is accuracy of the monitoring equipment as stated in the VCS PD? If the VCS PD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practice?	VCS PD does not specify the accuracy of monitoring equipment. However, based on GLC's experience of verifying similar other projects, it is confirmed that the accuracy of the meter represents good monitoring practice.	
Calibration frequency /interval:	The gas flow meter is calibrated at least once every 3 years The calibration dates of GM2 are 28-05-2009 and 29-11-2011 ^{/9/}.	
Is the calibration interval in line with the monitoring plan of the VCS PD? If the VCS PD does not specify the frequency of calibration, does the selected frequency represent good monitoring practice?	As per the registered VCS PD, it was mentioned that the gas flow meter would undergo calibration once in every 3 year. The calibration frequency is defined as 3 year as per the monitoring report. It is confirmed based on the calibration reports that the calibration frequency is inline with the VCS PD which represents a good monitoring practice.	
Company performing the calibration:	The calibration was carried out by instrument manufacturer FOX, California in 2009 & by Miracle International Technology Co. Ltd. in 2011 ^{/9/} .	
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes. The calibration certificates were checked and the meter was found functioning properly.	
Is (are) calibration(s) valid for the whole reporting period?	Yes. Calibration is valid for the whole reporting period.	
If applicable, has the reported data been cross-checked with other available data?	NA	
How were the values in the monitoring report verified?	The values mentioned in the monitoring report and ER sheet have been verified during the site visit with the log sheets. The values have been found to be correct.	
Does the data management (from monitoring	Yes, the data management ensures correct transfer	

equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	of data and reporting of emission reductions and the necessary QA/QC procedures are in place.
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Thus GLC confirms that

- the monitoring complies with the monitoring plan of the VCS PD
- all parameters such as baseline, project and leakage emission parameters are monitored as described in the monitoring plan.
- the frequency of monitoring, the accuracy of the measurement equipments and the calibration frequency are in line with the monitoring plan.

Remaining Issues from Validation

The verification team reviewed the validation report available on VCS database at

<https://vcsprojectdatabase2.apx.com/myModule/Interactive.asp?Tab=Projects&a=2&i=427&lat=16%2E8083&lon=103%2E0858&bp=1>

It was observed that four (4) FARs were raised by DOE during the validation. The FARs are discussed below:

FAR raised during Validation	Verification team's Assessment
FAR D1 Marking of flow direction and name of the fluid on all HDPE pipelines (wastewater, biogas gas) within the project boundary are requested in section 2.3 of the VCS-PD to facilitate easy traceability during next verifications. To be checked during the first periodic verification	It was observed during the site visit that the direction was marked but the name of the fluid was not mentioned. Therefore, a CAR was raised (please refer to CAR 15 in the enclosed Annex 3). The PPs have addressed the CAR by painting name of the fluid and flow direction clearly on all HDPE pipelines. The evidence for the same has been provided to the verification team. Therefore, the CAR has been closed.
FAR M2 Calibration record of all measuring equipments within project boundary need to be made available to the DOE during verifications. To be checked during the first periodic	Calibration reports of all monitoring equipments have been submitted to the verification team. The verification team checked all the calibration reports and found that the calibration frequency is within the specified limits. However, there was a delay in calibration of electricity meters. A CAR has been raised to address the calibration gap (please refer to CAR 11 in Annex 3). The CAR has been addressed

verification	appropriately by applying the UNFCCC's calibration guidelines and therefore it has been closed.
FAR M3 The operational condition of the dual fuel boiler, need to be verified during the subsequent verifications. In case it is found that the existing boiler is replaced with a new one during any verification no emission reductions shall be granted for heat displacement. To be checked during the next periodic verification	During the site visit, the thermal capacity of one of the boilers was observed to be different from the capacity mentioned in section 1.1 of the MR and also from the VCS PD. From the discussions with the PP it was learnt that the boiler was replaced with new boiler in 2010. Therefore, PPs have excluded the fossil fuel displacement by the boiler from the emission reduction calculation. The approach has been considered to be appropriate. The approach has been described transparently as a deviation from the monitoring plan in section 2.2 of the MR. Please refer to CAR 2 for details.
FAR M4 In ex post ER calculation the statistical analysis of CH₄% needs to be carried out as per the requirement of Para 36 of AMS III.H, Version 13. To be checked during the first periodic verification	Methane content in biogas (%CH₄) is monitored continuously using online gas analyser. The gas analyser has been installed on biogas line that goes for gas engines. Therefore, the %CH₄ was not monitored when the gas engines were stopped. Nevertheless, it is observed from the draft ER sheet that there was a consumption of biogas for boilers and for flare even though the gas engines were stopped on some of the days. Therefore, a CAR was raised as it is not appropriate to use the average value of the available measured %CH₄ for calculation of emission reduction on account of biogas consumption in boilers and flare. In order to meet the requirements of Para 36 of AMS III.H., (version 13), the PPs have applied 95% confidence level and revised the calculation in the ER sheet and resubmitted to the verification team. The approach has been described transparently as a deviation from the monitoring plan in section 2.2 of the MR. The CAR has been closed. Please refer to CAR 12 for details.

Previously Validated Methodology Deviations

Two deviations were taken from the applied methodologies during the validation. The deviations have been described transparently in section 2.2 of the MR. Summary of the deviations is presented below:

Data / Parameters / Variables	Reference of Methodology	Description of Deviations	Assessment by validation team
The baseline emissions from the heat displaced by the project activity $BE_{thermal,CO_2}$ is estimated through an alternative equation against the prescribed equation by the applied methodology.	AMS I.C., version 15, Para 15, Equation 2 & Para 30 (b)	Since there is no metering mechanism for measurement of net quantity of heat supplied by the project activity ($EG_{Thermal}$), an alternative approach is used. This approach is based on amount of heat required for starch drying, which is estimated on heat requirements per tonne of starch when only fuel oil was used. The approach compensates the fuel oil usage from total fuel oil requirement (in baseline) and conservatively estimates the fuel oil replaced by biogas, irrespective of quantity of biogas combusted. The deviated approach ensures that efficiency lost in system due to dual fired system is conservatively adjusted in the baseline emissions.	The deviated approach described in the section 4.1, of the final PD ver. 3.1 is verified by the validation team and found to be conservative as efficiency loss due to dual fired system is accounted in biogas usage, thereby estimating lower fuel oil replacement for baseline emission estimation. The efficiency drop due to dual fuel firing is confirmed from the expert opinion./IM03/ Thus the deviated approach is deemed appropriate and hence acceptable to the validation team. Thus the validation team confirms that the deviations do not affect the conservativeness of the baseline. Moreover since this parameter is not used for demonstration of financial additionality, the deviation has no impact on the additionality of the project. Therefore the deviation taken, satisfies the requirement of para 5.3, page 13 of VCS 2007.1 standard.
Flare efficiency is assumed 100% in	Paragraph 32 and equation	In the case that biogas is combusted for a gainful	This approach has been confirmed by the SSC WG

case of combustion MDy (i.e. gainful utilisation of biogas in boiler and gas engine. Whereas it need to be measured as per the applied methodology.	16 of of AMS III.H. Ver.13	use of the released energy, a flare efficiency (combustion efficiency in boiler and gas engines) can be assumed to be 100% in case calculation of MDy.	on 29th July 2009, who agreed to include such approach in a future revision of AMS III.H. Based on this, it can be concluded that the adopted approach is appropriate and acceptable.
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4.2 Accuracy of GHG Emission Reduction or Removal Calculations

GHG emissions reductions for the project and the baseline scenario were correctly calculated using the formulae described in the applied methodologies for this project. The verification team has reviewed the emission reduction (ER) spread sheet and checked all the formulae and found they are correct and inline with the monitoring plan of the registered VCS PD and the applied monitoring methodologies.

All the ex-ante parameters which are used in the calculation of emission reductions are consistent with the VCS registered PD. It is confirmed that ex-ante parameters mentioned in section 3.1 of the MR are inline with the parameters mentioned in section 3.3 of the VCS PD. All the ex-post parameters have been monitored as per the monitoring plan and presented in section 3.2 of the MR and the same have been described above in section 4.1.

By checking publicly available sources it has been verified that the applied emission factors, IPCC default values^{17/} and other reference values were applied correctly.

The emission reduction being claimed during the period from 03-12-2009 to 31-12-2011 is approximately 111% higher than the estimated emission reductions in the registered VCS PD, as given in the table below.

Table: Emission Reductions

Period	As per VCS PD (annual VERs)	Monitoring report (achieved VERs)
Emission Reductions	33,853 *	71,593
% Deviation (+/-)	0	(+) 111%

* The estimated annual emission reduction as per the VCS PD is 16,280 tCO₂e which is equivalent to 33,853 tCO₂e for the corresponding monitoring period of 759 days.

The main reasons for the higher emission reduction, as understood from the onsite interviews, are as below:

- Due to poor quality of raw material, for the same amount of starch production, more quantity of cassava root had to be consumed. This has resulted in increased water consumption for cassava root washing and thereby increased wastewater generation. It is also substantiated from the monitored values of wastewater flow and the starch production. For example, the wastewater factor for 2011 was 17.2 m³ per ton of starch while the ex-ante value as per the PDD was 11.4 m³ per ton of starch.

- Increased COD load and COD removal efficiency have also resulted in increased emission reduction. The actual COD removal efficiency for the covered lagoon system was 90% which is higher than ex-ante calculation value of 80%.

GLC understands that the variations in the operating parameters are beyond the control of PP and therefore, the increase in emission reduction is reasonable and acceptable.

4.3 Quality of Evidence to Determine GHG Emission Reductions or Removals

During the verification during site visit, all relevant documents were checked to assess the correctness and quality of data submitted by the project participants, which are used to determine emission reductions.

During the verification site visit, inlet and outlet COD of closed lagoons, quantity of wastewater through closed lagoon, biogas consumption for boilers, biogas consumption of gas engines, biogas consumption of flaring, methane concentration of biogas, electricity generation etc. were cross checked with the log sheet values to ensure that there is no over estimation of the VERs. The provided data was found to be of adequate quality.

All records needed for monitoring are archived in line with the requirements of the registered monitoring plan. No significant, lack of evidence and missing data were detected during onsite verification. Hence, the verification team confirms that the monitoring system ensures required quality of the monitoring system to ensure the quality of the monitored data. All internal data are subjected to QA/QC measures.

All the meters (wastewater flow meter, biogas flow meters, COD meter, and gas analyzer) were calibrated as per the calibration frequency specified in the monitoring plan (described in section 4.1) to ensure the quality of the data. In cases where the calibration of electricity meters (EM1 & EM2) is not carried out, the PP has applied calibration guidelines as per EB 52, Annex 60^{14/} and calculated the emission reductions conservatively. Hence the verification team confirms that the quality of data is good.

The monitoring personnel at site are well experienced and follow established and documented routines, which were produced to the DOE. This was verified during the verification site visit interview. Hence, the verification team concludes that competent staff is employed by the project participant to carry out the relevant tasks with sufficient accuracy.

The PP has taken two deviations for this monitoring period. The deviations are described in section 2.2 the monitoring report. The deviations are as follow:

1. The methane content is biogas is monitored by inline gas analyzer attached with generator set. This equipment can measure when the generators are in operation. In case of all generator stop, there is no monitored data although the boilers are in operation. As a compliance of the deviation PP has followed approach as per Annex 30 of EB 50^{18/} to adopt for this monitoring period. A 95% confidence level has been applied to the measured values of methane content. This meets the methodological requirements (Para 36 of AMS III.H., version 13).
2. There are two boilers at the project site where the biogas is utilised as a fuel replacing the fuel oil. One of the boilers has been replaced by a new one. The capacity of thermal energy output has been changed from 3.488 to 4.070 MW_{th}. As per description in FAR M3 of the validation report, if existing boiler is replaced with a new one during any verification no emission reduction shall be granted for heat displacement. Hence the heat displacement at this boiler is neglected from the emission reductions.

GLC is of the opinion that this method of estimation is accurate and results in conservative estimation of

emission reduction and is line with the applicable VCS requirements.

4.4 Management and Operational System

GLC was able to verify that authorities and responsibilities for monitoring and reporting of all data related to the emission reductions were clearly defined for the monitoring period from 2009-12-03 to 2011-12-31. Moreover, all project related equipments were confirmed to be operated by qualified and trained staff. The frequency of monitoring measurement, as well as applicable calibrations and reporting details were conducted as outlined in the monitoring plan available in the latest version of the VCS PD.

The allocation of the responsibilities is documented in a written form and is followed as described in the registered PD. Routines for the archiving of data are defined and documented. During the site visit all the required plant records were verified and found that the data is consistent with the provided in the final MR^{4/} and ER sheets^{5/}. Hence, the DOE confirms that the calculations laid down in the monitoring report are inline with the PD.

Majority of the parameters as described in section 4.1 are recorded by the operator once every shift (3 times a day) in log sheets. The Biogas Supervisor collects the log sheets on a daily basis, calculates the daily values of the parameters and transfers the data into electronic format (Excel sheets). From the daily sheets, monthly reports are prepared. Monthly reports are submitted to the Plant Manager by the Supervisor. The Plant Manager after checking the data sends the monthly reports to Carbon Consultant (South Pole Carbon Asset Management Ltd.) for emission reduction calculation.

The verification team has interviewed the plant personnel who are involved in the monitoring of the parameters that are used to determine the emission reductions of the VER project. It is confirmed based on the interviews that the plant's team is competent enough to monitor the parameters as described in the monitoring plan.

As discussed above, the verification team concludes that management and operational system of the project is implemented and running well. Thus it ensures the quality of data which is required in calculating the emission reductions.

5 VERIFICATION CONCLUSION

Germanischer Lloyd Certification GmbH (GLC) has performed the 1st verification of the project: "Chol Charoen Group Wastewater Treatment with Biogas System I (Khonkaen)" with regard to the applicable relevant requirements for VCS project activity.

The project activity involves the installation and operation of a methane recovery and utilization system. The use of Covered Lagoons to treat the wastewater enables capturing of methane produced during the process which would have otherwise been released into the atmosphere. The captured methane is utilized as fuel in dual fired boilers in the plant replacing heavy fuel oil and gas engines to produce electricity and the surplus methane, if any, is flared into the atmosphere.

This verification covers the period from 03-12-2009 to 31-12-2011 (including both days).

South Pole Carbon Asset Management Ltd. and Kaen Charoen Co., Ltd. are responsible for the collection of data in accordance with the validated monitoring plan and the reporting of GHG emissions reductions from the project.

It is GLC's responsibility to express an independent verification statement on the reported GHG emission reductions from the project. GLC does not express any opinion on the selected baseline scenario or on the validated and registered VCS PD.

GLC conducted the verification on the basis of the monitoring methodologies AMS III.H. (Version 13): "Methane Recovery in Wastewater Treatment", AMS I.C. (version 15): "Thermal energy production with or without electricity" and AMS I.D. (version 14): "Grid Connected Renewable Electricity Generation", the monitoring plan included in the VCS PD of the project and the monitoring report of "20-April-2012". The verification included:

- i) Checking whether the design of the project is implemented and installed as planned and described in the registered VCS PD
- ii) Checking whether the provisions of the monitoring methodology and the monitoring plan in the VCS PD were consistently and appropriately applied
- iii) The collection of evidence supporting the reported data
- iv) Checking whether the installed monitoring equipment are calibrated appropriately

GLC's verification approach draws on an understanding of the risks associated with reporting of GHG emission data and the controls in place to mitigate these. GLC planned and performed the verification by obtaining evidence and other information and explanations that GLC considers necessary to give reasonable assurance that reported GHG emission reductions are fairly stated.

In GLC's opinion, the GHG emissions reduction for the "Chol Charoen Group Wastewater Treatment with Biogas System I (Khonkaen)" as reported in the Monitoring Report issued on "20-April-2012" are calculated without material misstatements in a conservative and appropriate manner.

The GHG emission reductions were correctly calculated on the basis of the approved monitoring methodologies of AMS III.H. (version 13): "Methane Recovery in Wastewater Treatment", AMS I.C. (version 15): "Thermal energy production with or without electricity" and AMS I.D. (version 14): "Grid Connected Renewable Electricity Generation and the monitoring plan contained in the validated VCS PD.

Germanischer Lloyd Certification GmbH herewith confirms that the project has achieved emission reductions in the above mentioned reporting period as follows:

GHG Emission Reductions or Removals	Unit	2009	2010	2011
Baseline Emissions	tCO ₂ e	3,614	34,498	69,752
Project Emissions	tCO ₂ e	1,461	19,539	15,271
Leakage	tCO ₂ e	0	0	0
Net GHG emission reductions or removals	tCO₂e	2,153	14,959	54,481

It is confirmed that the project activity has achieved total emission reduction of **71,593 tCO₂e** during the monitoring period from 03-12-2009 to 31-12-2011.

<Hamburg>, 2012-06-04



Markus Weber

Verification Team Leader

ANNEX 1: ABBREVIATIONS

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CH ₄	Methane
CER	Certified Emission Reduction
CL	Clarification Request
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
COD	Chemical Oxygen Demand
DOE	Designated Operational Entity
ER	Emission Reduction
ER sheet	Emission Reduction calculation spread sheet
FAR	Forward Action Request
GHG	Greenhouse gas(es)
MP	Monitoring Plan
MR	Monitoring Report
PD	Project Description
PP	Project Participant
HFO	Heavy Fuel Oil
ISO	International Organisation for Standardization
t CO ₂ e	Ton of Carbon dioxide equivalent
QA/QC	Quality Assurance / Quality Control
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Verified Carbon Standard
VCSA	VCS Association
VCS PD	VCS Project Description
VCU	Verified Carbon Unit
VVM	Validation and Verification Manual

ANNEX 2: REFERENCES

Reference	Author: Title, version, date of issue
/1/	CDM-EB: Clean Development Mechanism Validation and Verification Manual (Version 1.2)
/2/	VCS: VCS Version 3 Requirement Documents - VCS Standard Version 3.2 issued on 01-02-2012 - VCS Program Guide Version.3.3 issued on 01-05-2012
/3/	VCS registered Project Description document for project : “Chol Charoen Group Wastewater Treatment with Biogas System I (Khonkaen)”, (VCS PD version 3.1 dated 13-11-2009)
/4/	Draft Monitoring Report of “Chol Charoen Group Wastewater Treatment with Biogas System I (Khonkaen)”, Version 01, dated 26-01-2012 Final Monitoring Report of “Chol Charoen Group Wastewater Treatment with Biogas System I (Khonkaen)”, Version 04, dated 20-04-2012
/5/	Draft Emission reduction calculation spreadsheet <“ER cal_1st ver_rev01_26-01-2012.xls”> Final Emission reduction calculation spreadsheet <“ER cal_1st ver_rev04_20-04-2012.xls”>
/6/	TÜV NORD CERT GmbH: Validation report for the VER project “Chol Charoen Group Wastewater Treatment with Biogas System I (Khonkaen)”, (Report Number: 53208409-09/309 dated 17-11-2009)
/7/	CDM-EB: Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories: AMS III.H.: Methane recovery in wastewater Treatment, Version 13 AMS I.D.: Grid connected renewable electricity generation, Version 14 AMS I.C.: Thermal energy production with or without electricity, Version 15

Reference	Author: Title, version, date of issue
/8/	ISO 14064-3:2006; Greenhouse gases -- Part 3: Specification with guidance for the validation and verification of greenhouse gas assertions; http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=38700 ; (25-09-2009)
/9/	Calibration Reports: 1. Wastewater Flow meter-1 (FM1) : Serial Number : ZAP0573 Miracle International Technology Co. Ltd., Calibration Certificate of Certificate No. R1111-030 issued on 13-12-2011 (Calibration Date : 29-11-2011) Euromag International, Calibration Certificate of Certificate No.: 06 CR issued on 20-05-2009 (Calibration Date: 24-02-2009) Euromag International, Calibration Certificate issued on 08-04-2010 (Calibration Date: 08-04-2010) 2. Biogas flow meter to Boiler 1 (GM1) : Serial Number : N1-TD02-9544958 Miracle International Technology Co. Ltd., Calibration Certificate of Certificate No.: L0903-036 issued on 25-09-2009 (Calibration date: 25-09-2009) Miracle International Technology Co. Ltd., Calibration Certificate of Certificate No.: L1006-340 issued on 06-07-2010 (Calibration date: 25-06-2010) Miracle International Technology Co. Ltd., Calibration Certificate of Certificate No.: L1111-124 issued on 13-12-2011 (Calibration date: 30-11-2011) 3. Biogas flow meter to flare (GM2) : Serial Number : 7568 Fox, Calibration Certificate issued on 28-05-2009 (Calibration date : 28-05-2009) Miracle International Technology Co. Ltd., Calibration Certificate of Certificate No.: L1111-126 issued on 13-12-2011 (Calibration date: 29-11-2011) 4. Biogas flow meter to gas engines (GM3): Serial Number : 7569 Fox, Calibration Certificate issued on 28-05-2009 (Calibration date : 28-05-2009) Miracle International Technology Co. Ltd., Calibration Certificate of Certificate No.: L1111-126 issued on 13-12-2011 (Calibration date: 29-11-2011)

Reference	Author: Title, version, date of issue
	5. Biogas flow meter to Boiler 2 (GM4) : Serial Number : N1-T905-9663007 Miracle International Technology Co. Ltd., Calibration Certificate of Certificate No.: L0903-037 issued on 25-09-2009 (Calibration date: 25-09-2009) Miracle International Technology Co. Ltd., Calibration Certificate of Certificate No.: L1006-339 issued on 06-07-2010 (Calibration date: 25-06-2010) 6. Gas Analyzer (MS) : Serial Number : 27391 JE, Calibration Certificate of Certificate No.: 2011/03-6 issued on 20-12-2009 (Calibration date : 15-12-2009) JE, Calibration Certificate of Certificate No.: 2011/03-6 issued on 23-03-2011 (Calibration date : 14-03-2011) 7. Spectrometer (CS) : Serial Number : HI19945I Hanna Instruments, Calibration Certificate issued on 18-03-2008 (Calibration date: 18-03-2008) Hanna Instruments, Calibration Certificate of Certificate No.: HIT-1028-0198 issued on 14-07-2010 (Calibration date: 14-07-2010) 8. Flow meter (OM1) Serial Number : 4546871 Miracle International Technology Co. Ltd., Calibration Certificate of Certificate No.: LC 1111-125 issued on 13-12-2011 (Calibration Date: 29-11-2011) 9. Flow meter (OM2) Serial Number : 4126168 Miracle International Technology Co. Ltd., Calibration Certificate of Certificate No.: LC 1111-126 issued on 13-12-2011 (Calibration Date: 29-11-2011)
/10/	<u>Specifications of monitoring equipments:</u> CARLO GAVAZZI : Instruction Manual Rev-12 of Power Meter (EM1 & EM2) EUROMAG INTERNATIONAL: Technical Specifications of Wastewater Flow meter (FM1) SIEMENS: Technical Specifications of Gas Flow meter (GM1 & GM4) FOX THERMAL INSTRUMENTS INC.: Technical Specifications of Gas Flow meter (GM2 & GM3)

Reference	Author: Title, version, date of issue
	JE: Technical Specifications of Gas Analyzer (MS) HANNA: Instruction Manual & Specifications of Spectrometer (CS) CONTOIL : Specifications of Flow meter (OM1 & OM2)
/11/	Specifications of gas engines and boilers: GUASCOR S.A. : Technical Specifications of Generator 1 & Generator 2 SCHERRER INDUSTRIES: Technical Specifications of Boiler 1 & Boiler 2
/12/	Daily log sheets of Kean Charoen Co., Ltd. • Wastewater flow meter readings • % CH4 measurement in biogas • COD measurement • Biogas consumption for boilers • Biogas combustion for gas engines • Biogas combustion for flare • Net Electricity generated by gas engines (Generator 1 & Generator 2)
/13/	ISEA3000 (Revised) Assurance Engagements other than Audits or Reviews of Historical Financial Information. Available online: http://www.ifac.org/IAASB/ProjectHistory.php?ProjID=0008; (25-09-2009)
/14/	CDM-EB: Guidelines for assessing compliance with the calibration frequency requirements (EB 52, Annex 60)
/15/	CDM-EB: General Guidelines to SSC CDM methodologies, Version 17 (EB 61, Annex 21)
/16/	GLC GmbH: Germanischer Lloyd CDM Procedures

Reference	Author: Title, version, date of issue
/17/	IPCC: 1996 IPCC Guidelines for National Greenhouse Gas Inventories: work book IPCC: 2006 IPCC Guidelines for National Greenhouse Gas Inventories: work book
/18/	CDM-EB: General Guidelines for Sampling and Surveys for Small-Scale CDM Project Activities (Annex 30 of EB 50 Report)
/19/	Environmental Engineering Laboratory Faculty of Engineering, KKU: Wastewater Analysis Reports (dated 21-10-2010 and 17-08-2011)
/20/	Kaen Chareon Co., Ltd.: Internal memo for multiplication factor of biogas flow meters, dated 10-12-2009

ANNEX 3: RESOLUTION OF CORRECTIVE ACTION AND CLARIFICATION REQUESTS (FINDINGS' LIST)

Description of Finding (CAR, CL, FAR)	Date (yyyy-mm-dd)	Project Participants Response	Date (yyyy-mm-dd)	GLC Assessment	Date (yyyy-mm-dd)
CAR 1 Complete contact details have not been included in the first page of the MR as per the VCS MR template.	2012-03-09	The first page of MR is revised and full contact details are included.	2012-03-22	OK. In the revised MR, complete contact details have been included as per VCS MR template. Therefore, CAR 1 is closed.	2012-03-30
CAR 2 During the site visit, the thermal capacity of one of the boilers was observed to be different from the capacity mentioned in section 1.1 of the MR and also from the VCS PD. Besides, the name plate of the boiler also indicates the year of construction as 2010.	2012-03-09	The old boiler was replaced by the new one in 2010. The related information is provided in table 1 of the MR rev.02.	2012-03-22	Not OK. Referring to FAR M3 from the validation (Report Number: 53208409-09/309), if existing boiler is replaced with a new one during any verification no emission reduction shall be granted for heat displacement. The provided response does not address the issue completely.	2012-03-30
CAR 2 continues...		The deviation 2.2 is added in section 2.2 of MR rev.03 to exclude the fuel displacement at boiler no.1 from the baseline emission calculation of AMS I.C as per the FAR from validation	2012-04-11	OK. A conservative approach has been applied in determining the emission reductions. The emission reduction equivalent to the fossil fuel displacement in Boiler-2 has not been accounted in baseline emission calculation. The	2012-04-17

Description of Finding (CAR, CL, FAR)	Date (yyyy-mm-dd)	Project Participants Response	Date (yyyy-mm-dd)	GLC Assessment	Date (yyyy-mm-dd)
		report.		approach has been demonstrated clearly in section 2.2 of the MR (described as a deviation) and the revised calculation has been transparently provided in the ER sheet. The emission reduction, on account of the revised calculation, has been reduced by 6366 tCO ₂ e. It is confirmed that the approach is conservative and therefore, CAR 2 is closed.	
CAR 3 The total capacity of the gas engine mentioned in section 1.1 of the MR does not match with the actual capacity verified during the site visit.	2012-03-09	The capacity of gas engines is updated to 952 kWe each from the technical specification document of Guascor, SFGLD 560 in table 1 of section 1.1 of MR rev.02.	2012-03-22	OK. In section 1.1 of the MR, the revised capacity of gas engines matches with the verified capacity of the gas engines during the site visit. There are two gas engines with a capacity of 952 kW each. The updated capacity also matches with the technical specifications provided by the technology supplier. Therefore CAR 3 is closed.	2012-03-30
CAR 4 Capacity of auxiliary drives has been mentioned as 276.868 kW in section 1.1 and as 379 kW in section 3.1 of the MR which is not consistent. Besides, the capacity of auxiliary equipments as per the list of equipment provided to the	2012-03-09	The list of installed capacity of all equipment is updated to 458 kW in table 1 of section 1.1 and monitoring table in section 3.1 of MR rev.02.	2012-03-22	OK. The total installed capacity of auxiliary drives has been corrected to 458 kW in the revised MR. The value is found to be consistent in section 1.1 and section 3.1 of the MR. The revised value mentioned in the MR is inline with the verified value during site visit. Furthermore, The revised value of	2012-03-30

Description of Finding (CAR, CL, FAR)	Date (yyyy-mm-dd)	Project Participants Response	Date (yyyy-mm-dd)	GLC Assessment	Date (yyyy-mm-dd)																															
verification team has different value. When the plant's team was interviewed it was learnt that some of the equipment were removed and some were added recently. The updated list of auxiliary equipments has not yet been provided to the verification team.				installed capacity of auxiliary drives results in conservative emission reductions. Therefore, CAR 4 is closed.																																
CAR 5 The biogas generation rate has been mentioned as 208 Nm ³ per hour in section 1.1 of the MR which is same as the value mentioned in the VCS PD. However, actual generation of biogas based on the measured values has been observed to be on higher side. Justification along with the correct value is required in the MR.	2012-03-09	The new biogas production rate is updated according to the new average figures. The new value' 1,430 Nm³/h' is corrected and the justification for this figure is provided in section 2.1 of MR rev.02. <table><tr><th>Average</th><th>Q_{ww} (m3/d)</th><th>COD_{in} (mg/l)</th><th>COD_{out} (mg/l)</th></tr><tr><td>2009</td><td>2,257</td><td>19,288</td><td>1,803</td></tr><tr><td>2010</td><td>1,889</td><td>18,303</td><td>1,417</td></tr><tr><td>2011</td><td>3,041</td><td>20,647</td><td>1,791</td></tr></table> <table><tr><th>RG produced</th><th>Nm3/d</th><th>Nm3/h</th></tr><tr><td>2009</td><td>31,577</td><td>1,316</td></tr><tr><td>2010</td><td>25,516</td><td>1,063</td></tr><tr><td>2011</td><td>45,880</td><td>1,912</td></tr><tr><td>Average</td><td></td><td>1,430</td></tr></table>	Average	Q _{ww} (m3/d)	COD _{in} (mg/l)	COD _{out} (mg/l)	2009	2,257	19,288	1,803	2010	1,889	18,303	1,417	2011	3,041	20,647	1,791	RG produced	Nm3/d	Nm3/h	2009	31,577	1,316	2010	25,516	1,063	2011	45,880	1,912	Average		1,430	2012-03-22	Not OK. The information in section 1.1 of the MR has been revised and in section 2.1, the value of biogas generation rate has been updated to 1430 Nm³/h. The reason understood for the increased biogas generation is higher water consumption for cassava root washing. As the actual biogas generation is higher than the estimated quantity of biogas at the time of validation, two additional gas engines of 450 kW_e each have been installed. The emission reduction on account of biogas consumption in the two new gas engines is not included in the emission reduction calculation which is a conservative approach. However, the justification on increased biogas generation has not been sufficiently provided.	2012-03-30
Average	Q _{ww} (m3/d)	COD _{in} (mg/l)	COD _{out} (mg/l)																																	
2009	2,257	19,288	1,803																																	
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RG produced	Nm3/d	Nm3/h																																		
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2011	45,880	1,912																																		
Average		1,430																																		

Description of Finding (CAR, CL, FAR)	Date (yyyy-mm-dd)	Project Participants Response	Date (yyyy-mm-dd)	GLC Assessment	Date (yyyy-mm-dd)
CAR 5 continues...		The increasing in biogas production rate is the effect from the increasing of wastewater volume and COD removal efficiency of covered lagoon system. During the developing of PD and additionality demonstration, the most conservative figures were applied and were verified by the DOE. The values used were based on the information available at that time. More explanation is provided in section 4.4 of MR rev.03.	2012-04-11	OK. Justification for the increased biogas generation has been provided sufficiently in section 4.4 of the revised MR. It is understood that the significant increase in biogas generation, especially in 2011, is due to increased wastewater consumption and increased COD removal efficiency of covered lagoons. Due to poor quality of raw material, for the same amount of starch production, more quantity of cassava root had to be consumed. This has resulted in increased water consumption for cassava root washing and thereby increased wastewater generation. It is learnt that these changes were beyond the control of project participants. The explanation provided in the MR is appropriate and therefore, CAR 5 is closed.	2012-04-17
CAR 6 In section 1.8 of the MR it is mentioned that “Methodology choices have already been justified in section 2.2” but there is no any justification available in section 2.2.	2012-03-09	The identified information in section 1.8 of MR rev.02 is revised.	2012-03-22	OK. Section 1.8 of the MR has been revised. It has been corrected as “Methodology choices have already been justified in section 2.2 of registered PD”, which is appropriate. The EB reference number has been included to the “Tool to determine project	2012-03-30

Description of Finding (CAR, CL, FAR)	Date (yyyy-mm-dd)	Project Participants Response	Date (yyyy-mm-dd)	GLC Assessment	Date (yyyy-mm-dd)
Furthermore, reference to the “Tool to determine project emissions from flaring gases containing methane” has not been mentioned appropriately.				emissions from flaring gases containing methane” as Annex 13 of EB 28 which is correct. Therefore CAR 6 is closed.	
CAR 7 Implementation status of the project activity has not been described sufficiently in section 2.1 of the MR in accordance with the VCS MR template.	2012-03-09	The implementation of the project activity has been provided in section 2.1 of MR rev.02.	2012-03-22	OK. The implementation status of the project activity has been described sufficiently in section 2.1 of the MR (version 2). Therefore, CAR 7 is closed.	2012-03-30
CAR 8 The deviations described in section 2.2 are not from the monitoring plan but were taken during the validation and approved by the validating DOE. However, it has not been stated clearly in the MR.	2012-03-09	The title of this deviation is revised.	2012-03-22	OK. The title under the section 2.2 of the MR (version 2) has been corrected which is now clearly understandable. Therefore, CAR 8 is closed.	2012-03-30
CAR 9 Calibration details have not been sufficiently provided in section 3.2 of the MR. Also a monitoring parameter which is a part of the monitoring plan has not been included in section 3.2.	2012-03-09	The calibration information in section 3.2 is referred to table 7 provided in section 5 of the MR. The missing monitoring table of $Q_{\text{biogas, flare, h}}$ is added.	2012-03-22	OK. Calibration information in section 3.2 of the MR has been referred to Table 7 provided in section 5 of the MR. It is considered to be appropriate. Also the missing monitoring parameter $Q_{\text{biogas, flare, h}}$ has been included in MR (version 2).	2012-03-30

Description of Finding (CAR, CL, FAR)	Date (yyyy-mm-dd)	Project Participants Response	Date (yyyy-mm-dd)	GLC Assessment	Date (yyyy-mm-dd)
				Therefore, CAR 9 is closed.	
CAR 10 It has been mentioned in section 3.2 of the MR that the wastewater flow measured by flow meter FM1 was included with the recycle water which is pumped from open lagoon-2 for pH adjustment of raw wastewater during the monitoring period from 2009-12-03 to 2010-12-14. Therefore, the recycled water quantity was estimated based on the capacity of the pump by pump up method. However, the capacity of the pump was calculated to be 83.5 m ³ /h based on the provided information. Therefore, the value mentioned in the MR is not conservative.	2012-03-09	The value 83 m ³ /h is corrected to 83.5 m ³ /hour in section 3.2 of MR rev.02 and ER calculation file rev.02.	2012-03-22	OK. The capacity of the pump has been corrected to 83.5 m ³ /h in section 3.2 of the MR and the same has been considered in the ER calculation sheet. Therefore, CAR 10 is closed.	2012-03-30
CAR 11 As per the monitoring plan of the registered PDD, the electricity meters used to monitor EG _y are <i>subject to periodic calibration according to the equipment's specifications and applicable</i>	2012-03-09	The gap in calibration has been addressed following the guidelines in EB52, Annex-60. The maximum error of -0.5% (for the electricity meters) is applied as a conservative approach. This information is updated in	2012-03-22	OK. It is understood that due to unavailability calibration agencies, the electricity meters were not calibrated. The gap in calibration has been addressed as per the guidelines of EB 52, Annex 60. The maximum error of -0.5% for the electricity meter has been applied for the whole monitoring period	2012-03-30

Description of Finding (CAR, CL, FAR)	Date (yyyy-mm-dd)	Project Participants Response	Date (yyyy-mm-dd)	GLC Assessment	Date (yyyy-mm-dd)
<i>industrial standards (generally on a once in three year basis).</i> However, it was understood during the onsite interviews with the operating staff that the electricity meters were not been calibrated since the installation of gas engines in October 2008. The calibration gap has not been addressed in the MR and ER sheet.		section 3.2 of MR rev.02 and applied in ER calculation file rev.02. Since installation there was no calibration equipment for this type of electricity meter in the past few years. The manufacturer of the meter could not issue the certificate of it although it is standard equipment attached with generator. At the present, there is only one supplier in Thailand who can do the calibration of this meter, which recommended by the manufacturer. Unfortunately, the calibration tool was damaged and sent to repair since mid of 2011. The supplier expects that they can do the service again in June 2012.		as a conservative approach. This information has been updated in section 3.2 of the MR (version 2). The revised emission reduction calculation in the ER sheet is found to be correct. Therefore, CAR 11 is closed.	
CAR 12 Methane content in biogas (%CH₄) is monitored continuously using online gas analyser. The gas	2012-03-09	The deviation 2.1 for the application of 95% of confidential level is provided in section 2.2 of MR rev.02. The ER calculation is	2012-03-22	OK. A 95% confidence level has been applied for the measured values of %CH ₄ and the values have been considered conservatively for baseline and project emissions calculation. The deviated	2012-03-30

Description of Finding (CAR, CL, FAR)	Date (yyyy-mm-dd)	Project Participants Response	Date (yyyy-mm-dd)	GLC Assessment	Date (yyyy-mm-dd)
analyser has been installed on biogas line that goes for gas engines. Therefore, the %CH ₄ was not monitored when the gas engines were stopped. Nevertheless, it is observed from the ER sheet that there was a consumption of biogas for boilers and for flare even though the gas engines were stopped on some of the days. In such case, it is not appropriate to use the average value of the available measured %CH ₄ for calculation of emission reduction on account of biogas consumption in boilers and flare.		revised accordingly.		approach has been sufficiently described in section 2.2 of the MR. The approach is considered to be appropriate since it is inline with Para 36 of the applied methodology, AMS III.H., version 13. Therefore CAR 12 is closed.	
CAR 13 Description of the monitoring plan in section 3.3 is incomplete with reference to the requirements of the MR template.	2012-03-09	The description in section 3.3 of MR rev.02 is revised.	2012-03-22	Not OK. The description of monitoring plan has been included in section 3.3 of the MR (version 2). However, data storage procedures have not been clearly described.	2012-03-30
CAR 13 continues...		The description in section 3.3 of MR is revised.	2012-04-11	OK. The data storage and back up procedures has been included in section 3.3 of the revised MR. The revised information is inline with onsite observations. Therefore, CAR 13 is closed.	2012-04-17

Description of Finding (CAR, CL, FAR)	Date (yyyy-mm-dd)	Project Participants Response	Date (yyyy-mm-dd)	GLC Assessment	Date (yyyy-mm-dd)
CAR 14 Model number of the measuring equipment mentioned in the table 7 of the MR does not match with the supporting documents. Furthermore, serial numbers of GM1, GM2, GM3 and GM4 were found to be different from the MR during the onsite verification.	2012-03-09	The table 7 in MR rev.02 is updated to correct the model numbers and serial numbers of the measuring equipment.	2012-03-22	OK. The table 7 of the MR (version 2) has been updated with the correct model numbers and serial numbers of the monitoring equipments. Therefore, CAR 14 is closed.	2012-03-30
CAR 15 (FAR D1 from the validation) <i>"Marking of flow direction and name of the fluid on all HDPE pipelines (wastewater, biogas gas) within the project boundary are requested in section 2.3 of the VCS-PD to facilitate easy traceability during next verifications."</i> It was observed during the site visit that the direction was marked but the name of the fluid was not mentioned.	2012-03-09	The name of fluid is painted on pipe. The evidence for the same is submitted.	2012-04-11	OK. The photographs of pipelines indicating the name of the fluid and direction have been submitted to the verification team. It is confirmed that the name and direction of the fluid is clearly identifiable. Therefore, the CAR is closed.	2012-04-17
CAR 16 In the ER calculation, the flare	2012-03-30	Flare efficiency is corrected as 0% in the revised ER sheet. MR	2012-04-11	OK. The flare efficiency has been corrected to be 0%. This is inline with the approach stated in the monitoring plan	

Description of Finding (CAR, CL, FAR)	Date (yyyy-mm-dd)	Project Participants Response	Date (yyyy-mm-dd)	GLC Assessment	Date (yyyy-mm-dd)
efficiency has been considered to be 50% which is a default value as per the "Tool to determine project emissions from flaring gases containing methane" for open flare system. However, it is stated in the monitoring plan of the registered VCS PD, "The default factor of 50% might be only applied if a flame is detected at the flare for more than 20 minutes in hour h, whenever biogas is sent to the flare system. If the biogas is sent to the flare for a period shorter than one hour, the flare detection signal shall be available for at least 1/3 of this period, following the same logic of the flaring tool (20 minutes out of 1 hour). If these conditions are not met, 0% default value should be used for this period." No evidence has been provided for monitoring of the flame detection period. Besides, the multiplication factors of the biogas flow meters have not been considered appropriately.		is corrected accordingly. Multiplication factors of biogas meters are corrected.		and it results in conservative estimation of emission reduction. Biogas consumption values have been adjusted by applying the multiplication factors. The applied multiplication factors are inline with the supporting document provided by the PP (Internal memo dated 2009-12-10). Therefore, the CAR is closed.	

Description of Finding (CAR, CL, FAR)	Date (yyyy-mm-dd)	Project Participants Response	Date (yyyy-mm-dd)	GLC Assessment	Date (yyyy-mm-dd)
CAR 17 Summary of GHG emission reductions has been presented in section 4.4 of the MR. However, justification has not been provided for the increase in achieved emission reductions. The estimated annual emission reduction from the VCS PD (expected VERs) is 16,280 tCO₂e; where as, the actual emission reduction during the monitoring period (corresponding to approximately 25 months) from the MR (version 02) is 90,124 tCO₂e.	2012-03-30	The justification for the increase in emission reductions is provided in section 4.4 of MR rev.03. The reasons of higher ERs are lower starch yield in the raw cassava root, the higher water factor and the improvement in the COD removal efficiency of covered lagoon system.	2012-04-11	From the provided explanation in section 4.4 of the revised MR, it is understood that the significant increase in emission reduction especially in 2011 is due to increased wastewater consumption. Due to poor quality of raw material, for the same amount of starch production more quantity of cassava root had to be consumed. This has resulted in increased water consumption for cassava root washing and thereby increased wastewater generation. Besides, the COD of wastewater and the COD removal efficiency of the covered lagoons were also observed to be on higher side compared to the ex-ante values. It is learnt that these changes were beyond the control of project participants. The explanation provided in the MR is appropriate and therefore, CAR 15 is closed.	2012-04-17
CL 1 The crediting period start date of the project activity has been mentioned as 2009-07-15 in section 1.6 of the MR. It has been further stated, <i>'due to insufficiency of monitoring equipments, the operational period prior to 15th July</i>	2012-03-09	The description in section 1.6 of MR is revised to state the start of crediting period from 3rd Dec 2009.	2012-03-22	Not OK. The CL is not addressed properly. The start date of crediting period has been changed as 3rd December 2009 in the revised MR (version 02), which is not correct. The crediting period start cannot be changed from the PDD. The CL was raised to explain the reason for the gap between the crediting period start date and the	2012-03-30

Description of Finding (CAR, CL, FAR)	Date (yyyy-mm-dd)	Project Participants Response	Date (yyyy-mm-dd)	GLC Assessment	Date (yyyy-mm-dd)
<i>2009 will be neglected from our claim of emission reduction'. However, the monitoring period starts from 2009-12-03 as per the MR which is not clear.</i>				monitoring period start date.	
CL 1 continues...		The start date of crediting period has been kept as 15th July 2009 as mentioned in section1.6 of MR rev.03.	2012-04-11	OK. It is understood from the revised information in the MR that due to insufficient monitoring equipments, the operational period from 15 July 2009 to 2 December 2009 has been neglected in claiming for emission reduction. Therefore, though the crediting period start date is 15 July 2009, the monitoring period start date has been considered from 3 December 2009. This is considered to be appropriate as it results in conservative emission reductions. Therefore, the CL is closed.	2012-04-17