



Industrie Service

Choose certainty.
Add value.

Validation Report

Deutsche Gesellschaft für
Technische Zusammenarbeit (GTZ) GmbH, Germany

Validation of Validation of the “Chumporn Applied Biogas Technology for Advanced Waste Water Management”, Thailand

Report No. 703911, Revision 05

July 06th, 2008

TÜV SÜD Industrie Service GmbH
Carbon Management Service
Westendstr. 199 - 80686 Munich – GERMANY

Report No.	Date of first issue	Revision No.	Date of this revision	Certificate No.
703911	2006-01-10	5	2008-07-06	-

Subject: Validation of a CDM Project	
Accredited TÜV SÜD Unit: TÜV SÜD Industrie Service GmbH Certification Body “Climate and Energy” Westendstr. 199 80686 Munich Federal Republic of Germany	TÜV SÜD Contract Partner: TÜV SÜD Industrie Service GmbH Carbon Management Service Westendstrasse 199 80686 Munich Federal Republic of Germany
Client: Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH Dag-Hammarskjöld- Weg 1-5 P.O.Box 5180 65726 Eschborn Germany	Project Site(s): CPI Factory, Chumporn Palm Oil Public Company Limited, Upper southern region of Thailand, approx. 460 km South of Bangkok and 15 km North from Chumporn City, 296, Moo 2 Phetchkasem Road, Tambol Salui, Ampur Tasae, Chumporn, Thailand 86140. Thailand
Project Title: “Chumporn Applied Biogas Technology for Advanced Waste Water Management”, Thailand	
Applied Methodology / Version: AM0013, Version 04	Scope(s): 13
First PDD Version: Date of issuance: September 9 th , 2005 Version No.: 1.0 Starting Date of First GSP 2005-09-15	Final PDD version: Date of issuance: 2008-05-10 Version No.: 07
Estimated Annual Emission Reduction: 23,448 tons CO ₂ e	
Assessment Team Leader: Thomas Kleiser	Further Assessment Team Members: Yutaka Yoshida, Cristian Delamarian and Robert Scharpenberg
Summary of the Validation Opinion: <ul style="list-style-type: none"> <input checked="" type="checkbox"/> The review of the project design documentation and the subsequent follow-up interviews have provided TÜV SÜD with sufficient evidence to determine the fulfilment of all stated criteria. In our opinion, the project meets all relevant UNFCCC requirements for the CDM. Hence TÜV SÜD will recommend the project for registration by the CDM Executive Board in case letters of approval of all Parties involved will be available before the expiring date of the applied methodology (ies) or the applied methodology version respectively. <input type="checkbox"/> The review of the project design documentation and the subsequent follow-up interviews have not provided TÜV SÜD with sufficient evidence to determine the fulfilment of all stated criteria. Hence TÜV SÜD will not recommend the project for registration by the CDM Executive Board and will inform the project participants and the CDM Executive Board on this decision. 	

Abbreviations

ACM	Approved Consolidated Methodology
AM	Approved Methodology
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
COP	Conference of the Parties
CR	Clarification Request
DNA	Designated National Authority
DOE	Designated Operational Entity
EB	Executive Board
EIA / EA	Environmental Impact Assessment / Environmental Assessment
ER	Emission reduction
GHG	Greenhouse gas(es)
GSP	Global Stakeholder Process
KP	Kyoto Protocol
MP	Monitoring Plan
MOP	Meeting of the Parties
NGO	Non Governmental Organisation
NM	New Methodology
PDD	Project Design Document
PP	Project Participant
QA	Quality Assurance
QC	Quality Control
TÜV SÜD	TÜV SÜD Industrie Service GmbH
UNFCCC	United Nations Framework Convention on Climate Change
VVM	Validation and Verification Manual

Table of Contents	Page
1 INTRODUCTION	4
1.1 Objective	4
1.2 Scope	4
2 METHODOLOGY	5
2.1 Appointment of the Assessment Team	7
2.2 Review of Documents	8
2.3 Follow-up Interviews	8
2.4 Resolution of Clarification and Corrective Action Requests	9
2.5 Internal Quality Control	9
3 SUMMARY OF FINDINGS	10
4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS	13
5 VALIDATION OPINION	16

Annex 1: Validation Protocol

Annex 2: Information Reference List

1 INTRODUCTION

1.1 Objective

The validation objective is an independent assessment by a Third Party (Designated Operational Entity = DOE) of a proposed project activity against all defined criteria set for the registration under the Clean Development Mechanism (CDM). Validation is part of the CDM project cycle and will finally result in a conclusion by the executing DOE whether a project activity is valid and should be submitted for registration to the CDM Executive Board (EB). The ultimate decision on the registration of a proposed project activity rests at the CDM Executive Board and the Parties involved.

The project activity covered by this validation report has been submitted under the project title:

“Chumporn Applied Biogas Technology for Advanced Waste Water Management, Thailand”

1.2 Scope

The scope of any assessment is defined by the underlying legislation, regulation and guidance given by relevant entities or authorities. In the case of CDM project activities the scope is set by:

- The Kyoto Protocol, in particular § 12
- Decision 2/CMP1 and Decision 3/CMP.1 (Marrakech Accords)
- Further COP/MOP decisions with reference to the CDM (e.g. decisions 4 – 8/CMP.1)
- Decisions by the EB published under <http://cdm.unfccc.int>
- Specific guidance by the EB published under <http://cdm.unfccc.int>
- Guidelines for Completing the Project Design Document (CDM-PDD), and the Proposed New Baseline and Monitoring Methodology (CDM-NM)
- The applied approved methodology
- The technical environment of the project (technical scope)
- Internal and national standards on monitoring and QA/QC
- Technical guideline and information on best practice

The validation is not meant to provide any consulting towards the client. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the project design.

Once TÜV SÜD receives a first PDD version, it is made publicly available on the internet at TÜV SÜD's webpage as well as on the UNFCCC CDM-webpage for starting a 30 day global stakeholder consultation process (GSP). In case of any request a PDD might be revised (under certain conditions the GSP will be repeated) and the final PDD will form the basis for the final evaluation as presented by this report. Information on the first and on the final PDD version is presented at page 1. In case of this concrete project a first GSP was started already in 2005. Due to the long-lasting process to acquire the Thai Letter of Approval (LoA) and running out of the validity of the originally applied methodology version number the GSP had to be repeated in 2007.

The only purpose of a validation is its use during the registration process as part of the CDM project cycle. Hence, TÜV SÜD can not be held liable by any party for decisions made or not made based on the validation opinion, which will go beyond that purpose.

2 METHODOLOGY

The project assessment aims at being a risk based approach and is based on the methodology developed in the Validation and Verification Manual, an initiative of Designated and Applicant Entities, which aims to harmonize the approach and quality of all such assessments.

In order to ensure transparency, a validation protocol was customised for the project. TÜV SÜD developed a “cook-book” for methodology-specific checklists and protocol based on the templates presented by the Validation and Verification Manual. The protocol shows, in a transparent manner, criteria (requirements), the discussion of each criterion by the assessment team and the results from validating the identified criteria. The validation protocol serves the following purposes:

- It organises, details and clarifies the requirements a CDM project is expected to meet;
- It ensures a transparent validation process where the validator will document how a particular requirement has been validated and the result of the validation.

The validation protocol consists of three tables. The different columns in these tables are described in the figure below.

The completed validation protocol is enclosed in Annex 1 to this report.

Validation Protocol Table 1: Conformity of Project Activity and PDD				
Checklist Topic / Question	Reference	Comments	PDD in GSP	Final PDD
<i>The checklist is organised in sections following the arrangement of the applied PDD version. Each section is then further subdivided. The lowest level constitutes a checklist question / criterion.</i>	<i>Gives reference to documents where the answer to the checklist question or item is found in case the comment refers to documents other than the PDD.</i>	<i>The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is further used to explain the conclusions reached. In some cases sub-checklist are applied indicating yes/no decisions on the compliance with the stated criterion. Any Request has to be substantiated within this column</i>	<i>Conclusions are presented based on the assessment of the first PDD version. This is either acceptable based on evidence provided (✓), or a Corrective Action Request (CAR) due to non-compliance with the checklist question (See below). Clarification Request (CR) is used when the validation team has identified a need for further clarification.</i>	<i>Conclusions are presented in the same manner based on the assessment of the final PDD version.</i>

Validation Protocol Table 2: Resolution of Corrective Action and Clarification Requests			
Clarifications and corrective action requests	Ref. to table 1	Summary of project owner response	Validation team conclusion
<i>If the conclusions from table 1 are either a Corrective Action Request or a Clarification Request, these should be listed in this section.</i>	<i>Reference to the checklist question number in Table 1 where the Corrective Action Request or Clarification Request is explained.</i>	<i>The responses given by the client or other project participants during the communications with the validation team should be summarised in this section.</i>	<i>This section should summarise the validation team's responses and final conclusions. The conclusions should also be included in Table 1, under “Final PDD”.</i>

In case of a denial of the project activity more detailed information on this decision will be presented in table 3.

Validation Protocol Table 3: Unresolved Corrective Action and Clarification Requests		
Clarifications and corrective action requests	Id. of CAR/CR 1	Explanation of the Conclusion for Denial
<i>If the final conclusions from table 2 results in a denial the referenced request should be listed in this section.</i>	<i>Identifier of the Request.</i>	<i>This section should present a detail explanation, why the project is finally considered not to be in compliance with a criterion.</i>

2.1 Appointment of the Assessment Team

According to the technical scopes and experiences in the sectoral or national business environment, TÜV SÜD has composed a project team in accordance with the appointment rules of the TÜV SÜD certification body “Climate and Energy”. The composition of an assessment team has to be approved by the Certification Body ensuring that the required skills are covered by the team. The Certification Body TÜV SÜD operates four qualification levels for team members that are assigned by formal appointment rules:

- Assessment Team Leader (ATL)
- Greenhouse Gas Auditor (GHG-A)
- Greenhouse Gas Auditor Trainee (T)
- Experts (E)

It is required that the sectoral scope linked to the methodology has to be covered by the assessment team.

The validation team was consisting of the following experts (the responsible Assessment Team Leader in written in bold letters):

Name	Qualification	Coverage of technical scope	Coverage of sectoral expertise	Host country experience
Thomas Kleiser	ATL	☑	☑	☑
Yutaka Yoshida	Auditor	☑	☑	-
Cristian Delamarian	Auditor and expert	☑	☑	☑
Robert Scharpenberg	Auditor	☑	☑	-

Thomas Kleiser is a Lead Auditor/Assessment Team Leader for CDM and JI projects at TÜV SÜD Industrie Service GmbH and head of CDM/JI division within TÜV SÜD. In this position he is responsible for the implementation of validation and certification processes for GHG mitigation projects. He has participated in more than 90 CDM and JI project assessments.

Yutaka Yoshida is production engineer and responsible for the carbon market of TÜV SÜD in Japan. He is based in TÜV SÜD Japan Ltd branch office Osaka working as ghg auditor and is recently involved in several CDM projects of all scales and multiple scopes. He received extensive training on all aspects of the flexible mechanism and is familiar with the recent version of CDM and JI criteria as necessary for the implementation of Art. 6 and Art. 12 of the KP. As project manager and ghg lead auditor he participated in numerous assessments of CDM and JI projects on global stage. Before entering this department he worked as expert for quality assurance and statistic process control. In this specific project he was responsible for keeping the communication with all project participants, furthermore he assisted in the assessment of support documents and in discussing technical issues of this project.

Cristian Delamarian is a lead auditor for quality and environmental management systems (according to ISO 9001 and ISO 14001) at TÜV Philippines, Inc., TÜV SÜD Group in Manila. He is an acknowledged expert for electricity and heat generation project based on renewable sources worldwide. In his position he is responsible for the implementation of validation, verification and certifications audits for management systems. He has received extensive training in the CDM validation process and worked as an GhG Auditor in several CDM project in the South- and South-East Asian region and now again, after his return in his former home office at TUV Romania in Bukarest, in some JI projects.

Robert Scharpenberg is an auditor for CDM / JI validations and verifications at TÜV SÜD Industrie Service GmbH in Munich. He has received several initial training as auditor and in diverse aspects of the flexible mechanisms. Before he joined TÜV SÜD he worked as project developer in several JI projects, contributing to his background knowledge of the Kyoto requirements and procedures. Furthermore he has worked as FSC auditor (Forest Stewardship Council) with a focus on the chain of custody. He is a graduate in wood science and technology. In this specific project he assisted with his special experience in the utilization of biomass.

2.2 Review of Documents

The first PDD version submitted by the client and additional background documents related to the project design and baseline were reviewed as initial step of the validation process. A complete list of all documents and proofs reviewed is attached as Annex 2 to this report.

2.3 Follow-up Interviews

On October 05th and 06th, 2005 TÜV SÜD (Cristian Delamarian as local auditor and expert) performed on-site interviews with project stakeholders (project owner, project developer and further people involved in the planning process for the project) to confirm selected information and to discuss and resolve issues identified in the first document review. An additional audit took place on October 7th, 2005 with the project developers (Envima, German GTZ). The table below provides a list of all persons interviewed in the context of this on-site visit.

Name	Organisation
Suniya Ayachanna	CPI Assistant Managing Director
Nithad Rungnapanate	CPI Logistic Manager
Poanee Jittawarajinda	CPI Quality Control Manager
Weerapan Kiatpakdee	Natural Power, Thailand
Chatree Daenghaew	Thailand Environmental Institute
Anorn Rittan	CPI Production Manager
Yosmrorn Arronsak	CPI Office Manager
Magnus Staudte	Director, Envima GmbH Thailand (first PDD developer; responsible for monitoring plan)
Rudolf Rauch and Werner Kossmann	GTZ Thailand (PDD Developer)
Pirom Intapirak	CPI Rae Material Researching Manager

Furthermore representatives of local state organisations as well as NGOs have been interviewed. Further interviews in the ongoing validation process such as interviews with Sonja Butzengeiger (Perspectives GmbH in Hamburg) responsible for the development of the final documentation (PDD) as well as Anja Wucke from GTZ in Germany have been carried out via e-mails and telephone calls.

2.4 Resolution of Clarification and Corrective Action Requests

The validation of the project started already in September/October 2005. A first PDD was submitted to the DOE, a fact finding on-site mission was carried out and the project then was already finally and successfully validated by the responsible DOE – TÜV SÜD – end of January 2006, following the methodology version number and relevant tools valid at that time. Due to unexpected delays in the issuance of the LoA in Thailand, caused by political circumstances, the PDD had to be updated and re-published in a second GSP in May 2007 and the applied methodology as well as the applied tools linked to the methodology had to be applied in the most recent new version number. The attached validation protocol refers to this repeat GSP.

The objective of this phase of the validation is to resolve the requests for corrective actions and clarifications and any other outstanding issues which needed to be clarified for TÜV SÜD's positive conclusion on the project design.

All the Corrective Action Requests and Clarification Requests raised by TÜV SÜD were finally resolved during communication between the client and TÜV SÜD. To guarantee the transparency of the validation process, the concerns raised and responses that have been given are summarised in Chapter 3 below and documented in more detail in the validation protocol in Annex 1.

2.5 Internal Quality Control

As final step of a validation, the validation report and the protocol have to undergo an internal quality control procedure by the Certification Body “Climate and Energy”, i.e. each report has to be approved either by the head of the certification body or his deputy. In case one of these two persons is part of the assessment team approval can only be given by the other one.

It rests at the decision of TÜV SÜD's Certification Body whether a project will be submitted for re-requesting registration by the EB or not.

3 SUMMARY OF FINDINGS

As informed above all findings are summarized in detail table 2 of the attached validation protocol.

Project description:

The following description of the project as per PDD could be verified during the on-site audit:

The purpose of the *Chumporn applied biogas technology for advanced waste water management* is to treat the wastewater generated in the production of palm oil and to use the organic matter removed from the wastewater to produce heat from clean, renewable energy (biogas). The planned project activity consists of a wastewater treatment facility, i.e. two anaerobic tank digesters, as well as a combustion system to generate heat from the produced biogas. Biogas is produced by the anaerobic digestion of organic matter in the tank reactors. The project activity involves the design, construction, installation, start-up and operation of the wastewater treatment and heat generation facilities. Hence, the project will lead to a shift from traditional waste water treatment in open, anaerobic ponds with uncontrolled release of methane to the atmosphere to a closed tank digester system with biogas capture and utilization. The ultimate purpose of the project activity is to reduce greenhouse gas emissions to the atmosphere and contribute to an environmentally and socially sustainable development of palm oil production at Chumporn Palm Oil Industry (CPI). The project is designed as Gold Standard project.

Besides the tank reactor, being the central element of the improved treatment process, the following components will be installed:

- **Collection and equalization tank**
The tank allows temperature adjustment of waste water leaving the production process as well as a first sedimentation of solid components
- **Screening and sand trap**
The effluent from the collection/equalization tank will be pumped to a screening device for removing large particles and sand from the wastewater before entering A-CSTR.
- **Distribution Tank**
The distribution tank continuously pumps screened effluent to A-CSTR.
- **Sand Bed Filter**
Separation of solid and liquid parts of digested sludge from the bottom of the digester.
- **Post Treatment and storage pond**
Overflow effluent of the A-CSTR digester and effluent from the sand bed filter will be further treated in the existing open pond system.
- **Biogas Filter**
Retained gas stored will first be channeled through a biogas filter in order to remove hydrogen sulfide (H₂S).

- **Combustion system**

The cleaned biogas will be utilized in the steam boilers to generate heat.

Two boilers are operated:

a mid/high pressure boiler (60-90 bar, boiler type NUK-HP 930, dual-fuel burner type RGMS7/1-D ZMD, DN50) and a low pressure boiler (30 bar, AWG Series II dual-fuel burner from Hamworthy (AWG 15)).

Plant operation will be monitored continuously. An open flare system will come into operation to deal with oversupply of methane or irregularities in the operation of the boilers. In such cases, the surplus of methane will be flared until the system operates regularly again.

The project will mainly reduce GHG emissions directly from the following sources:

- Avoidance from methane emissions from open lagoons

The overall GHG emission reductions expected from the project are 234,480 t CO₂e over the 10 year period 2008-2017.

The project will have the following additional benefits:

- As a result of reduced methane emissions, offensive smells from the operation of the palm oil mill will be minimized. In recent years, the approx. 200 farmers and villagers in the vicinity of the mill had raised complains with regard to bad odours being released from the plant. The project activity will thus improve living and working standards of the local community.
- Produced biogas can be used to substitute at least 374,200 liters/year of heavy oil and 5,397.5 tons/year of palm shells that would otherwise have been utilized. Substitution of fossil fuels by biogas will lower the emission of local air pollutants.
- The operation of the factory is expected to become more efficient. Additional fossil fuel consumption can be avoided, and the chemical oxygen demand (COD) of effluents will be reduced by approximately 80%.
- The significant reduction of COD of discharged water contributes to the protection of natural water resources, which improves the quality of the water supplied to the local community.
- Sludge and treated effluent can be used for fertilizing farm land without negatively impacting ground water quality (otherwise, there would be the danger of pollution e.g. through high COD).
- The project will result in additional jobs/employment opportunities
- The project activity helps to reduce the dependency on fossil fuels by implementing a modern technology that produces biogas (autonomous renewable energy).
- The project activity will constitute a positive example for other palm oil plants in Thailand. Applied on a large scale, the project type may have macroeconomic benefits by reducing the need for fossil fuel imports. Additionally, such decentralized types of power generation help to minimize governmental expenses for power production infrastructure.

- The project activity serves the industrial pollution prevention scheme of the government according to the 9th National Economic and Social Development Plan (NESDP) 2002 – 2006. The NESDP focuses, amongst others, on the promotion on renewable energy, improving energy conservation and the eco-efficiency of the agro-industry of Thailand.

The project was developed as Gold Standard CDM project and is in parallel applying for approval as Gold Standard CDM project.

The project design is well prepared and the technical and non-technical description is performed clearly and transparently. The final PDD applies the correct methodology in the currently still valid version number (AM0013, version 4). The tools linked to the project – additionality tool and flare tool – are also applied correctly in the currently valid version.

Project History/Validation Process:

The initial discussions on the project already started in early 2004 at CPI headquarter. It was clear already in a very early stage that the project cannot be realised without additional revenues from CDM. No other projects in the field of innovative wastewater treatment was realised until that time besides one project which received support by state bodies as pilot project. Thus – considering the lack of money and missing CDM experience - already in June 2004 CPI contacted German GTZ and discussed with GTZ the options to go for CDM. Mid of 2005 the final decision to go for CDM (and additional to apply for the high quality Gold Standard) was made as well as the decision to cooperate in this field with German GTZ. In July the development of the first PDD started. The process was finalized in September 2005. From October 2005 to end of January 2006 the first validation process was conducted and the project was successfully validated. Due to unexpected political circumstances it was not possible to get a Letter of Approval (LoA) from Thailand in the following months until mid of 2007. As meanwhile the CDM rules had been tightened, a new PDD format as well as new tools and methodology versions had been issued/became valid – thus a second validation process had to be started in May 2007. An updated PDD version (version 04) was published in May/June 2007 in a second GSP. In the following months further revisions had to be carried out due to requirements from the validation process. In parallel the process to receive the LoAs from the involved parties was initiated again. The final PDD version (version 07) on which the positive validation opinion is based is dated May 2008.

Start of construction of the plant was already in June 2006, at that time CPI was still expecting a quick registration process at UNFCCC (after receipt of the Thai LoA) based on the positive validation opinion in February 2006. Unfortunately – due to political circumstances – this did not happen. Meanwhile preliminary operation has started (June 2007), but the plant (especially monitoring system) is still not fully operational due to lack of financing.

As described above and confirmed by written documentation during the on-site visit CDM was taken in consideration from the very beginning of planning the project. It could be clearly, transparently and re-traceably demonstrated that the project is additional and would not have been realized without the possibility of CDM revenues. The project was also presented to local stakeholders, NGOs and state bodies in the context of the Gold Standard stakeholder Consultation Process and received – as summary – broad assistance. Suggestions by stakeholders to optimize the project have been included in the planning as far as possible.

Baseline and monitoring plan are well developed. The assumptions, figures, applied values and the concept could be confirmed in the validation process. The environmental impact assessment for this project has been performed on a high level, and the conducted local stakeholder process exceeds the national requirements by far as the project is designed as Gold Standard project.

To guarantee a transparent and clear validation process all findings are summarized in Table 2 of the attached validation protocol. The assessment team expressed 20 Clarification Requests and 30 Corrective Action Requests.

During the on-site audit questions concerning potential project alternatives as well as barriers for the project came up. Furthermore some parameters were missing in the original monitoring plan.

Some Corrective Action Requests and Clarification requests were raised accordingly. The involved companies solved all open issues and all Corrective Action Requests and Clarification Requests were closed.

Additionality has been documented by investment analysis. It could be clearly shown that the project is financial not attractive without CDM revenues and thus additional.

Findings:

In total the assessment resulted in 20 clarification requests and 30 corrective action requests. Table 2 of the attached protocol gives a detailed overview about the CARs and CRs and their solution.

More information were requested on the description of the project, identification of the location of the project, project boundaries, time schedule of planning and internal education/training measures, discussion of alternatives to the project, additionality/financial figures, parameters to be monitored and transparency of calculating the emission reductions.

The required adjustments and corrections in the PDD as well as further evidences (project history, financial figures, benchmark, time schedule, monitoring concept) have been submitted to the DOE. All the documentation supporting the clarifications and corrections requests were satisfactorily provided to the DOE.

After closing all the open questions the PDD is in compliance with the CDM requirements.

Baseline Setting and Calculation:

The project in its final version follows strictly the most recent version of the methodologies valid for this type of project.

Possible Alternatives to the projects have been extensively discussed. It is clearly and transparently demonstrated that the continuation of current practice is identified as the most plausible baseline scenario.

Baseline emissions include:

- Lagoon baseline emissions
- Electricity/heat baseline emissions

Lagoon baseline emissions are calculated based on the chemical oxygen demand (COD) of the effluent that would enter the lagoon in the absence of the project activity, the maximum methane producing capacity (Bo) and a methane conversion factor (MCF) that expresses what proportion of the effluent would be anaerobically digested in the open lagoons.

The grid emission factor for the Thai electricity grid has been - given limited data availability - calculated as a Simple OM (operating margin) following strictly ACM0002. The analysis determines the Thai grid emissions factor as 0.523 kg CO₂/kWh. Underlying data and details of calculation are given in Annex 3 of the PDD.

The approach and argumentation as well as the calculation have been assessed and have been evaluated as conducted correctly and in a conservative way by the validator.

Thus baseline assumptions, discussions and baseline setting are considered fully in line with the relevant CDM requirements.

Additionality:

Following the tool for demonstration of additionality, the benchmark analysis option (Option 3 of the Additionality Tool) has been applied, because the planned CDM project activity creates financial/economic benefits through reducing the consumption of fossil fuels. This proceeding is correct.

The applied financial indicator is equity IRR. The Benchmark equity IRR has been calculated as 14.95 %. The discussion, the approach/assumptions for the calculation as well as the underlying figures/used data/concept in general have been assessed. The value is plausible and the derivation is transparent and well-done.

The IRR_{equity} of the project is 6.1 %. All input parameter have been assessed and could be confirmed. The sensitivity analysis clearly, transparently and plausibly demonstrates that the benchmark equity IRR is much higher than the equity IRR which can be reached by the project.

Thus there are no doubts that the project is additional.

Common practice analysis in this sector in Thailand shows that this kind of projects currently cannot be realized without CDM revenues. Only one project with comparable measures has been realized outside the CDM system, but this was a pilot project and was only made feasible with financial assistance from state bodies.

Thus there are no doubts that the project is additional.

Conclusion

All CARs and CRs for this project, mainly related to project description and history, baseline setting, additionality proof and missing monitoring parameters could be solved during the validation process.

Thus it can be confirmed that the project is fully in line with all related CDM requirements.

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

TÜV SÜD published the project documents on the UNFCCC website by installing a link to TÜV SÜD's own website and invited comments by Parties, stakeholders and non-governmental organisations during a period of 30 days.

The following table presents all key information on this process:

webpage: http://www.netinform.de/KE/Wegweiser/Guide2_1.aspx?ID=2961&Ebene1_ID=26&Ebene2_ID=895&mode=1	
Starting date of the second (repeat) global stakeholder consultation process: 2007-05-03	
Comment submitted by: none	Issues raised: -
Response by TÜV SÜD: -	

5 VALIDATION OPINION

TÜV SÜD has performed a validation of the following proposed CDM project activity:

Chumporn Applied Biogas Technology for Advanced Waste Water Management”, Thailand

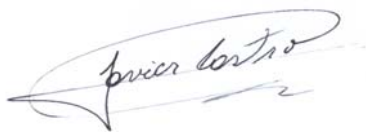
The review of the project design documentation and the subsequent follow-up interviews have provided TÜV SÜD with sufficient evidence to determine the fulfilment of stated criteria. In our opinion, the project meets all relevant UNFCCC requirements for the CDM. Hence TÜV SÜD will recommend the project for registration by the CDM Executive Board after receipt of the LoAs from the involved parties.

An analysis as provided by the applied methodology demonstrates that the proposed project activity is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity. Given that the project is implemented as designed, the project is likely to achieve the estimated amount of emission reductions as specified within the final PDD version.

The validation is based on the information made available to us and the engagement conditions detailed in this report. The validation has been performed using a risk based approach as described above. The only purpose of this report is its use during the registration process as part of the CDM project cycle. Hence, TÜV SÜD can not be held liable by any party for decisions made or not made based on the validation opinion, which will go beyond that purpose.

Munich, 2008-07-06

Munich, 2008-07-06



Javier Castro

Head

of Certification Body “Climate and Energy”
within TÜV SÜD Industrie Service GmbH

Thomas Kleiser

Assessment Team Leader

Validation of the CDM Project:
“Chumporn Applied Biogas Technology for Advanced Waste Water
Management”, Thailand



Industrie Service

Annex 1: Validation Protocol

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

CHECKLIST TOPIC / QUESTION		Ref.	COMMENTS	PDD in GSP	Final PDD
A. General description of project activity					
A.1. Title of the project activity					
A.1.1.	Does the used project title clearly enable to identify the unique CDM activity?	1-7, 51	Yes, the title allows a clear identification of the CDM project. There is currently no risk for a mix-up with other projects in Thailand.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
A.1.2.	Are there any indication concerning the revision number and the date of the revision?	1-7	<p>Yes, the version number is clearly identified. The PDD in GSP (Global Stakeholder Consultation Process) has version number 04, dated April 30th, 2007. This was a repeat-GSP using the currently valid new CDM-PDD format (version 03.1). GSP was running from May 03rd to June 01st, 2007. This PDD applies ACM0013, version 04.</p> <p>A first GSP with the PDD version 1.0, dated September 9th, 2005 was conducted from September 15th to October 14th, 2005. This PDD was designed in the old CDM format and used the approved large scale methodology ACM0013, version 02. The repetition of the GSP also became necessary as the methodology version No. applied in the first PDD already was outdated at the time the PDD format changed. The big time delays were a result of the long lasting process for receiving the Thai Letter of Approval (LoA).</p> <p><u>Clarification Request No. 1:</u></p> <p>The new CDM-PDD format is on some pages mistakenly indicated as there are a number of pages with version 02. This has to be corrected and to be ensured that the correct PDD format is used persistently.</p>	CR 1	<input checked="" type="checkbox"/>

Table 1 is applicable to ACM0013, vers 04, valid from December 22nd, 2006 onwards

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

A.1.3.	Is this consistent with the time line of the project's history?	1-12	Yes, see also comment above.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
A.2. Description of the project activity					
A.2.1.	Is the description delivering a transparent overview of the project activities?	1-12, 8-12	Yes, the description in chapter A.2 in combination with chapter A.4 gives a clear description of the project activity. Nevertheless it would be helpful to have an initial description at the beginning of chapter A.2 describing in a few sentences what is done in the project and indicating some technical figures such as capacity etc. <u>Clarification Request No. 2:</u> Please add some additional sentences before going in details in subchapter 1) under A.2 with title "Purpose of the project activity, reduction of greenhouse gases". These sentences should give a sort but clear description of the measures carried out in the project and some clarifying technical basic information.	CR 2	<input checked="" type="checkbox"/>
A.2.2.	What proofs are available demonstrating that the project description is in compliance with the actual situation or planning?	1-22	During the on-site visits the current situation as described in the PDD could be viewed visually and checked on basis of flowcharts with the technical planning of the project. All was in line with the description in the PDD.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
A.2.3.	Is the information provided by these proofs consistent with the information provided by the PDD?	1-22	Yes. All the information delivered and shown during the on-site visit as well as submitted additional documentation during the validation process substantiated the information given in the PDD.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
A.2.4.	Is all information presented consistent with details provided by further chapters of the PDD?	1-22	Yes. See also comments above.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

A.3. Project participants					
A.3.1.	Is the form required for the indication of project participants correctly applied?	1-5, 6, 7	Yes. The form to indicate the participation in the project is correctly applied. Project Participants are "Deutsche Gesellschaft für technische Zusammenarbeit (GTZ), Eschborn, Germany and Chumporn Palm Oil, Public Company Limited, Thailand. Additional Information on participation in the project is provided in Annex 1 to the PDD.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
A.3.2.	Is the participation of the listed entities or Parties confirmed by each one of them?	1-5, 6, 7	Yes. During the on-site visit and in e-mail correspondence the participation of both participants, GTZ from Germany and Chumporn Palm Oil Public Company Limited (in future: CPI) from Thailand has been confirmed verbally and in writing.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
A.3.3.	Is all information on participants / Parties provided in consistency with details provided by further chapters of the PDD (in particular annex 1)?	1-5, 6, 7	Yes. See also comments above.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
A.4. Technical description of the project activity					
<i>A.4.1. Location of the project activity</i>					
A.4.1.1.	Does the information provided on the location of the project activity allow for a clear identification of the site(s)?	1-5, 6, 7	Yes. But it would be helpful to have a little bit more detailed information on the site of the project such as for example GPS-data or at least indication of a street and land register (cadastral) information. <u>Clarification Request No. 3:</u> Please add more detailed information on the location of the project in chapter A.4.1.	CR 3	<input checked="" type="checkbox"/>
A.4.1.2.	How is it ensured and/or demonstrated, that the project proponents can implement the project at this site (ownership, licenses, contracts etc.)?	1-5, 6, 7, 21 - 29	Yes. Ownerships, necessary contracts and necessary licenses could be viewed during the on-site visit and clearly confirm the ownership and operating licenses of Chumporn Palm Oil Public Company Limited. There are no indications that these frame con-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

		ditions will change during the project life-time.		
A.4.2. Category(ies) of project activity				
A.4.2.1.	To which category(ies) does the project activity belonging to? Is the category correctly identified and indicated?	1-5, 6, 7	The project belongs to category (scope) 13: Waste handling and disposal under CDM. This is correctly described in the PDD.	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
A.4.3. Technology to be employed by the project activity				
A.4.3.1.	Does the technical design of the project activity reflect current good practices?	1,5, 6, 7, 20, 21, 22, 26, 34, 48, 49	Yes, the technical design of the project activity does reflect current good practices exceeding standard designs for Thailand in this sector (palm oil industry).	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
A.4.3.2.	Does the description of the technology to be applied provide sufficient and transparent input/ information to evaluate its impact on the greenhouse gas balance?	1,5, 6, 7, 20, 21, 22, 26, 34, 48, 49	Yes. Modern waste water treatment technology following standards in developed countries will be applied in this project. Nevertheless more information about source and equipment providers for all the equipment should be added to the PDD (also for the flare). <u>Clarification Request No. 4:</u> Please add some additional information on source and final providers of the equipment applied in this project.	CR 4 <input checked="" type="checkbox"/>
A.4.3.3.	Does the implementation of the project activity require any technology transfer from annex-I-countries to the host country(ies)?	1,5, 6, 7, 20, 21, 22, 26,	Yes. But see also CAR 4. Modern technology – an appropriate stirred tank reactor - based on standards from The Netherlands and developed in cooperation with Thai experts will be applied in this project.	CR 4 <input checked="" type="checkbox"/>

Table 1 is applicable to ACM0013, vers 04, valid from December 22nd, 2006 onwards

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

	34, 48, 49			
A.4.3.4. Is the technology implemented by the project activity environmentally safe?	1,5, 6 ,7, 17- 19, 20, 21, 22, 26, 34, 48, 49	Yes. This is clearly demonstrated by the documentation given in the PDD. The project is also intended to run under the Gold Standard which sets additional and higher standards on environmental and social impacts of such a project in comparison to CDM.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
A.4.3.5. Is the information provided in compliance with actual situation or planning?	1,5, 6 ,7, 20, 21, 22, 26, 34, 48, 49	Yes, all information given in the PDD could be confirmed during the on-site visit and interviews.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
A.4.3.6. Does the project use state of the art technology and / or does the technology result in a significantly better performance than any commonly used technologies in the host country?	1,5, 6 ,7, 20, 21, 22, 26, 34, 48,	Yes. The project applies a technology even much better than commonly used technologies in the waste water treatment sector in Thailand.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Table 1 is applicable to ACM0013, vers 04, valid from December 22nd, 2006 onwards

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

	49			
A.4.3.7. Is the project technology likely to be substituted by other or more efficient technologies within the project period?	1-7	No, there is no indication that the technology could be substituted by another or more efficient technology during the lifetime of the project.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
A.4.3.8. Does the project require extensive initial training and maintenance efforts in order to be carried out as scheduled during the project period?	1-7	Yes, and this is covered by a well developed training program for employees organised by CPI and carried out by CPI and equipment providers.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
A.4.3.9. Is information available on the demand and requirements for training and maintenance?	1-7	Yes. Detailed Information on envisaged training and training requirements is given on pages 53/54 of the PDD and more detailed information was already available during the on-site visit.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
A.4.3.10. Is a schedule available for the implementation of the project and are there any risks for delays?	1-7	No <u>Clarification Request No. 5:</u> At least an envisaged time schedule for the trainings and information on already conducted trainings should be included in the PDD.	CR 5	<input checked="" type="checkbox"/>
A.4.4. Estimated amount of emission reductions over the chosen crediting period				
A.4.4.1. Is the form required for the indication of projected emission reductions correctly applied?	6, 7, 61	Yes: The form is completely in line with the requirements given by UNFCCC with the PPD format.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
A.4.4.2. Are the figures provided consistent with other data presented in the PDD?	6, 7, 61	No, there are inconsistencies between the figures given in chapter A.4.4 and B.6.4 and the information provided for baseline and project emissions in Annex 3. This should be corrected or explained. <u>Corrective Action Request No. 1:</u> Inconsistencies between figures given in the PDD in chapters A.4.4 and B.6.4 A and annex 3 should be corrected and clarified.	CAR 1	<input checked="" type="checkbox"/>

Table 1 is applicable to ACM0013, vers 04, valid from December 22nd, 2006 onwards

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

A.4.5. Public funding of the project activity				
A.4.5.1.	Is the information provided on public funding provided in compliance with the actual situation or planning as available by the project participants?	1-5, 6, 7, 8-11, 12, 28, 44-45	Yes. There is no public funding or official development in this project. This could be confirmed during the on-site audit and in the interviews when checking the financing. This situation did not change during the long-lasting validation process.	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
A.4.5.2.	Is all information provided consistent with the details given in remaining chapters of the PDD (in particular annex 2)?	1-5, 6, 7, 8-11, 12, 28, 44-45	Yes. There is no detailed information available in annex 2 but the statements on funding nevertheless could be confirmed by checking the financial figures and discussion with the responsible persons during the on-site visit.	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
B. Application of a baseline and monitoring methodology				
B.1. Title and reference of the approved baseline and monitoring methodology				
B.1.1.1.	Are reference number, version number, and title of the baseline and monitoring methodology clearly indicated?	6, 7; 39 – 42, 48-49	No. Unfortunately the version number is not indicated in the PDD. All other information is correct and by adding the date of first validity of the methodology also the version number is identifiable. Nevertheless the version number needs to be added. <u>Corrective Action Request No. 2:</u> The version number of the applied methodology needs to be added to the PDD. Furthermore the link to ACM0002 with applied version No should be given in the PDD in this chapter.	CAR 2 <input checked="" type="checkbox"/>
B.1.1.2.	Is the applied version the most recent one and / or is this version still applicable?	6, 7; 39 - 42	Yes., but see CAR 2	CAR 2 <input checked="" type="checkbox"/>

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

B.2. Justification of the choice of the methodology and why it is applicable to the project activity												
B.2.1.1. Is the applied methodology considered the most appropriate one?	6, 7; 39 - 42	Yes. Application of AM0013 is more appropriate for this project than AM0022 which also – at least theoretically - could be applied for a project of this type. The project (published PDD in the second stakeholder process) applies ACM0013 in the most recent version – version 04 valid until August 13 th , 2008.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>								
Integrate the required amount of sub-checklists on the applicability criteria as given by the applied methodology and comment on at least every line answered with “No”;												
B.2.2. Criterion 1: The existing waste water treatment system is an open lagoon system, characterized as follows: <ul style="list-style-type: none">- the depth of the open lagoon system is at least 1 m,- The T° of the lagoon is higher than 10°C. (Monthly average temperature less than 10°C should not be included in the estimations, no anaerobic activity possible.)- The residence time of the organic matter should be at least 30 days.	1 - 7	<table><tr><th>Applicability checklist</th><th>Yes / No</th></tr><tr><td>Criterion discussed in the PDD?</td><td>Yes.</td></tr><tr><td>Compliance provable?</td><td>Yes.</td></tr><tr><td>Compliance verified?</td><td>Yes.</td></tr></table>	Applicability checklist	Yes / No	Criterion discussed in the PDD?	Yes.	Compliance provable?	Yes.	Compliance verified?	Yes.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Applicability checklist	Yes / No											
Criterion discussed in the PDD?	Yes.											
Compliance provable?	Yes.											
Compliance verified?	Yes.											
B.2.3. Criterion 2: Sludge produced during project activity is not be stored onsite before land application to avoid any possible methane emissions from anaerobic degradation.	1-7	<table><tr><th>Applicability checklist</th><th>Yes / No</th></tr><tr><td>Criterion discussed in the PDD?</td><td>Yes.</td></tr><tr><td>Compliance provable?</td><td>Yes.</td></tr><tr><td>Compliance verified?</td><td>Yes.</td></tr></table>	Applicability checklist	Yes / No	Criterion discussed in the PDD?	Yes.	Compliance provable?	Yes.	Compliance verified?	Yes.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Applicability checklist	Yes / No											
Criterion discussed in the PDD?	Yes.											
Compliance provable?	Yes.											
Compliance verified?	Yes.											
B.3. Description of the sources and gases included in the project boundary												
B.3.1. Source: Direct emissions from the waste	1-7		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>								

Table 1 is applicable to ACM0013, vers 04, valid from December 22nd, 2006 onwards

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

	treatment processes. Gas(es): CH4 Type: Baseline Emissions.		Boundary checklist	Yes / No		
			Source and gas(es) discussed in the PDD?	Yes.		
			Inclusion / exclusion justified?	Yes.		
			Explanation / Justification sufficient?	Yes.		
			Consistency with monitoring plan?	Yes.		
B.3.2.	Source: Emissions from electricity consumption / generation. Gas(es): CO2 Baseline Emissions	1-7	Boundary checklist	Yes / No	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
			Source and gas(es) discussed in the PDD?	Yes.		
			Inclusion / exclusion justified?	Yes.		
			Explanation / Justification sufficient?	Yes.		
			Consistency with monitoring plan?	Yes.		
B.3.3.	Source: Emissions from thermal energy generation Gas(es) CO2 Type: Baseline Emissions	1-7	Boundary checklist	Yes / No	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
			Source and gas(es) discussed in the PDD?	Yes.		
			Inclusion / exclusion justified?	Yes.		
			Explanation / Justification sufficient?	Yes.		
			Consistency with monitoring plan?	Yes.		
B.3.4.	Source: On-site fossil fuel consumption due to the project activity. Gas(es): CO2 Type: Project Emissions:	1-7	Boundary checklist	Yes / No	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
			Source and gas(es) discussed in the PDD?	Yes.		
			Inclusion / exclusion justified?	Yes.		
			Explanation / Justification sufficient?	Yes.		
			Consistency with monitoring plan?	Yes.		
B.3.5.	Source: Emissions from on-site electricity use. Gas(es): CO2 Type: Project Emissions	1-7	Boundary checklist	Yes / No	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
			Source and gas(es) discussed in the PDD?	Yes.		
			Inclusion / exclusion justified?	Yes.		
			Explanation / Justification sufficient?	Yes.		
			Consistency with monitoring plan?	Yes.		

Table 1 is applicable to ACM0013, vers 04, valid from December 22nd, 2006 onwards

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

B.3.6.	Source: Direct emissions from the waste treatment processes. Gas(es): CH4 Source: Project Emissions.	1-7	Boundary checklist	Yes / No	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
			Source and gas(es) discussed in the PDD?	Yes.		
			Inclusion / exclusion justified?	Yes.		
			Explanation / Justification sufficient?	Yes.		
			Consistency with monitoring plan?	Yes.		
B.3.7.	Do the spatial and technological boundaries as verified on-site comply with the discussion provided by / indication included to the PDD?	1-7	Yes, all spatial and technological boundaries verified during the on-site visit comply with the discussions /situation found and indications given during the on-site visit. Nevertheless a drawing illustrating project boundaries and installations currently and in the future would help to increase the transparency of the PDD. <u>Clarification Request No. 6:</u> Please add a drawing of project boundaries and considered equipment/activities to the PDD.		CR 6	<input checked="" type="checkbox"/>
B.4. Description of how the baseline scenario is identified and description of the identified baseline scenario						
B.4.1.	Have all technically feasible baseline scenario alternatives to the project activity been identified and discussed by the PDD? Why can this list be considered as being complete? (Following alternatives shall be included :) Sludge is brought to sludge pits (BAU) Methane recovery and flaring Meth. Recovery and utilization for electricity or heat generation. Landfilling Anaerobic composting	1-7	In principle, yes. But it is not discussed why some of the alternatives listed besides are not applicable for this project. <u>Clarification Request No. 7:</u> An additional discussion (maybe also integration) of further alternatives should be included in the PDD.		CR 7	<input checked="" type="checkbox"/>

Table 1 is applicable to ACM0013, vers 04, valid from December 22nd, 2006 onwards

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

Mineralization Composting Land application of the sludge				
B.4.2. Does the project identifies correctly and excludes those options not in line with regulatory or legal requirements?	1-7	In principle, yes, but the discussion is too limited, see CR 7.	CR 7	<input checked="" type="checkbox"/>
B.4.3. Have applicable regulatory or legal requirements been identified?	1-7	Yes. But a hint to the law(s)/legal requirements ruling this sector and branch should be given in the PDDF. Clarification Request No. 8: Please add at least in a foot note whether there are and which are the laws/legal requirements for wastewater treatment in this sector in Thailand.	CR 8	<input checked="" type="checkbox"/>
B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered CDM project activity (assessment and demonstration of additionality):				
B.5.1. In case of applying step 2 / investment analysis of the additionality tool: Is the analysis method identified appropriately (step 2a)?	1-7, 8-11, 14, 21, 25, 28- 29, 38, 39, 40- 42, 45, 47, 52- 55, 58-	Yes, but see also CR 7. And the discussion of the investment analysis is a little bit too limited in the PDD. Clarification Request No. 9: As the proof of additionality has to be uploaded for the registration of the project this chapter should be elaborated more detailed. Sources of used data should be given and it should be worked out more transparently which of the options mentioned below (B.5.2 to B.5.4) have been applied in this project.	CR 7, CR 9	<input checked="" type="checkbox"/>

Table 1 is applicable to ACM0013, vers 04, valid from December 22nd, 2006 onwards

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

	60, 62-64			
B.5.2. In case of Option I (simple cost analysis): Is it demonstrated that the activity produces no economic benefits other than CDM income?	1-7	Not Applicable (NA).	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.5.3. In case of Option II (investment comparison analysis): Is the most suitable financial indicator clearly identified (IRR, NPV, cost benefit ratio, or (levelized) unit cost)?	1-7	NA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.5.4. In case of Option III (benchmark analysis): Is the most suitable financial indicator clearly identified (IRR, NPV, cost benefit ratio, or (levelized) unit cost)?	1-7, 8-11, 14, 21, 25, 28- 29, 38, 39, 40- 42, 45, 47, 52- 55, 58- 60, 62-64	Most suitable financial indicators are not elaborated as detailed and transparent enough as it is meanwhile requested by EB for large scale CDM projects. On the other side it has to be mentioned that this project also could run under small scale methodologies AMS-II.H combined with AMS-I.C. <u>Clarification Request No. 10:</u> Financial indicators mentioned under B.5.4 of this protocol should be elaborated more detailed in the PDD.	CR 10	<input checked="" type="checkbox"/>
B.5.5. In case of Option II or Option III: Is the calculation of financial figures for this indicator correctly done for all alternatives	1-7, 8-11, 14,	Yes. The calculation is correctly done. But see also CR 9 and CR 10.	CR 9 and CR 10	<input checked="" type="checkbox"/>

Table 1 is applicable to ACM0013, vers 04, valid from December 22nd, 2006 onwards

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

and the project activity?	21, 25, 28- 29, 38, 39, 40- 42, 45, 47, 52- 55, 58- 60, 62-64			
B.5.6. In case of Option II or Option III: Is the analysis presented in a transparent manner including publicly available proofs for the utilized data?	1-7, 8-11, 14, 21, 25, 28- 29, 38, 39, 40- 42, 45, 47, 52- 55, 58- 60,	Yes. The calculation is done correctly. But see also CR 9 and CR 10.	CR 9 and CR 10	<input checked="" type="checkbox"/>

Table 1 is applicable to ACM0013, vers 04, valid from December 22nd, 2006 onwards

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

	62-64			
B.5.7. In case of applying step 3 (barrier analysis) of the additionality tool: Is a complete list of barriers developed that prevent the different alternatives to occur?	1-7	No, the barriers are not elaborated as detailed enough as it is meanwhile required for large scale CDM projects. Currently the barriers chapter only gives a rough and generalised description of potential barriers. Clarification Request No. 11: Please work out and highlight the different barriers for this project.	CR 11	<input checked="" type="checkbox"/>
B.5.8. In case of applying step 3 (barrier analysis): Is transparent and documented evidence provided on the existence and significance of these barriers?	1-7	Only partially, see CR 11.	CR 11	<input checked="" type="checkbox"/>
B.5.9. In case of applying step 3 (barrier analysis): Is it transparently shown that the execution of at least one of the alternatives is not prevented by the identified barriers?	1-7	This is not shown detailed and transparent enough. Please include this when answering CR 11.	CR 11	<input checked="" type="checkbox"/>
B.5.10. Have other activities in the host country / region similar to the project activity been identified and are these activities appropriately analyzed by the PDD (step 4a)?	1-7	Yes. Nevertheless it should be argued why 2 of 34 palm oil mills at the moment of the research already used a – in some kind - comparable system as applied in Chumporn CDM project. Clarification Request No. 12: Please elaborate the discussion on common practice more detailed and retraceable.	CR 12	<input checked="" type="checkbox"/>
B.5.11. If similar activities are occurring: Is it demonstrated that in spite of these similarities the project activity would not be implemented without the CDM component (step 4b)?	1-7	This is not demonstrated clear enough. See also CR 12.	CR 12	<input checked="" type="checkbox"/>
B.5.12. Is it appropriately explained how the ap-	1-7	Yes. This is explained transparently and underlined with financial	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Table 1 is applicable to ACM0013, vers 04, valid from December 22nd, 2006 onwards

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

proval of the project activity will help to overcome the economic and financial hurdles or other identified barriers (step 5)?		figures which could be confirmed during the on-site audit.		
B.6. Emissions reductions				
<i>B.6.1. Explanation of methodological choices</i>				
B.6.1.1.	Is it explained how the procedures provided in the methodology are applied by the proposed project activity?	1-7, 8-11, 43, 44, 46, 57, 61	Yes. Applications of procedures provided by the methodology are explained transparently and clear in the PDD.	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
B.6.1.2.	Is every selection of options offered by the methodology correctly justified and is this justification in line with the situation verified on-site?	1-7, 8-11, 43, 44, 46, 57, 61	Yes. Selection of options offered by the methodology is correctly justified in the PDD and justification could be confirmed in the on-site visit and interviews.	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
B.6.1.3.	Are the formulae required for the determination of project emissions correctly presented, enabling a complete identification of parameter to be used and / or monitored?	1-7, 8-11, 43, 44, 46, 57, 61	No, not in this chapter. <u>Corrective Action Request No. 3:</u> Please add formulae given in the methodology for determination of project, baseline emissions, leakage and emission reductions.	CAR 3 <input checked="" type="checkbox"/>
B.6.1.4.	Are the formulae required for the determination of baseline emissions correctly presented, enabling a complete identification of parameter to be used and / or	1-7, 8-11, 43, 44,	No, see CAR 3.	CAR 3 <input checked="" type="checkbox"/>

Table 1 is applicable to ACM0013, vers 04, valid from December 22nd, 2006 onwards

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

monitored?	46, 57, 61			
B.6.1.5. Are the formulae required for the determination of leakage emissions correctly presented, enabling a complete identification of parameter to be used and / or monitored?	1-7, 8-11, 43, 44, 46, 57, 61	No, see CAR 3.	CAR 3	<input checked="" type="checkbox"/>
B.6.1.6. Are the formulae required for the determination of emission reductions correctly presented?	1-7, 8-11, 43, 44, 46, 57, 61	No, see CAR 3.	CAR 3	<input checked="" type="checkbox"/>
B.6.2. Data and parameters that are available at validation				
B.6.2.1. Is the list of parameters presented in chapter B.6.2 considered to be complete with regard to the requirements of the applied methodology?	1-7, 8-11, 13, 15, 20, 24- 25, 26, 32	No, not completely. Parameters COD _{a, in} and COD _{a, out} are mentioned only under chapter B.7 (page 26 and 27 of the PDD) and in B.6.1 in table 8. But this are fixed parameters defined ex-ante on 1 year measurement. Thus they have to be included in chapter B.6.2. <u>Corrective Action Request No. 4:</u> Please include the parameters COD _{a, in} and COD _{a, out} in chapter B.6.	CAR 4	<input checked="" type="checkbox"/>

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

B.6.2.2. Parameter Title: COD _{available,m} : Monthly Chemical Oxygen Demand available for conversion (Lagoon baseline emissions)	1-7, 8-11, 13, 15, 33- 34, 48-50		Yes / No	CAR 5	<input checked="" type="checkbox"/>
		Title in line with methodology?			
		Data unit correctly expressed?			
		Appropriate description of parameter?			
		Source clearly referenced?			
		Correct value provided?			
		Has this value been verified?			
		Choice of data correctly justified?			
		Measurement method correctly described?			
		<u>Corrective Action Request No. 5:</u> Parameter COD _{available,m} is missing in chapter B.6. Please discuss and insert.			
B.6.2.3. Parameter Title: B ₀ : Maximum methane producing capacity. (Lagoon baseline emissions)	1-7, 8-11, 13, 15, 33- 34, 48-50		Yes / No	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
		Title in line with methodology?	Yes.		
		Data unit correctly expressed?	Yes.		
		Appropriate description of parameter?	Yes.		
		Source clearly referenced?	Yes.		
		Correct value provided?	Yes.		
		Has this value been verified?	Yes.		
		Choice of data correctly justified?	Yes.		
		Measurement method correctly described?	NA		
		B.6.2.4. Parameter Title: COD _{a,out} (based on one year historical data) (Lagoon baseline emissions)	1-7, 8-11, 13, 15, 33- 34, 48-50		
Title in line with methodology?					
Data unit correctly expressed?					
Appropriate description of parameter?					
Source clearly referenced?					
Correct value provided?					
Has this value been verified?					
Choice of data correctly justified?					

Table 1 is applicable to ACM0013, vers 04, valid from December 22nd, 2006 onwards

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

		<table><tr><td>Measurement method correctly described?</td><td></td></tr></table> <p>This parameter is missing in chapter B.6., see CAR 4.</p>	Measurement method correctly described?																			
Measurement method correctly described?																						
B.6.2.5. Parameter Title: COD _{a,in} : (based on one year historical data) (Lagoon baseline emissions)	1-7, 8-11, 13, 15, 33- 34, 48-50	<table><tr><th>Data Checklist</th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td></td></tr><tr><td>Data unit correctly expressed?</td><td></td></tr><tr><td>Appropriate description of parameter?</td><td></td></tr><tr><td>Source clearly referenced?</td><td></td></tr><tr><td>Correct value provided?</td><td></td></tr><tr><td>Has this value been verified?</td><td></td></tr><tr><td>Choice of data correctly justified?</td><td></td></tr><tr><td>Measurement method correctly described?</td><td></td></tr></table> <p>This parameter is missing in chapter B.6., see CAR 4.</p>	Data Checklist	Yes / No	Title in line with methodology?		Data unit correctly expressed?		Appropriate description of parameter?		Source clearly referenced?		Correct value provided?		Has this value been verified?		Choice of data correctly justified?		Measurement method correctly described?		CAR 4	<input checked="" type="checkbox"/>
Data Checklist	Yes / No																					
Title in line with methodology?																						
Data unit correctly expressed?																						
Appropriate description of parameter?																						
Source clearly referenced?																						
Correct value provided?																						
Has this value been verified?																						
Choice of data correctly justified?																						
Measurement method correctly described?																						
B.6.2.6. Parameter Title: F _d : Fraction of anaerobic degradation due to depth. (Lagoon baseline emissions)	1-7, 8-11, 13, 15, 33- 34, 48-50	<table><tr><th></th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td></td></tr><tr><td>Data unit correctly expressed?</td><td></td></tr><tr><td>Appropriate description of parameter?</td><td></td></tr><tr><td>Source clearly referenced?</td><td></td></tr><tr><td>Correct value provided?</td><td></td></tr><tr><td>Has this value been verified?</td><td></td></tr><tr><td>Choice of data correctly justified?</td><td></td></tr><tr><td>Measurement method correctly described?</td><td></td></tr></table> <p><u>Corrective Action Request No. 6:</u> Parameter F_d s missing in chapter B.6, but mentioned in chapter 6.1, table 8. Please discuss and insert the parameter under B.2.</p>		Yes / No	Title in line with methodology?		Data unit correctly expressed?		Appropriate description of parameter?		Source clearly referenced?		Correct value provided?		Has this value been verified?		Choice of data correctly justified?		Measurement method correctly described?		CAR 6	<input checked="" type="checkbox"/>
	Yes / No																					
Title in line with methodology?																						
Data unit correctly expressed?																						
Appropriate description of parameter?																						
Source clearly referenced?																						
Correct value provided?																						
Has this value been verified?																						
Choice of data correctly justified?																						
Measurement method correctly described?																						

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

B.6.2.7. Parameter Title: 0,89: uncertainty conservativeness factor (Lagoon baseline emissions)	1-7, 8-11, 13, 15, 33- 34, 48-50		Yes / No		CAR 7	<input checked="" type="checkbox"/>
		Title in line with methodology?				
		Data unit correctly expressed?				
		Appropriate description of parameter?				
		Source clearly referenced?				
		Correct value provided?				
		Has this value been verified?				
		Choice of data correctly justified?				
		Measurement method correctly described?				
		<u>Corrective Action Request No. 7:</u> Uncertainty conservativeness factor is not mentioned in chapter B.6.2 and should be included.				
B.6.2.8. Parameter Title: E: Activation energy constant. (Lagoon baseline emissions)	1-7, 8-11, 13, 15, 33- 34, 48-50		Yes / No		CAR 8	<input checked="" type="checkbox"/>
		Title in line with methodology?				
		Data unit correctly expressed?				
		Appropriate description of parameter?				
		Source clearly referenced?				
		Correct value provided?				
		Has this value been verified?				
		Choice of data correctly justified?				
		Measurement method correctly described?				
		<u>Corrective Action Request No. 8:</u> Activation energy constant is not mentioned in chapter B.6.2 and should be included.				

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

B.6.2.9. Parameter Title: T1: Temperature constant (Lagoon baseline emissions)	1-7, 8-11, 13, 15, 33- 34, 48-50		Yes / No	CAR 9	<input checked="" type="checkbox"/>
		Title in line with methodology?			
		Data unit correctly expressed?			
		Appropriate description of parameter?			
		Source clearly referenced?			
		Correct value provided?			
		Has this value been verified?			
		Choice of data correctly justified?			
		Measurement method correctly described?			
		<u>Corrective Action Request No. 9:</u> T1: Temperature constant is not mentioned in chapter B.6.2 and should be included.			
B.6.2.10. Parameter Title: R: Ideal gas constant (Lagoon baseline emissions)	1-7, 8-11, 13, 15, 33- 34, 48-50		Yes / No	CAR 10	<input checked="" type="checkbox"/>
		Title in line with methodology?			
		Data unit correctly expressed?			
		Appropriate description of parameter?			
		Source clearly referenced?			
		Correct value provided?			
		Has this value been verified?			
		Choice of data correctly justified?			
		Measurement method correctly described?			
		<u>Corrective Action Request No. 10:</u> R: Ideal gas constant is not mentioned in chapter B.6.2 and should be included.			

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

B.6.2.11. Parameter Title: EG _y : amount of electricity in the year y that would be consumed at the project in the absence of the project activity (Electricity baseline emissions)	1-7, 32		Yes / No	CR 11	<input checked="" type="checkbox"/>
		Title in line with methodology?			
		Data unit correctly expressed?			
		Appropriate description of parameter?			
		Source clearly referenced?			
		Correct value provided?			
		Has this value been verified?			
		Choice of data correctly justified?			
		Measurement method correctly described?			
		<u>Corrective Action Request No. 11:</u> EG _y : amount of electricity in the year y that would be consumed at the project in the absence of the project activity is not mentioned in chapter B.6.2 and should be included.			
B.6.2.12. Parameter Title: CEF _{Bl,elec,y} : CO2 emission factor for electricity consumed at the project site in the absence of the project activity. (Electricity baseline emissions)	1-7, 32		Yes / No	CR 12	<input checked="" type="checkbox"/>
		Title in line with methodology?	No		
		Data unit correctly expressed?	Yes.		
		Appropriate description of parameter?	Yes.		
		Source clearly referenced?	Yes.		
		Correct value provided?	Yes.		
		Has this value been verified?	No.		
		Choice of data correctly justified?	No.		
		Measurement method correctly described?	NA		
		<u>Corrective Action Request No. 12:</u> CEF _{Bl,elec,y} : CO2 emission factor for electricity consumed at the project site in the absence of the project activity is mentioned incorrectly in the PDD and should be adjusted. Calculation under ACM0002, applied version and the argumentation, why a simple			

Table 1 is applicable to ACM0013, vers 04, valid from December 22nd, 2006 onwards

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

		operating margin approach was used should be added to the PDD.																					
B.6.2.13. Parameter Title: EG _{d,y} : amount of electricity generated utilizing the biogas collected during project activity and exported to the grid during the year. (Electricity baseline emissions)	1-7	NA as no electricity is generated to feed in in the grid.		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>																		
B.6.2.14. Parameter Title: CEF _{grid} : CO2 emission factor for the grid where electricity is exported. (Electricity baseline emissions)	1-7	NA as no electricity is exported to the grid.		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>																		
B.6.2.15. Parameter Title: CEF _{Bl,therm} : CO2 emissions intensity for thermal energy generation. (Electricity baseline emissions)	1-7, 32	<table><tr><th></th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td></td></tr><tr><td>Data unit correctly expressed?</td><td></td></tr><tr><td>Appropriate description of parameter?</td><td></td></tr><tr><td>Source clearly referenced?</td><td></td></tr><tr><td>Correct value provided?</td><td></td></tr><tr><td>Has this value been verified?</td><td></td></tr><tr><td>Choice of data correctly justified?</td><td></td></tr><tr><td>Measurement method correctly described?</td><td></td></tr></table>		Yes / No	Title in line with methodology?		Data unit correctly expressed?		Appropriate description of parameter?		Source clearly referenced?		Correct value provided?		Has this value been verified?		Choice of data correctly justified?		Measurement method correctly described?			CAR 13	<input checked="" type="checkbox"/>
	Yes / No																						
Title in line with methodology?																							
Data unit correctly expressed?																							
Appropriate description of parameter?																							
Source clearly referenced?																							
Correct value provided?																							
Has this value been verified?																							
Choice of data correctly justified?																							
Measurement method correctly described?																							

Table 1 is applicable to ACM0013, vers 04, valid from December 22nd, 2006 onwards

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

		<u>Corrective Action Request No. 13:</u> CEF _{BI,therm} : CO2 emissions intensity for thermal energy generation is not mentioned in chapter B.6.2 and should be included.			
B.6.2.16. Parameter Title: HG _{Bly} : The quantity of thermal energy that would be consumed in the year y at the project site in the absence of the project activity. (Electricity baseline emissions)	1-7, 8-11, 24		Yes / No	CAR 14	<input checked="" type="checkbox"/>
		Title in line with methodology?			
		Data unit correctly expressed?			
		Appropriate description of parameter?			
		Source clearly referenced?			
		Correct value provided?			
		Has this value been verified?			
		Choice of data correctly justified?			
		Measurement method correctly described?			
		<u>Corrective Action Request No. 14:</u> HG _{Bly} : The quantity of thermal energy that would be consumed in the year y at the project site in the absence of the project activity is not mentioned in chapter B.6.2 and should be included.			
B.6.2.17. Parameter Title: COD _{dig_out} : Chemical Oxygen Demand of effluent entering lagoons. (Methane emissions from lagoons)	1-7, 8-11, 24		Yes / No	CAR 15	<input checked="" type="checkbox"/>
		Title in line with methodology?			
		Data unit correctly expressed?			
		Appropriate description of parameter?			
		Source clearly referenced?			
		Correct value provided?			
		Has this value been verified?			
		Choice of data correctly justified?			
		Measurement method correctly described?			
		<u>Corrective Action Request No. 15:</u> COD _{dig_out} : Chemical Oxygen Demand of effluent entering lagoons is not mentioned in chapter B.6.2 and should be included.			

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

B.6.2.18. Parameter Title: EL _{Py} : amount of electricity in the year y that is consumed at the project site for the project activity. (Stack emissions from the flare or energy generation)	1-7, 8-11		Yes / No	CAR 16	<input checked="" type="checkbox"/>
		Title in line with methodology?			
		Data unit correctly expressed?			
		Appropriate description of parameter?			
		Source clearly referenced?			
		Correct value provided?			
		Has this value been verified?			
		Choice of data correctly justified?			
		Measurement method correctly described?			
		<u>Corrective Action Request No. 16:</u> EL _{Py} : amount of electricity in the year y that is consumed at the project site for the project activity is not mentioned in chapter B.6.2 and should be included.			
B.6.2.19. Parameter Title: CEF _d : CO2 emission factor for electricity consumed at the project site during the project activity. (Stack emissions from the flare or energy generation)	1-7, 8-11		Yes / No	CAR 17	<input checked="" type="checkbox"/>
		Title in line with methodology?	No		
		Data unit correctly expressed?	Yes.		
		Appropriate description of parameter?	Yes.		
		Source clearly referenced?	Yes.		
		Correct value provided?	Yes.		
		Has this value been verified?	No.		
		Choice of data correctly justified?	No.		
		Measurement method correctly described?	NA		
		<u>Corrective Action Request No. 17:</u> CEF _{Bl,elec,y} : CO2 emission factor for electricity consumed at the project site ins mentioned incorrectly in the PDD and should be adjusted. Calculation under ACM0002, applied version and the argumentation, why a simple operating margin approach was used should be added to the PDD. .			

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

B.6.2.20. Parameter Title: HG _{Pr,y} : quantity of thermal energy consumed in the year y at the project site due to the project activity. (Stack emissions from the flare or energy generation)	1-7, 8-11		Yes / No	CAR 18	<input checked="" type="checkbox"/>
		Title in line with methodology?			
		Data unit correctly expressed?			
		Appropriate description of parameter?			
		Source clearly referenced?			
		Correct value provided?			
		Has this value been verified?			
		Choice of data correctly justified?			
		Measurement method correctly described?			
		<u>Corrective Action Request No. 18:</u> HG _{Pr,y} : quantity of thermal energy consumed in the year y at the project site due to the project activity.is not mentioned in chapter B.6.2 and should be included.			
B.6.2.21. Parameter Title: CEF _{Pr,therm,y} : CO2 emissions intensity for thermal energy generation. (Stack emissions from the flare or energy generation)	1-7, 8-11		Yes / No	CAR 19	<input checked="" type="checkbox"/>
		Title in line with methodology?			
		Data unit correctly expressed?			
		Appropriate description of parameter?			
		Source clearly referenced?			
		Correct value provided?			
		Has this value been verified?			
		Choice of data correctly justified?			
		Measurement method correctly described?			
		<u>Corrective Action Request No. 19:</u> CEF _{Pr,therm,y} : CO2 emissions intensity for thermal energy generation is not mentioned in chapter B.6.2 and should be included.			

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

B.6.2.22. Parameter Title: COD _{la} : Chemical Oxygen Demand of the sludge used for land application after dewatering (Emissions from land application of sludge)	1-7, 8-11, 20, 26, 34, 37, 48-49		Yes / No	CAR 20	<input checked="" type="checkbox"/>
		Title in line with methodology?			
		Data unit correctly expressed?			
		Appropriate description of parameter?			
		Source clearly referenced?			
		Correct value provided?			
		Has this value been verified?			
		Choice of data correctly justified?			
		Measurement method correctly described?			
		<u>Corrective Action Request No. 20:</u> COD _{la} : Chemical Oxygen Demand of the sludge used for land ap- plication after dewatering is not mentioned in chapter B.6.2 and should be included.			
B.6.2.23. Parameter Title: S _a : amount of sludge applied to land (Emissions from land application of sludge)	1-7, 8-11, 20, 26, 34, 37, 48-49		Yes / No	CAR 21	<input checked="" type="checkbox"/>
		Title in line with methodology?			
		Data unit correctly expressed?			
		Appropriate description of parameter?			
		Source clearly referenced?			
		Correct value provided?			
		Has this value been verified?			
		Choice of data correctly justified?			
		Measurement method correctly described?			
		<u>Corrective Action Request No. 21:</u> S _a : amount of sludge applied to land is not mentioned in chapter B.6.2 and should be included.			

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

B.6.2.24. Parameter Title: NC: Nitrogen Content of the sludge (Emissions from land application of sludge)	1-7, 8-11, 20, 26, 34, 37, 48-49		Yes / No	CAR 22	<input checked="" type="checkbox"/>
		Title in line with methodology?			
		Data unit correctly expressed?			
		Appropriate description of parameter?			
		Source clearly referenced?			
		Correct value provided?			
		Has this value been verified?			
		Choice of data correctly justified?			
		Measurement method correctly described?			
		<u>Corrective Action Request No. 22:</u> NC: Nitrogen Content of the sludge is not mentioned in chapter B.6.2 and should be included.			
B.6.2.25. Parameter Title: EF _{N2O} : Emission factor of nitrogen from sludge applied to land. (Emissions from land application of sludge)	1-7, 8-11, 13, 15, 20, 26, 34, 37, 48-49		Yes / No	CAR 23	<input checked="" type="checkbox"/>
		Title in line with methodology?			
		Data unit correctly expressed?			
		Appropriate description of parameter?			
		Source clearly referenced?			
		Correct value provided?			
		Has this value been verified?			
		Choice of data correctly justified?			
		Measurement method correctly described?			
		<u>Corrective Action Request No. 23:</u> EF _{N2O} : Emission factor of nitrogen from sludge applied to land is not mentioned in chapter B.6.2 and should be included.			

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

B.6.2.26. Parameter Title: COD _{dw} : Chemical Oxygen demand in the wastewater from the dewatering process. (Emissions from wastewater removed in the dewatering process)	1-7, 8-11, 13, 15, 20, 26, 34, 37, 48-49		Yes / No	CAR 24	<input checked="" type="checkbox"/>
		Title in line with methodology?			
		Data unit correctly expressed?			
		Appropriate description of parameter?			
		Source clearly referenced?			
		Correct value provided?			
		Has this value been verified?			
		Choice of data correctly justified?			
		Measurement method correctly described?			
		<u>Corrective Action Request No. 24:</u> COD _{dw} : Chemical Oxygen demand in the wastewater from the dewatering process is not mentioned in chapter B.6.2 and should be included.			
B.6.3. Ex-ante calculation of emission reductions					
B.6.3.1. Is the projection based on the same procedures as used for future monitoring?	1-7	Yes, but see all the CARs mentioned above under B.6.2.		CAR 4 - 18	<input checked="" type="checkbox"/>
B.6.3.2. Are the GHG calculations documented in a complete and transparent manner?	1-7	No, this is currently not the case. See CAR 1		CAR 1	<input checked="" type="checkbox"/>
B.6.3.3. Is the data provided in this section consistent with data as presented in other chapters of the PDD?	1-7	Yes, this is the case.		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.6.4. Summary of the ex-ante estimation of emission reductions					
B.6.4.1. Will the project result in fewer GHG emissions than the baseline scenario?	1-7, 61	Yes.		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.6.4.2. Is the form/table required for the indication of projected emission reductions correctly applied?	1-7, 61	This cannot yet be confirmed finally as the formulae are not mentioned in the related section of the PDD. See also CAR 1		CAR 1	<input checked="" type="checkbox"/>
B.6.4.3. Is the projection in line with the envisioned time schedule for the project's implemen-	1-7, 61	Yes. But an updated time-schedule should be submitted to the validator.		CR 13	<input checked="" type="checkbox"/>

Table 1 is applicable to ACM0013, vers 04, valid from December 22nd, 2006 onwards

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

tation and the indicated crediting period?		Clarification Request No. 13: Please submit an adjusted time-schedule valid for the current situation on-site.																										
B.6.4.4. Is the data provided in this section in consistency with data as presented in other chapters of the PDD?	1-7, 61	Yes.	<input checked="" type="checkbox"/>																									
B.7. Application of the monitoring methodology and description of the monitoring plan																												
<i>B.7.1. Data and parameters monitored</i>																												
B.7.1.1. Is the list of parameters presented in chapter B.7.1 considered to be complete with regard to the requirements of the applied methodology?	1-7, 30-31, 35, 36, 40-42	Yes. The list is deemed sufficient.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>																								
B.7.1.2. Parameter Title: F _{dig} : Flow rate of organic wastewater into the digester	1-7, 30-31, 35, 36, 40-42	<table><tr><th>Monitoring Checklist</th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td>Yes.</td></tr><tr><td>Data unit correctly expressed?</td><td>Yes.</td></tr><tr><td>Appropriate description of parameter?</td><td>Yes.</td></tr><tr><td>Source clearly referenced?</td><td>Yes.</td></tr><tr><td>Correct value provided for estimation?</td><td>Yes.</td></tr><tr><td>Has this value been verified?</td><td>Yes.</td></tr><tr><td>Measurement method correctly described?</td><td>Yes.</td></tr><tr><td>Correct reference to standards?</td><td>Yes.</td></tr><tr><td>Indication of accuracy provided?</td><td>Yes.</td></tr><tr><td>QA/QC procedures described?</td><td>Yes.</td></tr><tr><td>QA/QC procedures appropriate?</td><td>Yes.</td></tr></table>	Monitoring Checklist	Yes / No	Title in line with methodology?	Yes.	Data unit correctly expressed?	Yes.	Appropriate description of parameter?	Yes.	Source clearly referenced?	Yes.	Correct value provided for estimation?	Yes.	Has this value been verified?	Yes.	Measurement method correctly described?	Yes.	Correct reference to standards?	Yes.	Indication of accuracy provided?	Yes.	QA/QC procedures described?	Yes.	QA/QC procedures appropriate?	Yes.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Monitoring Checklist	Yes / No																											
Title in line with methodology?	Yes.																											
Data unit correctly expressed?	Yes.																											
Appropriate description of parameter?	Yes.																											
Source clearly referenced?	Yes.																											
Correct value provided for estimation?	Yes.																											
Has this value been verified?	Yes.																											
Measurement method correctly described?	Yes.																											
Correct reference to standards?	Yes.																											
Indication of accuracy provided?	Yes.																											
QA/QC procedures described?	Yes.																											
QA/QC procedures appropriate?	Yes.																											

Table 1 is applicable to ACM0013, vers 04, valid from December 22nd, 2006 onwards

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

B.7.1.3. Parameter Title: COD _{c,BL} : concentration of organic waste-water into the digester or directed for Land application	1-7, 30-31, 35, 36, 40-42	Monitoring Checklist	Yes / No	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
		Title in line with methodology?	Yes.		
		Data unit correctly expressed?	Yes.		
		Appropriate description of parameter?	Yes.		
		Source clearly referenced?	Yes.		
		Correct value provided for estimation?	Yes.		
		Has this value been verified?	Yes.		
		Measurement method correctly described?	Yes.		
		Correct reference to standards?	Yes.		
		Indication of accuracy provided?	Yes.		
B.7.1.4. Parameter Title: COD _{a,out} : COD that leaves the lagoon with the effluent	1-7, 30-31, 35, 36, 40-42	Monitoring Checklist	Yes / No	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
		Title in line with methodology?	Yes.		
		Data unit correctly expressed?	Yes.		
		Appropriate description of parameter?	Yes.		
		Source clearly referenced?	Yes.		
		Correct value provided for estimation?	Yes.		
		Has this value been verified?	Yes.		
		Measurement method correctly described?	Yes.		
		Correct reference to standards?	Yes.		
		Indication of accuracy provided?	Yes.		
B.7.1.5. Parameter Title: COD _{a,in} : COD that enters the lagoon	1-7, 30-31, 35, 36,	Monitoring Checklist	Yes / No	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
		Title in line with methodology?	Yes.		
		Data unit correctly expressed?	Yes.		
		Appropriate description of parameter?	Yes.		
		Source clearly referenced?	Yes.		

Table 1 is applicable to ACM0013, vers 04, valid from December 22nd, 2006 onwards

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

	40-42	<div>Correct value provided for estimation? Yes.</div> <div>Has this value been verified? Yes.</div> <div>Measurement method correctly described? Yes.</div> <div>Correct reference to standards? Yes.</div> <div>Indication of accuracy provided? Yes.</div> <div>QA/QC procedures described? Yes.</div> <div>QA/QC procedures appropriate? Yes.</div>			
B.7.1.6. Parameter Title: T _{lag} : Ambient Temperature	1-7, 30-31, 35, 36, 40-42	<div>Monitoring Checklist Yes / No</div> <div>Title in line with methodology? Yes.</div> <div>Data unit correctly expressed? Yes.</div> <div>Appropriate description of parameter? Not fully.</div> <div>Source clearly referenced? Yes.</div> <div>Correct value provided for estimation? No</div> <div>Has this value been verified? No.</div> <div>Measurement method correctly described? Yes.</div> <div>Correct reference to standards? Yes.</div> <div>Indication of accuracy provided? Yes.</div> <div>QA/QC procedures described? Yes.</div> <div>QA/QC procedures appropriate? Yes.</div> <div>Clarification Request No. 14: Please add information on values for T_{lag}: Ambient Temperature used and a description of this data.</div>		CR 14	<input checked="" type="checkbox"/>
B.7.1.7. Parameter Title: D _{lag} : Depth of lagoon	1-7, 30-31, 35, 36, 40-42, 48-50	<div>Monitoring Checklist Yes / No</div> <div>Title in line with methodology?</div> <div>Data unit correctly expressed?</div> <div>Appropriate description of parameter?</div> <div>Source clearly referenced?</div> <div>Correct value provided for estimation?</div> <div>Has this value been verified?</div> <div>Measurement method correctly described?</div> <div>Correct reference to standards?</div>		CAR 25	<input checked="" type="checkbox"/>

Table 1 is applicable to ACM0013, vers 04, valid from December 22nd, 2006 onwards

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

		<table><tr><td>Indication of accuracy provided?</td><td></td></tr><tr><td>QA/QC procedures described?</td><td></td></tr><tr><td>QA/QC procedures appropriate?</td><td></td></tr></table> <p><u>Corrective Action Request No. 25:</u></p> <p>Information on D_{lag}: Depth of lagoon Is missing in chapter B.7.1 and should be included.</p>	Indication of accuracy provided?		QA/QC procedures described?		QA/QC procedures appropriate?																					
Indication of accuracy provided?																												
QA/QC procedures described?																												
QA/QC procedures appropriate?																												
B.7.1.8. Parameter Title: EG _y : Amount of electricity in the year y that would be consumed at the project site in the absence of the project activity.	1-7, 32	<table><tr><th>Monitoring Checklist</th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td>No.</td></tr><tr><td>Data unit correctly expressed?</td><td>Yes.</td></tr><tr><td>Appropriate description of parameter?</td><td>Yes.</td></tr><tr><td>Source clearly referenced?</td><td>Yes.</td></tr><tr><td>Correct value provided for estimation?</td><td>Yes.</td></tr><tr><td>Has this value been verified?</td><td>Yes.</td></tr><tr><td>Measurement method correctly described?</td><td>No</td></tr><tr><td>Correct reference to standards?</td><td>Yes.</td></tr><tr><td>Indication of accuracy provided?</td><td>No</td></tr><tr><td>QA/QC procedures described?</td><td>Yes</td></tr><tr><td>QA/QC procedures appropriate?</td><td>Yes.</td></tr></table> <p><u>Clarification Request No. 15:</u></p> <p>Please add information on measurement procedures and accuracy level for EG_y: Amount of electricity in the year y that would be consumed at the project site in the absence of the project activity.</p>	Monitoring Checklist	Yes / No	Title in line with methodology?	No.	Data unit correctly expressed?	Yes.	Appropriate description of parameter?	Yes.	Source clearly referenced?	Yes.	Correct value provided for estimation?	Yes.	Has this value been verified?	Yes.	Measurement method correctly described?	No	Correct reference to standards?	Yes.	Indication of accuracy provided?	No	QA/QC procedures described?	Yes	QA/QC procedures appropriate?	Yes.	CR 15	<input checked="" type="checkbox"/>
Monitoring Checklist	Yes / No																											
Title in line with methodology?	No.																											
Data unit correctly expressed?	Yes.																											
Appropriate description of parameter?	Yes.																											
Source clearly referenced?	Yes.																											
Correct value provided for estimation?	Yes.																											
Has this value been verified?	Yes.																											
Measurement method correctly described?	No																											
Correct reference to standards?	Yes.																											
Indication of accuracy provided?	No																											
QA/QC procedures described?	Yes																											
QA/QC procedures appropriate?	Yes.																											

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

B.7.1.9. Parameter Title: EG _{d,y} : Amount of electricity generated utilizing the biogas collected during project activity and exported to the grid during the year.	1-7, 30-31, 40-42	NA		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>																								
B.7.1.10. Parameter Title: HG _{Bl,y} : Quantity of thermal energy that would be consumed in the year y at the project site in the absence of the project activity using fossil fuel.	1-7, 30-31, 40-42	<table><tr><th>Monitoring Checklist</th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td>Yes.</td></tr><tr><td>Data unit correctly expressed?</td><td>Yes.</td></tr><tr><td>Appropriate description of parameter?</td><td>Yes.</td></tr><tr><td>Source clearly referenced?</td><td>Yes.</td></tr><tr><td>Correct value provided for estimation?</td><td>Yes.</td></tr><tr><td>Has this value been verified?</td><td>Yes.</td></tr><tr><td>Measurement method correctly described?</td><td>No.</td></tr><tr><td>Correct reference to standards?</td><td>Yes.</td></tr><tr><td>Indication of accuracy provided?</td><td>Yes.</td></tr><tr><td>QA/QC procedures described?</td><td>Yes.</td></tr><tr><td>QA/QC procedures appropriate?</td><td>Yes.</td></tr></table>	Monitoring Checklist	Yes / No	Title in line with methodology?	Yes.	Data unit correctly expressed?	Yes.	Appropriate description of parameter?	Yes.	Source clearly referenced?	Yes.	Correct value provided for estimation?	Yes.	Has this value been verified?	Yes.	Measurement method correctly described?	No.	Correct reference to standards?	Yes.	Indication of accuracy provided?	Yes.	QA/QC procedures described?	Yes.	QA/QC procedures appropriate?	Yes.		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Monitoring Checklist	Yes / No																												
Title in line with methodology?	Yes.																												
Data unit correctly expressed?	Yes.																												
Appropriate description of parameter?	Yes.																												
Source clearly referenced?	Yes.																												
Correct value provided for estimation?	Yes.																												
Has this value been verified?	Yes.																												
Measurement method correctly described?	No.																												
Correct reference to standards?	Yes.																												
Indication of accuracy provided?	Yes.																												
QA/QC procedures described?	Yes.																												
QA/QC procedures appropriate?	Yes.																												

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

B.7.1.11. Parameter Title: $F_{\text{dig_out}}$: Flow rate of organic wastewater out of the digester.	1-7, 30-31, 40-42	Monitoring Checklist	Yes / No	CAR 26	<input checked="" type="checkbox"/>
		Title in line with methodology?			
		Data unit correctly expressed?			
		Appropriate description of parameter?			
		Source clearly referenced?			
		Correct value provided for estimation?			
		Has this value been verified?			
		Measurement method correctly described?			
		Correct reference to standards?			
		Indication of accuracy provided?			
		QA/QC procedures described?			
		QA/QC procedures appropriate?			
		Corrective Action Request No. 26: No information on $F_{\text{dig_out}}$: Flow rate of organic wastewater out of the digester available in the PDD. Please explain and add the required information.			
		B.7.1.12. Parameter Title: $\text{COD}_{\text{c,dig_out}}$: concentrations in discharged effluent from digester.	1-7, 30-31, 40-42		
Title in line with methodology?	Yes.				
Data unit correctly expressed?	Yes.				
Appropriate description of parameter?	Yes.				
Source clearly referenced?	Yes.				
Correct value provided for estimation?	Yes.				
Has this value been verified?	Yes.				
Measurement method correctly described?	No.				
Correct reference to standards?	Yes.				
Indication of accuracy provided?	Yes.				
QA/QC procedures described?	Yes.				
QA/QC procedures appropriate?	Yes.				

Table 1 is applicable to ACM0013, vers 04, valid from December 22nd, 2006 onwards

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

B.7.1.13. Parameter Title: EL _{p,y} : Amount of electricity in the year y that is consumed at the project site for the project activity.	1-7	<table><tr><th>Monitoring Checklist</th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td>Yes</td></tr><tr><td>Data unit correctly expressed?</td><td>Yes</td></tr><tr><td>Appropriate description of parameter?</td><td>Yes</td></tr><tr><td>Source clearly referenced?</td><td>Yes</td></tr><tr><td>Correct value provided for estimation?</td><td>Yes</td></tr><tr><td>Has this value been verified?</td><td>Yes</td></tr><tr><td>Measurement method correctly described?</td><td>No</td></tr><tr><td>Correct reference to standards?</td><td>No</td></tr><tr><td>Indication of accuracy provided?</td><td>No</td></tr><tr><td>QA/QC procedures described?</td><td>Yes</td></tr><tr><td>QA/QC procedures appropriate?</td><td>Yes.</td></tr></table>	Monitoring Checklist	Yes / No	Title in line with methodology?	Yes	Data unit correctly expressed?	Yes	Appropriate description of parameter?	Yes	Source clearly referenced?	Yes	Correct value provided for estimation?	Yes	Has this value been verified?	Yes	Measurement method correctly described?	No	Correct reference to standards?	No	Indication of accuracy provided?	No	QA/QC procedures described?	Yes	QA/QC procedures appropriate?	Yes.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Monitoring Checklist	Yes / No																											
Title in line with methodology?	Yes																											
Data unit correctly expressed?	Yes																											
Appropriate description of parameter?	Yes																											
Source clearly referenced?	Yes																											
Correct value provided for estimation?	Yes																											
Has this value been verified?	Yes																											
Measurement method correctly described?	No																											
Correct reference to standards?	No																											
Indication of accuracy provided?	No																											
QA/QC procedures described?	Yes																											
QA/QC procedures appropriate?	Yes.																											
B.7.1.14. Parameter Title: HG _{Pr,y} : Quantity of thermal energy consumed in the year y at the project site due to the project activity.	1-7	<table><tr><th>Monitoring Checklist</th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td>Yes</td></tr><tr><td>Data unit correctly expressed?</td><td>Yes</td></tr><tr><td>Appropriate description of parameter?</td><td>Yes</td></tr><tr><td>Source clearly referenced?</td><td>Yes</td></tr><tr><td>Correct value provided for estimation?</td><td>Yes</td></tr><tr><td>Has this value been verified?</td><td>Yes</td></tr><tr><td>Measurement method correctly described?</td><td>No</td></tr><tr><td>Correct reference to standards?</td><td>No</td></tr><tr><td>Indication of accuracy provided?</td><td>No</td></tr><tr><td>QA/QC procedures described?</td><td>Partial</td></tr><tr><td>QA/QC procedures appropriate?</td><td>Partial</td></tr></table> <p>Clarification Request No. 16: Please exclude DOE from QA/QC measures.. A DOE cannot be made responsible for QA/QC measures in the context of monitoring in a CDM project.</p>	Monitoring Checklist	Yes / No	Title in line with methodology?	Yes	Data unit correctly expressed?	Yes	Appropriate description of parameter?	Yes	Source clearly referenced?	Yes	Correct value provided for estimation?	Yes	Has this value been verified?	Yes	Measurement method correctly described?	No	Correct reference to standards?	No	Indication of accuracy provided?	No	QA/QC procedures described?	Partial	QA/QC procedures appropriate?	Partial	CR 16	<input checked="" type="checkbox"/>
Monitoring Checklist	Yes / No																											
Title in line with methodology?	Yes																											
Data unit correctly expressed?	Yes																											
Appropriate description of parameter?	Yes																											
Source clearly referenced?	Yes																											
Correct value provided for estimation?	Yes																											
Has this value been verified?	Yes																											
Measurement method correctly described?	No																											
Correct reference to standards?	No																											
Indication of accuracy provided?	No																											
QA/QC procedures described?	Partial																											
QA/QC procedures appropriate?	Partial																											

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

B.7.1.15. Parameter Title: F _{la} : Flow rate of sludge used for land application after dewatering.	1-7, 30-31, 40-42	Monitoring Checklist	Yes / No	CAR 27	<input checked="" type="checkbox"/>
		Title in line with methodology?			
		Data unit correctly expressed?			
		Appropriate description of parameter?			
		Source clearly referenced?			
		Correct value provided for estimation?			
		Has this value been verified?			
		Measurement method correctly described?			
		Correct reference to standards?			
		Indication of accuracy provided?			
		QA/QC procedures described?			
		QA/QC procedures appropriate?			
		There is no information available on F _{la} : Flow rate of sludge used for land application after dewatering and whether this parameter is relevant for the project or not. <u>Corrective Action Request No. 27:</u> Please add information on F _{la} : Flow rate of sludge used for land application after dewatering and whether this is of relevance for the project.			

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

B.7.1.16. Parameter Title: COD _{c,la} : of the sludge used for land application after dewatering.	1-7, 30-31, 40-42	Monitoring Checklist	Yes / No	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
		Title in line with methodology?	Yes.		
		Data unit correctly expressed?	Yes.		
		Appropriate description of parameter?	Yes.		
		Source clearly referenced?	Yes.		
		Correct value provided for estimation?	Yes.		
		Has this value been verified?	Yes.		
		Measurement method correctly described?	Yes.		
		Correct reference to standards?	Yes.		
		Indication of accuracy provided?	Yes.		
		QA/QC procedures described?	Yes.		
		QA/QC procedures appropriate?	Yes.		
B.7.1.17. Parameter Title: F _{c,dw} : Flow rate of organic wastewater from the dewatering process.	1-7, 30-31, 40-42	Monitoring Checklist	Yes / No	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
		Title in line with methodology?	Yes.		
		Data unit correctly expressed?	Yes.		
		Appropriate description of parameter?	Yes.		
		Source clearly referenced?	Yes.		
		Correct value provided for estimation?	NA		
		Has this value been verified?	NA		
		Measurement method correctly described?	Yes.		
		Correct reference to standards?	Yes.		
		Indication of accuracy provided?	Yes.		
		QA/QC procedures described?	No		
		QA/QC procedures appropriate?	No		

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

B.7.1.18. Parameter Title: COD _{c,dw} of the wastewater from the dewatering process.	1-7, 30-31, 40-42	Monitoring Checklist	Yes / No	CAR 28	<input checked="" type="checkbox"/>
		Title in line with methodology?			
		Data unit correctly expressed?			
		Appropriate description of parameter?			
		Source clearly referenced?			
		Correct value provided for estimation?			
		Has this value been verified?			
		Measurement method correctly described?			
		Correct reference to standards?			
		Indication of accuracy provided?			
		QA/QC procedures described?			
		QA/QC procedures appropriate?			
		There are some inconsistencies in the context of dewatering. On one hand it is mentioned that no dewatering takes place on the other hand measurements are taken to measure parameters linked to dewatering (for example F _{c,dw}).			
<u>Corrective Action Request No. 28:</u> Please clarify the issue of dewatering.					

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

B.7.1.19. Parameter Title: FR _{bio} : Amount of biogas collected in the outlet of the Biodigester	1-7, 30-31, 40-42	Monitoring Checklist	Yes / No	CAR 29	<input checked="" type="checkbox"/>
		Title in line with methodology?			
		Data unit correctly expressed?			
		Appropriate description of parameter?			
		Source clearly referenced?			
		Correct value provided for estimation?			
		Has this value been verified?			
		Measurement method correctly described?			
		Correct reference to standards?			
		Indication of accuracy provided?			
		QA/QC procedures described?			
		QA/QC procedures appropriate?			
		According to the methodology there is a parameter FR _{bio} : Amount of biogas collected in the outlet of the bio-digester to be measured. It is not clear whether this parameter is included in the monitoring concept in the PDD or not.			
		<u>Corrective Action Request No. 29:</u>			
Please clarify a whether the parameter FR _{bio} : Amount of biogas collected in the outlet of the bio-digester is included in the monitoring plan and explain how measurement is done.					
B.7.1.20. Parameter Title: P _{CH₄ bio} : Percentage of methane in the biogas in the outlet of the digester.	1-7, 30-31, 40-42	Monitoring Checklist	Yes / No	CAR 30	<input checked="" type="checkbox"/>
		Title in line with methodology?	Yes.		
		Data unit correctly expressed?	Yes.		
		Appropriate description of parameter?	Yes.		
		Source clearly referenced?	Yes.		
		Correct value provided for estimation?	Yes.		
		Has this value been verified?	Yes.		
		Measurement method correctly described?	No.		
		Correct reference to standards?	Yes.		
		Indication of accuracy provided?	Yes.		
		QA/QC procedures described?	Yes.		

Table 1 is applicable to ACM0013, vers 04, valid from December 22nd, 2006 onwards

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

		<table><tr><td>QA/QC procedures appropriate?</td><td>Yes.</td></tr></table> <p>There is a mistake in the description of the Min./Max.-Range.</p> <p><u>Corrective Action Request No. 30:</u></p> <p>The measurement of : P_{CH, bio}: Percentage of methane in the bio-gas in the outlet of the digester.needs to be done in Vol % - the Min./Max. Range has to be adjusted!</p>	QA/QC procedures appropriate?	Yes.																								
QA/QC procedures appropriate?	Yes.																											
B.7.1.21. Parameter Title: FR _{f,inlet} : Flow rate of the biogas entering the flare	1-7, 30-31, 40-42	<table><tr><th>Monitoring Checklist</th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td>Yes.</td></tr><tr><td>Data unit correctly expressed?</td><td>Yes.</td></tr><tr><td>Appropriate description of parameter?</td><td>Yes.</td></tr><tr><td>Source clearly referenced?</td><td>Yes.</td></tr><tr><td>Correct value provided for estimation?</td><td>Yes.</td></tr><tr><td>Has this value been verified?</td><td>Yes.</td></tr><tr><td>Measurement method correctly described?</td><td>No.</td></tr><tr><td>Correct reference to standards?</td><td>Yes.</td></tr><tr><td>Indication of accuracy provided?</td><td>Yes.</td></tr><tr><td>QA/QC procedures described?</td><td>Yes.</td></tr><tr><td>QA/QC procedures appropriate?</td><td>Yes.</td></tr></table> <p>It is not clear why in the PDD also FR f,s is given as parameter. Please clarify where this is needed.</p> <p><u>Clarification Request No. 17:</u></p> <p>Please clarify where FR f,s - flow rate of the flare stack gases – is needed and ho this can be measured.</p>	Monitoring Checklist	Yes / No	Title in line with methodology?	Yes.	Data unit correctly expressed?	Yes.	Appropriate description of parameter?	Yes.	Source clearly referenced?	Yes.	Correct value provided for estimation?	Yes.	Has this value been verified?	Yes.	Measurement method correctly described?	No.	Correct reference to standards?	Yes.	Indication of accuracy provided?	Yes.	QA/QC procedures described?	Yes.	QA/QC procedures appropriate?	Yes.	CR 17	<input checked="" type="checkbox"/>
Monitoring Checklist	Yes / No																											
Title in line with methodology?	Yes.																											
Data unit correctly expressed?	Yes.																											
Appropriate description of parameter?	Yes.																											
Source clearly referenced?	Yes.																											
Correct value provided for estimation?	Yes.																											
Has this value been verified?	Yes.																											
Measurement method correctly described?	No.																											
Correct reference to standards?	Yes.																											
Indication of accuracy provided?	Yes.																											
QA/QC procedures described?	Yes.																											
QA/QC procedures appropriate?	Yes.																											

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

B.7.1.22. Parameter Title: PE _{flare,y} : Project emissions from flaring of the residual gas stream in year y	1-7, 30-31, 40-42	Monitoring Checklist	Yes / No	CR 18	<input checked="" type="checkbox"/>
		Title in line with methodology?			
		Data unit correctly expressed?			
		Appropriate description of parameter?			
		Source clearly referenced?			
		Correct value provided for estimation?			
		Has this value been verified?			
		Measurement method correctly described?			
		Correct reference to standards?			
		Indication of accuracy provided?			
		QA/QC procedures described?			
		QA/QC procedures appropriate?			
		An open flare is used and a default value is used to calculate the efficiency of the flare. The process to calculate the project emissions from the flare and which parameters need to be monitored in this context should be explained. <u>Clarification Request No. 18:</u> Please clarify the necessity of parameters to be monitored for later calculating of project emissions from the flare.			

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

B.7.1.23. Parameter Title: FR _{e,inlet} : Flow rate of the biogas entering the electricity generation equipment.	1-7	NA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.7.1.24. Parameter Title: FR _{e,s} : Flow rate of the electricity genera- tion equipment stack gases.	1-7	NA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

B.7.1.25. Parameter Title: P _{CH4,e,s} : Methane content in stack gas of electricity generation equipment	1-7	NA		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>																								
B.7.1.26. Parameter Title: T _{comb,e} : Fraction of time gas is combusted in the heat generation equipment.	1-7, 30, 31, 40-42	<table><tr><th>Monitoring Checklist</th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td>Yes</td></tr><tr><td>Data unit correctly expressed?</td><td>Yes</td></tr><tr><td>Appropriate description of parameter?</td><td>Yes</td></tr><tr><td>Source clearly referenced?</td><td>No</td></tr><tr><td>Correct value provided for estimation?</td><td>No</td></tr><tr><td>Has this value been verified?</td><td>No</td></tr><tr><td>Measurement method correctly described?</td><td>No</td></tr><tr><td>Correct reference to standards?</td><td>No</td></tr><tr><td>Indication of accuracy provided?</td><td>No</td></tr><tr><td>QA/QC procedures described?</td><td>Partial</td></tr><tr><td>QA/QC procedures appropriate?</td><td>Partial</td></tr></table> <p>The description is not complete – it is not clear how the run-time meter works and whether there is a permanent ignition or how flaring can be ensured.</p> <p>An open flare is used and a default value is used to calculate the efficiency of the flare. The process to calculate the project emissions from the flare and which parameters need to be monitored</p>	Monitoring Checklist	Yes / No	Title in line with methodology?	Yes	Data unit correctly expressed?	Yes	Appropriate description of parameter?	Yes	Source clearly referenced?	No	Correct value provided for estimation?	No	Has this value been verified?	No	Measurement method correctly described?	No	Correct reference to standards?	No	Indication of accuracy provided?	No	QA/QC procedures described?	Partial	QA/QC procedures appropriate?	Partial		CR 19	<input checked="" type="checkbox"/>
Monitoring Checklist	Yes / No																												
Title in line with methodology?	Yes																												
Data unit correctly expressed?	Yes																												
Appropriate description of parameter?	Yes																												
Source clearly referenced?	No																												
Correct value provided for estimation?	No																												
Has this value been verified?	No																												
Measurement method correctly described?	No																												
Correct reference to standards?	No																												
Indication of accuracy provided?	No																												
QA/QC procedures described?	Partial																												
QA/QC procedures appropriate?	Partial																												

Table 1 is applicable to ACM0013, vers 04, valid from December 22nd, 2006 onwards

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

		<p>in this context should be explained.</p> <p><u>Clarification Request No. 19:</u></p> <p>Additional information how $T_{comb,e}$: Fraction of time gas is combusted in the heat generation equipment. Will be measured has to be added to the PDD.</p>			
<p>B.7.1.27. Parameter Title:</p> <p>$FR_{e,inlet}$: Flow rate of the biogas entering the heat generation equipment.</p>	1-7	Monitoring Checklist	Yes / No	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
		Title in line with methodology?	Yes		
		Data unit correctly expressed?	Yes		
		Appropriate description of parameter?	Yes		
		Source clearly referenced?	No		
		Correct value provided for estimation?	Yes		
		Has this value been verified?	No		
		Measurement method correctly described?	Yes		
		Correct reference to standards?	Yes		
		Indication of accuracy provided?	No		
		QA/QC procedures described?	Partial		
		QA/QC procedures appropriate?	Partial		

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

B.7.1.28. Parameter Title: FR _{e,s} : Flow rate of the heat generation equipment stack gases	1-7	Monitoring Checklist	Yes / No	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
		Title in line with methodology?	Yes		
		Data unit correctly expressed?	Yes		
		Appropriate description of parameter?	Yes		
		Source clearly referenced?	No		
		Correct value provided for estimation?	No		
		Has this value been verified?	No		
		Measurement method correctly described?	Yes		
		Correct reference to standards?	Yes		
		Indication of accuracy provided?	No		
		QA/QC procedures described?	Partial		
		QA/QC procedures appropriate?	Partial		
B.7.1.29. Parameter Title: P _{CH₄,e,s} : Methane content in stack gas of heat generation equipment.	1-7	Monitoring Checklist	Yes / No	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
		Title in line with methodology?	Yes		
		Data unit correctly expressed?	Yes		
		Appropriate description of parameter?	Yes		
		Source clearly referenced?	No		
		Correct value provided for estimation?	No		
		Has this value been verified?	No		
		Measurement method correctly described?	Yes		
		Correct reference to standards?	Yes		
		Indication of accuracy provided?	No		
		QA/QC procedures described?	Partial		
		QA/QC procedures appropriate?	Partial		

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

B.7.1.30. Parameter Title: T _{comb,e} : Fraction of time gas is combusted in the heat generation equipment.	1-7 30-31, 40-42	Monitoring Checklist	Yes / No	CR 19	<input checked="" type="checkbox"/>
		Title in line with methodology?	Yes		
		Data unit correctly expressed?	Yes		
		Appropriate description of parameter?	Yes		
		Source clearly referenced?	No		
		Correct value provided for estimation?	No		
		Has this value been verified?	No		
		Measurement method correctly described?	No		
		Correct reference to standards?	No		
		Indication of accuracy provided?	No		
		QA/QC procedures described?	Partial		
		QA/QC procedures appropriate?	Partial		
		It is not clear from the PDD how this fraction of time can be monitored. Additional information has to be added to the PDD. See CR 19			
		B.7.1.31. Parameter Title: S _e – Amount of sludge applied for land	1-7, 26		
Title in line with methodology?	Yes				
Data unit correctly expressed?	Yes				
Appropriate description of parameter?	Yes				
Source clearly referenced?	Yes				
Correct value provided for estimation?	Yes				
Has this value been verified?	Yes				
Measurement method correctly described?	Yes				
Correct reference to standards?	Yes				
Indication of accuracy provided?	No				
QA/QC procedures described?	Partial				
QA/QC procedures appropriate?	Partial				
B.7.1.32. Parameter Title: NC- Nitrogen content in the sludge	1-7, 26			Monitoring Checklist	Yes / No
		Title in line with methodology?	Yes		
		Data unit correctly expressed?	Yes		

Table 1 is applicable to ACM0013, vers 04, valid from December 22nd, 2006 onwards

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

		Appropriate description of parameter?	Yes		
		Source clearly referenced?	Yes		
		Correct value provided for estimation?	Yes		
		Has this value been verified?	Yes		
		Measurement method correctly described?	Yes		
		Correct reference to standards?	Yes		
		Indication of accuracy provided?	No		
		QA/QC procedures described?	Partial		
		QA/QC procedures appropriate?	Partial		
B.7.2. Description of the monitoring plan					
B.7.2.1.	Is the operational and management structure clearly described and in compliance with the envisioned situation?	1-7, 8-11, 30-31	Yes, the structure is explained in a transparent manner in figure 4, page 36.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.7.2.2.	Are responsibilities and institutional arrangements for data collection and archiving clearly provided?	1-7, 8-11, 30-31	Yes, so far as possible at this stage of the project responsibilities already have been allocated.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.7.2.3.	Does the monitoring plan provide current good monitoring practice?	1-7, 8-11, 30-31	Yes, besides the CARs mentioned above.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.7.2.4.	If applicable: Does annex 4 provide useful information enabling a better understanding of the envisioned monitoring provisions?	1-7, 8-11, 30-31	Yes, definitely, all is explained clear and re-traceable.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.8. Date of completion of the application of the baseline study and monitoring methodology an the name of the responsible person(s)/entity(ies)					
B.8.1.1.	Is there any indication of a date when the baseline was determined?	1-7, 8-11, 30-31	The baseline was completed shortly before submission of the PDD for GSP. It would be helpful if a concrete date could added to the PDD.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

B.8.1.2.	Is this consistent with the time line of the PDD history?	1-7, 8-11, 30-31	Yes.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.8.1.3.	Is the information on the person(s) / entity(ies) responsible for the application of the baseline and monitoring methodology provided consistent with the actual situation?	1-7, 8-11, 30-31	Yes.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B.8.1.4.	Is information provided whether this person / entity is also considered a project participant?	1-7, 8-11, 30-31	No, this person(s)/company are not project participants.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
C. Duration of the project activity / crediting period					
C.1. Duration of the project activity					
C.1.1.	Are the project's starting date and operational lifetime clearly defined and reasonable?	1-7	Yes. Reasons were only given verbally during the on-site audit bit can be added to the PDD for transparency reasons..	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
C.2. Choice of the crediting period and related information					
C.2.1.	Is the assumed crediting time clearly defined and reasonable (renewable crediting period of max 7 years with potential for 2 renewals or fixed crediting period of max. 10 years)?	1-7	'The fixed ten year crediting period was chosen. Envisaged starting date for the project was 1 st of July 2007, but due to different delays this date needs to be adjusted.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D. Environmental impacts					
D.1. Documentation on the analysis of the environmental impacts, including transboundary impacts					
D.1.1.	Has the analysis of the environmental impacts of the project activity been sufficiently described?	1-7, 12, 16,	Yes, as the project also wants to go for Gold Standard and they require a high level of analysis of Environmental impacts.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Table 1 is applicable to ACM0013, vers 04, valid from December 22nd, 2006 onwards

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

	17-19, 21, 22, 23, 26-27, 33, 34, 35-35, 37, 38-40, 48-49, 56			
D.1.2. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, has an EIA been approved?	1-7, 12, 16, 17-19, 21, 22, 23, 26-27, 33, 34, 35-35, 37,	Not directly. Only the Thai DNA requires an Initial Environmental Assessment (IEE) for potential CDM projects. Besides this there are no requirements.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Table 1 is applicable to ACM0013, vers 04, valid from December 22nd, 2006 onwards

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

	38-40, 48-49, 56			
D.1.3. Will the project create any adverse environmental effects?	1-7, 12, 16, 17-19, 21, 22, 23, 26-27, 33, 34, 35-35, 37, 38-40, 48-49, 56	No, in all environmental areas the project leads in sum to a reduction of GHG emissions and pollution in general.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D.1.4. Were transboundary environmental impacts identified in the analysis?	1-7, 12, 16, 17-19, 21, 22,	No.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Table 1 is applicable to ACM0013, vers 04, valid from December 22nd, 2006 onwards

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

	23, 26- 27, 33, 34, 35- 35, 37, 38- 40, 48- 49, 56			
D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party				
D.2.1. Have the identified environmental impacts been addressed in the project design sufficiently?	1-7, 12, 16, 17- 19, 21, 22, 23, 26- 27, 33, 34, 35- 35, 37,	Yes.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Table 1 is applicable to ACM0013, vers 04, valid from December 22nd, 2006 onwards

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

	38-40, 48-49, 56			
D.2.2. Does the project comply with environmental legislation in the host country?	1-7, 12, 16, 17-19, 21, 22, 23, 26-27, 33, 34, 35-35, 37, 38-40, 48-49, 56	Yes.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E. Stakeholders' comments				
E.1. Brief description how comments by local stakeholders have been invited and compiled				
E.1.1. Have relevant stakeholders been consulted?	1-7, 8-11, 16,	Yes – see also Gold Standard process.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Table 1 is applicable to ACM0013, vers 04, valid from December 22nd, 2006 onwards

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

	22, 27, 33, 34, 35- 36, 37			
E.1.2. Have appropriate media been used to invite comments by local stakeholders?	1-7, 8-11, 16, 22, 27, 33, 34, 35- 36, 37	Yes. But the way of invitations should be described more detailed in chapter E1. <u>Clarification Request No. 20:</u> Please add information on the media used for invitations to the PDD	CR 20	<input checked="" type="checkbox"/>
E.1.3. If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	1-7, 8-11, 16, 22, 27, 33, 34, 35- 36, 37	It is not required in Thailand but due to Gold Standard process an extensive Stakeholder Consultation Process has been carried out.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E.1.4. Is the undertaken stakeholder process that was carried out described in a complete and transparent manner?	1-7, 8-11, 16, 22,	Yes.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Table 1 is applicable to ACM0013, vers 04, valid from December 22nd, 2006 onwards

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

	27, 33, 34, 35- 36, 37			
E.2. Summary of the comments received				
E.2.1. Is a summary of the received stakeholder comments provided?	1-7, 8-11, 16, 22, 27, 33, 34, 35- 36, 37	Yes.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E.3. Report on how due account was taken of any comments received				
E.3.1. Has due account been taken of any stakeholder comments received?	1-7, 8-11, 16, 22, 27, 33, 34, 35- 36, 37	Yes, as far as comments affected the project they have been considered. See detailed description in annex 8.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

F. Annexes 1 - 4					
F.1. Annex 1: Contact Information					
F.1.1.	Is the information provided consistent with the one given under section A.3?	1-7, 8-11	Yes.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
F.1.2.	Is the information on all private participants and directly involved Parties presented?	1-7, 8-11	Yes.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
F.2. Annex 2: Information regarding public funding					
F.2.1.	Is the information provided on the inclusion of public funding (if any) in consistency with the actual situation presented by the project participants?	1-7, 28, 54,	Yes.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
F.2.2.	If necessary: Is an affirmation available that any such funding from Annex-I-countries does not result in a diversion of ODA?	1-7, 28	Not applicable.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
F.3. Annex 3: Baseline information					
F.3.1.	If additional background information on baseline data is provided: Is this information consistent with data presented by other sections of the PDD?	1-7, 8-11, 14, 21, 25, 48-50, 54, 55, 58, 62-64	Yes, but with some mistakes. See CAR 1	CAR 1	<input checked="" type="checkbox"/>

Table 1 is applicable to ACM0013, vers 04, valid from December 22nd, 2006 onwards

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

F.3.2.	If additional background information on baseline data is provided: Is this information consistent with data presented by other sections of the PDD?	1-7, 8-11, 14, 21, 25, 48-50, 54, 55, 58, 62-64	Yes.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
F.3.3.	Is the data provided verifiable? Has sufficient evidence been provided to the validation team?	1-7, 8-11, 14, 21, 25, 48-50, 54, 55, 58, 62-64	Yes. All data given in Annex 3 could be checked and confirmed during the on-site visit.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
F.3.4.	Does the additional information substantiate / support statements given in other sections of the PDD?	1-7, 8-11, 14, 21, 25, 48-50, 54, 55,	No, the information is an add-on to information already available in the PDD.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Table 1 is applicable to ACM0013, vers 04, valid from December 22nd, 2006 onwards

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

		58, 62-64			
F.4. Annex 4: Monitoring information					
F.4.1.	If additional background information on monitoring is provided: Is this information consistent with data presented in other sections of the PDD?	1-7, 30-31, 34, 48-50	Yes.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
F.4.2.	Is the information provided verifiable? Has sufficient evidence been provided to the validation team?	1-7, 30-31, 34, 48-50	Yes.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
F.4.3.	Do the additional information and / or documented procedures substantiate / support statements given in other sections of the PDD?	1-7, 30-31, 34, 48-50	Yes.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

Table 2 Resolution of Corrective Action and Clarification Requests

Clarifications and corrective action requests by validation team	Ref. to table 1	Summary of project owner response	Validation team conclusion
<u>Clarification Request No. 1:</u> The new CDM-PDD format is on some pages mistakenly indicated as there are a number of pages with version 02. This has to be corrected and to be ensured that the correct PDD format is used persistently.	A.1.2	The format has been adjusted/corrected in the new PDD version.	<u>The clarification request is solved.</u> <input checked="" type="checkbox"/>
<u>Clarification Request No. 2:</u> Please add some additional sentences before going in details in subchapter 1) under A.2 with title "Purpose of the project activity, reduction of greenhouse gases". These sentences should give a short but clear description of the measures carried out in the project and some clarifying technical basic information.	A.2.1	The requested sentences and explanations have been added to section A.2 of the PDD.	The requested additional and clarifying information giving a more detailed and clear picture on the idea behind the project have been included in the final PDD. <input checked="" type="checkbox"/>
<u>Clarification Request No. 3:</u> Please add more detailed information on the location of the project in chapter A.4.1..!	A.4.1.1	The requested information as well as a drawing clearly indicating the location has been added to the final PDD. There is no risk that the mill included in this CDM project is mixed up with any other mill in the region.	The requested additional information on the location of the project site have been added to the final PDD. <input checked="" type="checkbox"/>

Table 1 is applicable to ACM0013, vers 04, valid from December 22nd, 2006 onwards

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

<u>Clarification Request No. 4:</u> Please add some additional information on source and final providers of the equipment applied in this project.	A.4.3.2	The requested information has been added to the final PDD.	
<u>Clarification Request No. 5:</u> At least an envisaged time schedule for the trainings and information on already conducted trainings should be included in the PDD.	A.4.3.10	The requested information has been added (see page 49 and 50 of the final PDD).	The requested additional information on the location of the project site has been added to the final PDD. This allows identifying the project site <input checked="" type="checkbox"/>
<u>Corrective Action Request No. 1:</u> Inconsistencies between figures given in the PDD in chapters A.4.4 and B.6.4 A and annex 3 should be corrected and clarified.	A.4.4.2	The figures have been updates. Please note that the start of the crediting period also has been changed from 1 July 2007 to 1 May 2008 or upon date of registration.	The inconsistencies are eliminated and the date of starting the crediting period has been changed to a more realistic data when the probably project can be registered. The clause "or upon date of registration" opens the door to a later starting date of the crediting period when the registration would be later – even without need then to adjust this again in the PDD, <input checked="" type="checkbox"/>
<u>Corrective Action Request No. 2:</u> The version number of the applied methodology needs to be added to the PDD. Further-	B.1.1.1	The requested information has been added.	The requested information has been included in the final PDD.

Table 1 is applicable to ACM0013, vers 04, valid from December 22nd, 2006 onwards

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

more the link to ACM0002 with applied version No should be given in the PDD in this chapter.			<input checked="" type="checkbox"/>
Clarification Request No. 6: Please add a drawing of project boundaries and considered equipment/activities to the PDD.	B.3.7	The requested drawing has been added (new figure 3).	A drawing has been added to the PDD as figure 3 and this figure gives a clear overview about the project boundaries. <input checked="" type="checkbox"/>
Clarification Request No. 7: An additional discussion (maybe also integration) of further alternatives should be included in the PDD.	B.4.1	<p>As described in sections B.4 and B.5 of the PDD, the following alternatives have been identified as plausible baseline scenarios:</p> <ol style="list-style-type: none"> 1) Replacing the existing anaerobic ponds by managed aerobic or alternating ponds; 2) Continuation of current practice; and 3) Implementation of the project activity without CDM (methane recovery and utilization for heat generation). <p>Land filling, aerobic composting, mineralization, and composting have not been considered as realistic alternatives due to the characteristics of the sludge (categorisation as a fluid). Land application of untreated sludge would constitute a danger of contamination for ground and surface water and is therefore excluded from further consideration.</p> <p>Hence, the PDD in its current version entails all scenarios that can be considered as realistic alternative to the CDM project activity.</p>	The validator can follow the list and argumentation given here. With the given arguments there is no need to include further baseline scenarios. <input checked="" type="checkbox"/>

Table 1 is applicable to ACM0013, vers 04, valid from December 22nd, 2006 onwards

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

Clarification Request No. 8: Please add at least in a foot note whether there are and which are the laws/legal requirements for wastewater treatment in this sector in Thailand.	B.4.3	The requested information has been added to section B.5 of the PDD	The requested information has been included in the final PDD. <input checked="" type="checkbox"/>
Clarification Request No. 9: As the proof of additionality has to be uploaded for the registration of the project this chapter should be elaborated more detailed. Sources of used data should be given and it should be worked out more transparently which of the options mentioned below (B.5.2 to B.5.4) have been applied in this project.	B.5.1	The description has been expanded. In addition, detailed results of different calculations have been provided to the DOE; they are commercially confidential. Annotation: The clients should assess whether it is possible also to upload the underlying .xls calculations.	The requested information has been submitted to the validator. The information will be uploaded on a confidential basis. <input checked="" type="checkbox"/>
Clarification Request No. 10: Financial indicators mentioned under B.5.4 of this protocol should be elaborated more detailed in the PDD.	B.5.6	See CR 9.	<input checked="" type="checkbox"/>
Clarification Request No. 11: Please work out and highlight the different barriers for this project.	B.5.7	As the new version of the "Tool for the demonstration and assessment of additionality" states that anecdotal evidence alone is not sufficient proof of barriers, and as no sufficient statistical data is available to underline the arguments presented in step 3, and as the outcome of the investment test (step 2 of the additionality tool) clearly is that the project is not financially attractive without the CDM, the voluntary barrier test has been deleted.	The validator can follow the suggestion of the project developer. <input checked="" type="checkbox"/>
Yes. Nevertheless it should be argued why 2 of 34 palm oil mills at the moment of the re-	B.5.10	A 2006 PhD thesis provides statistical information on the waste water management system applied in the	The given additional information and clarification is

Table 1 is applicable to ACM0013, vers 04, valid from December 22nd, 2006 onwards

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

<p>search already used a – in some kind - comparable system as applied in Chumporn CDM project.</p> <p><u>Clarification Request No. 12:</u></p> <p>Please elaborate the discussion on common practice more detailed and retraceable.</p>		<p>Thai Palm Oil industry and is quoted in the PDD.</p> <p>Moreover, an independent expert with in-depth knowledge of the situation was interviewed and the results were used in the PDD.</p> <p>Finally, documentation of the two CDM projects on methane capture from wastewater treatment in Thai palm oil mills has been provided to the DOE.</p>	<p>deemed sufficient. CR 12 is resolved.</p> <p><input checked="" type="checkbox"/></p>
<p><u>Corrective Action Request No. 3:</u></p> <p>Please add formulae given in the methodology for determination of project, baseline emissions, leakage and emission reductions.</p>	B.6.1.3	<p>It has been mentioned in section B.6. several times that the formulas as specified in AM0013 have been applied on a 1:1 basis. We are of the opinion that the benefits of simply copying these formulas to the PDD are very limited – especially since the DOE checks their correct application in detail as part of the validation process.</p> <p>However, as this seems to be a strict rule, the formulae have been added as requested.</p>	<p>The calculations have been assessed by the DOE and are correct. The validator in principle could accept the argumentation of the project developer but to allow also persons not so familiar with projects and methodologies getting a quick overview about project it makes sense to include the formulae in the PDD. The CAR is solved by including the requested formulae.</p> <p><input checked="" type="checkbox"/></p>
<p><u>Corrective Action Request No. 4:</u></p> <p>Please include parameters $COD_{a, in}$ and $COD_{a, out}$ in chapter B.62.</p>	B.6.2.1	<p>The respective parameters have been added with a reference to table 8.</p>	<p>The missing parameters have been included in the final revised PDD and CAR 4 is considered resolved.</p> <p><input checked="" type="checkbox"/></p>

Table 1 is applicable to ACM0013, vers 04, valid from December 22nd, 2006 onwards

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

<u>Corrective Action Request No. 5:</u> Parameter COD _{available,m} is missing in chapter B.6. Please discuss and insert.	B.6.2.2	The parameter has been calculated in line with AM0013 and is part of the Excel-Sheet as submitted during validation. Monthly values are presented in Annex 3 of the PDD (screenshot of the Excel-Sheet). In section B.6.2, parameter COD _{available,m} has been added as requested (with reference to Annex 3)	The missing parameter has been added. The explanation is sufficient. Excel-sheets have been checked and are correct. CAR 5 is considered resolved. <input checked="" type="checkbox"/>
<u>Corrective Action Request No. 6:</u> Parameter F _d s missing in chapter B.6, but mentioned in chapter 6.1 in table 8. Please discuss and insert the parameter under B.2.	B.6.2.6	Has been added in chapter B.6.2.	The missing parameter has been added. CAR 6 is considered resolved. <input checked="" type="checkbox"/>
<u>Corrective Action Request No. 7:</u> Uncertainty conservativeness factor is not mentioned in chapter B.6.2 and should be included.	B.6.2.7	Has been added in chapter B.6.2.	The missing parameter has been added. CAR 7 is considered resolved. <input checked="" type="checkbox"/>
<u>Corrective Action Request No. 8:</u> Activation energy constant is not mentioned in chapter B.6.2 and should be included.	B.6.2.8	Has been added in chapter B.6.2.	The missing parameter has been added. CAR 8 is considered resolved. <input checked="" type="checkbox"/>
<u>Corrective Action Request No. 9:</u> T1: Temperature constant is not mentioned in chapter B.6.2 and should be included.	B.6.2.9	Has been added in chapter B.6.2.	The missing parameter has been added. CAR 9 is considered resolved. <input checked="" type="checkbox"/>

Table 1 is applicable to ACM0013, vers 04, valid from December 22nd, 2006 onwards

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

<u>Corrective Action Request No. 10:</u> R: Ideal gas constant is not mentioned in chapter B.6.2 and should be included.	B.6.2.10	Has been added in chapter B.6.2.	The missing parameter has been added. CAR 10 is considered resolved. <input checked="" type="checkbox"/>
<u>Corrective Action Request No. 11:</u> EG _y : amount of electricity in the year y that would be consumed at the project in the absence of the project activity is not mentioned in chapter B.6.2 and should be included. B.6.2.11		Has been added in chapter B.6.2.	The missing parameter has been added. CAR 11 is considered resolved. <input checked="" type="checkbox"/>
<u>Corrective Action Request No. 12:</u> CE _{F,Bl,elec,y} : CO2 emission factor for electricity consumed at the project site in the absence of the project activity is mentioned incorrectly in the PDD and should be adjusted. Calculation under ACM0002, applied version and the argumentation, why a simple operating margin approach was used should be added to the PDD.	B.6.2.12	The abbreviation has been corrected. The reference to the applied version of ACM002 has been added to section B.1 of the PDD. The explanation for applying the simple operating margin had also been given in Annex 3.	The requested corrective actions have been carried out. CAR 11 is considered resolved. <input checked="" type="checkbox"/>
<u>Corrective Action Request No. 13:</u> CE _{F,Bl,therm} : CO2 emissions intensity for thermal energy generation is not mentioned in chapter B.6.2 and should be included.	B.6.2.15	Has been added in chapter B.6.2.	The missing parameter has been added. CAR 13 is considered resolved. <input checked="" type="checkbox"/>
<u>Corrective Action Request No. 14:</u> HG _{Bly} : The quantity of thermal energy that would be consumed in the year y at the project site in the absence of the project activity	B.6.2.16	Has been added in chapter B.6.2.	The missing parameter has been added. CAR 14 is considered resolved. <input checked="" type="checkbox"/>

Table 1 is applicable to ACM0013, vers 04, valid from December 22nd, 2006 onwards

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

is not mentioned in chapter B.6.2 and should be included.			
<u>Corrective Action Request No. 15:</u> COD_{dig_in} : Chemical Oxygen Demand of effluent entering lagoons is not mentioned in chapter B.6.2 and should be included.	B.6.2.17	Has been added in chapter B.6.2.	The missing parameter has been added. CAR 15 is considered resolved. <input checked="" type="checkbox"/>
<u>Corrective Action Request No. 16:</u> EL_{py} : amount of electricity in the year y that is consumed at the project site for the project activity is not mentioned in chapter B.6.2 and should be included.	B.6.2.18	EL_{py} will be monitored after project implementation. Hence, the parameter had been listed in section B.7.1 and not B 6.2 of the PDD.	Ok, the explanation is correct and is accepted by the determinator. <input checked="" type="checkbox"/>
<u>Corrective Action Request No. 17:</u> $CEF_{Bl,elec,y}$: CO2 emission factor for electricity consumed at the project site is mentioned incorrectly in the PDD and should be adjusted. Calculation under ACM0002, applied version and the argumentation, why a simple operating margin approach was used should be added to the PDD.	B.6.2.19	The abbreviation has been corrected. The reference to the applied version of ACM002 has been added to section B.1 of the PDD. The explanation for applying the simple operating margin had also been given in Annex 3.	CAR 17 is solved.. <input checked="" type="checkbox"/>
<u>Corrective Action Request No. 18:</u> HG_{py} : quantity of thermal energy consumed in the year y at the project site due to the project activity is not mentioned in chapter B.6.2 and should be included.	B.6.2.20	The requested information has been added to section B.6.2 of the PDD.	CAR 18 is solved. <input checked="" type="checkbox"/>
<u>Corrective Action Request No. 19:</u> $CEF_{Pr,therm,y}$: CO2 emissions intensity for	B.6.2.21	The requested information has been added to section B.6.2 of the PDD.	CAR 19 is solved. <input checked="" type="checkbox"/>

Table 1 is applicable to ACM0013, vers 04, valid from December 22nd, 2006 onwards

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

thermal energy generation is not mentioned in chapter B.6.2 and should be included.			
<u>Corrective Action Request No. 20:</u> COD _{la} : Chemical Oxygen Demand of the sludge used for land application after dewatering is not mentioned in chapter B.6.2 and should be included.	B.6.2.22	COD _{la} will be monitored after project implementation. Hence, the parameter had been listed in section B.7.1 and not B 6.2 of the PDD.	The argumentation is correct. CAR 20 is solved. <input checked="" type="checkbox"/>
<u>Corrective Action Request No. 21:</u> S _a : amount of sludge applied to land is not mentioned in chapter B.6.2 and should be included.	B.6.2.23	S _a will be monitored after project implementation. Hence, the parameter had been listed in section B.7.1 and not B 6.2 of the PDD.	The explanation is correct. CAR 21 is solved. <input checked="" type="checkbox"/>
<u>Corrective Action Request No. 22:</u> NC: Nitrogen Content of the sludge is not mentioned in chapter B.6.2 and should be included.	B.6.2.24	NC will be monitored after project implementation. Hence, the parameter had been listed in section B.7.1 and not B 6.2 of the PDD.	The explanation is correct. <input checked="" type="checkbox"/>
<u>Corrective Action Request No. 23:</u> EF _{N2O} : Emission factor of nitrogen from sludge applied to land is not mentioned in chapter B.6.2 and should be included.	B.6.2.25	The requested information has been added to section B.6.2 of the PDD.	. <input checked="" type="checkbox"/>
<u>Corrective Action Request No. 24:</u> COD _{dw} : Chemical Oxygen demand in the wastewater from the dewatering process is not mentioned in chapter B.6.2 and should be included.	B.6.2.26	As no dewatering process takes place, this factor is not applicable. The information has been added to section B.6.2.	The explanation is correct. CAR 24 is solved. <input checked="" type="checkbox"/>
<u>Clarification Request No. 13:</u> Please submit an adjusted time-schedule valid for the current situation on-site.	B.6.4.3	The requested information has been added (page 55).	The requested information is now included in the PDD. The issue is solved. <input checked="" type="checkbox"/>

Table 1 is applicable to ACM0013, vers 04, valid from December 22nd, 2006 onwards

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

<u>Clarification Request No. 14:</u> Please add information on values for T_{lag} : Ambient Temperature used and a description of this data.	B.7.1.6	T_{lag} has already been described in section B.6.2.	Correct – the issue is solved. <input checked="" type="checkbox"/>
<u>Corrective Action Request No. 25:</u> Information on D_{lag} : Depth of lagoon Is missing in chapter B.7.1 and should be included.	B.7.1.7	The parameter D_{lag} is already listed in section B.6.2	Correct – the issue is solved. <input checked="" type="checkbox"/>
<u>Clarification Request No. 15:</u> Please add information on measurement procedures and accuracy level for EG_y : Amount of electricity in the year y that would be consumed at the project site in the absence of the project activity.	B.7.1.8	The respective information has been added to the PDD.	Correct – the issue is solved. <input checked="" type="checkbox"/>
<u>Corrective Action Request No. 26:</u> No information on F_{dig_out} : Flow rate of organic wastewater flow into the digester available in the PDD. Please explain and add the required information.	B.7.1.11	AM0013 specifies F_{Dig_out} as "wastewater flow into the digester". This means that $F_{Dig-out}$ is identical with F_{Dig} . Even if this is a typo in AM0013, F_{Dig} and $F_{Dig-out}$ can be assumed as identical, as there are no losses in the biogas digester itself.	The explanation is correct.. Correct – the issue is solved. <input checked="" type="checkbox"/>
<u>Clarification Request No. 16:</u> Please exclude DOE from QA/QC measures.. A DOE cannot be made responsible for QA/QC measures in the context of monitoring in a CDM project.	B.7.1.14	Done.	Correct – the issue is solved. <input checked="" type="checkbox"/>

Table 1 is applicable to ACM0013, vers 04, valid from December 22nd, 2006 onwards

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

<u>Corrective Action Request No. 27:</u> Please add information on F_{la} : Flow rate of sludge used for land application after dewatering and whether this is of relevance for the project.	B.7.1.15	The parameter was already described in section B.6.2 of the PDD	Correct – the issue is solved. <input checked="" type="checkbox"/>
<u>Corrective Action Request No. 28:</u> Please clarify the issue of dewatering.	B.7.1.18	It has been clarified that no dewatering takes place and that the respective parameters therefore are not applicable.	Correct – the issue is solved. <input checked="" type="checkbox"/>
<u>Corrective Action Request No. 29:</u> Please clarify a whether the parameter FR_{bio} : Amount of biogas collected in the outlet of the biodigester is included in the monitoring plan and explain how measurement is done.	B.7.1.19	The parameter FR_{bio} is included in the monitoring plan and is been described in detail in section B.7.1	Correct – the issue is solved. <input checked="" type="checkbox"/>
<u>Corrective Action Request No. 30:</u> The measurement of: $P_{CH, bio}$: Percentage of methane in the biogas in the outlet of the digester. needs to be done in Vol % - the Min./Max. Range has to be adjusted!	B.7.1.20	Has been adjusted.	Correct – the issue is solved. <input checked="" type="checkbox"/>
<u>Clarification Request No. 17:</u> Please clarify where $FR_{f,s}$ - flow rate of the flare stack gases – is needed and how this can be measured.	B.7.1.21	Thank you for the comment. $FR_{f,s}$ will not be measured. As an open flare system is applied, a flare efficiency of 0.5 is assumed in line with "Tool to determine project emissions from flaring gases containing Methane" in order to calculate project emissions from flare operation.	Correct – the issue is solved. <input checked="" type="checkbox"/>
<u>Clarification Request No. 18:</u> Please clarify the necessity of parameters to be monitored for later calculating of project emissions from the flare.	B.7.1.22	A description on the calculation of $PE_{flare, y}$ has been added to Section B 7.1. of the PDD:	Correct – the issue is solved. <input checked="" type="checkbox"/>

Table 1 is applicable to ACM0013, vers 04, valid from December 22nd, 2006 onwards

Validation Protocol

Project Title: "Chumporn applied biogas technology for advanced waste water management", CDM-Project in Thailand

Date of Completion: July 6th, 2008

Number of Pages: 69



Industrie Service

Clarification Request No. 19: Additional information how $T_{comb,e}$: Fraction of time gas is combusted in the heat generation equipment. Will be measured has to be added to the PDD.	B.7.1.26	The requested information has been added.	Correct – the issue is solved. <input checked="" type="checkbox"/>
Clarification Request No. 20: Please add information on the media used for invitations to the PDD	E.1.2	This has been described in section E.1 of the PDD: step 2 of the local stakeholder consultation: <ul style="list-style-type: none"> Announcement of the project and access to all documents through press publications at Bangkok Post Nov. 3, 2005 and Nov. 17, 2005, including invitations for comments to the project. Public access to all documents at Chumporn Local Authority, CPI Factory Chumporn, CPI Offices in Bangkok, TEI Offices in Bangkok, ENVIMA Office in Bangkok. 	Correct – the issue is solved. <input checked="" type="checkbox"/>

Table 3 Unresolved Corrective Action and Clarification Requests (in case of denials)


Clarifications and / or corrective action requests by validation team	Id. of CAR/CR	Explanation of Conclusion for Denial
-	-	-

Validation of the CDM Project:
“Chumporn Applied Biogas Technology for Advanced Waste Water
Management”, Thailand




Industrie Service


Annex 2: Information Reference List

Final Validation Report 2008-07-06	Validation of the “Chumporn Applied Biogas Technology for Advanced Waste Water Management” CDM project in Thailand Information Reference List	Page 2 of 10	 Industrie Service
---	--	-----------------	--


Reference No.	Document or Type of Information
	Interviewed persons: <ol style="list-style-type: none"> 1. Magnus Staudte – Envima GmbH 2. Rudolf Rauch – GTZ 3. Suniya Ayachanna – CPI Assistant Managing Director 4. Nithad Rungnapanate – CPI Logistic Manager 5. Poanee Jittawarajinda – CPI QC Manager 6. Weerapan Kiatpakdee – Natural Power 7. Chatree Daenghaew – Thailand Environmental Institute 8. Anorn Rittan – CPI Production Manager 9. Yosmrorn Arronsak – CPI Office Manager
3.	On-site interview at CPI Chumporn, Thailand Date: 6 th October 2005 (afternoon, visit of the facilities)nt Validation team on site: <div style="display: flex; justify-content: space-between;"> Cristian Delamarian TÜV Philippines Inc. - TÜV SÜD Group </div>

Final Validation Report 2008-07-06	Validation of the “Chumporn Applied Biogas Technology for Advanced Waste Water Management” CDM project in Thailand Information Reference List	Page 3 of 10	 Industrie Service
---	--	-----------------	--


Reference No.	Document or Type of Information
	<p>Interviewed persons:</p> <ol style="list-style-type: none"> 1. Magnus Staudte – Envima GmbH 2. Weerapan Kiatpakdee – Natural Power 3. Chatree Daenghaew – Thailand Environmental Institute 4. Panya Maseevikeg – Village Administrator 5. Nida Nanasutlat - Village Administrator 6. Suvakon Pokbeesana – Teacher from Bammaisonborn 7. Sahyan Mollivihok – Deputy Mayor of T.O.A. (Tambon (sub-district) office administration) 8. Kiattiyot Boonyor – Prutacian Health Center 9. Surin Yingnoy – Sudistrict Health Manager Assisstant 10. Preeda Hinthong – Mayor of T.O.A. 11. Nithad Rungnapanate – CPI Logistic Manager 12. Tosaporn Aroonsak – CPI Office Manager 13. Pirom Intapirak – CPI Rae Material Researching Manager 14. Anorn Pittan – CPI Production Manager 15. Poanee Jittawarajinda – CPI QC Manager

Final Validation Report 2008-07-06	Validation of the “Chumporn Applied Biogas Technology for Advanced Waste Water Management” CDM project in Thailand Information Reference List	Page 4 of 10	 Industrie Service
---	--	-----------------	--


Reference No.	Document or Type of Information
	16. Anorn Rittan – CPI Production Manager 17. Yosmrorn Arronsak – CPI Office Manager
4.	<p>On-site interview at Windsor Suits – Bangkok, Thailand Date: 7th October 2005 Validation team on site: Cristian Delamarian TÜV Philippines Inc. - TÜV SÜD Group</p> <p>Interviewed persons:</p> <ol style="list-style-type: none"> 1. Magnus Staudte – Envima GmbH 2. Werner Kossmann - GTZ 3. Weerapan Kiatpakdee – Natural Power
5.	<p>PDD in First GSP of “Chumporn Applied Biogas Technology for Advanced Waste Water Management, Thailand” CDM project, version No. 1.0, dated September 9th, 2005, submitted September 14th, 2005 and published in the First Global Stakeholder Process (GSP) in the period from September 15th, 2005 to October 14th, 2006.</p> <p>http://www.netinform.net/KE/Wegweiser/Guide2.aspx?ID=1256&Ebene1_ID=26&Ebene2_ID=303&mode=1.</p>

Final Validation Report 2008-07-06	Validation of the “Chumporn Applied Biogas Technology for Advanced Waste Water Management” CDM project in Thailand Information Reference List	Page 5 of 10	 Industrie Service
---	--	-----------------	--


Reference No.	Document or Type of Information
6.	<p>PDD in 2. GSP of “Chumporn Applied Biogas Technology for Advanced Waste Water Management, Thailand” CDM project, version 04, dated April 30th, 2007th, submitted May 1st, 2007 and published in the Second (Repeat) Global Stakeholder Process (GSP) in the period from May 03rd, 2007 to June 01st, 2007.</p> <p>http://www.netinform.de/KE/Wegweiser/Guide2_1.aspx?ID=2961&Ebene1_ID=26&Ebene2_ID=895&mode=1</p>
7.	Final revised PDD of “Chumporn Applied Biogas Technology for Advanced Waste Water Management, Thailand” CDM project, version 07, dated May 10 th , 2008 and submitted to DOE on May 12 th , 2008
8.	Question List based on the Initial Document Review of “Chumporn Applied Biogas Technology for Advanced Waste Water Management, Thailand”, submitted to GTZ on September 16 th , 2005
9.	Answers on first questions based on the document Review of first version of “Chumporn Applied Biogas Technology for Advanced Waste Water Management, Thailand”, submitted by Envima/GTZ on September 27 th , 2005
10.	Question list and audit schedule, dated September 30 th , 2005 and submitted to the client on September 30 th , 2005 for the preparation of the on-site visit
11.	Answers on questions delivered to CPI Chumporn during the on-site audit; submitted to TÜV SÜD validator on October 30 th , 2005
12.	Brochure 2002/2003 from CPI Chumporn “CPI - first ISO 9002 Palm Oil Manufacturer in Thailand” (provided to TÜV SÜD auditor during the on-site audit in October 2005) with description of business activities and of the intended project measures
13.	Summary report of the tests (2005) conducted in the laboratory for the values of the COD used in the PDD, provided and explained by CPI Chumporn to TÜV SÜD auditor during the on-site audit in October 2005

Final Validation Report 2008-07-06	Validation of the “Chumporn Applied Biogas Technology for Advanced Waste Water Management” CDM project in Thailand Information Reference List	Page 6 of 10	 Industrie Service
---	--	-----------------	--


Reference No.	Document or Type of Information
14.	Annual values of consumption and costs for different fuels for the years 1999 – 2004, submitted to TÜV SÜD auditor by CPI Chumporn during the on-site audits in October 2005
15.	Results of laboratory tests of this particularly waste water anaerobic digestion process and biogas potential, 2004/2005, provided to TÜV SÜD auditor by CPI Chumporn during the on-site audits in October 2005
16.	Minutes of the first stakeholder meeting together with the evaluation of the answers of the questions raised by the stakeholders (Thai version and version in English translation), submitted to TÜV SÜD auditor by CPI Chumporn during the on-site audits in October 2005
17.	ISO 9001:2000 certificates of CPI Chumporn, valid until 09/2006 (TÜV Product Service; Thailand Institute of Scientific and Technical research), presented during the on-site audit
18.	Certificate of Approval for CPI Chumporn concerning “Hazard analysis and Critical Control Point (HACCP)”, valid until November 2007 and issued by Thailand Institute of Scientific and Technical research) in 2004, presented during the on-site visit
19.	Certificate of Approval for CPI Chumporn concerning “Good Manufacturing Practice (GMP)”, valid until November 2007 and issued by Thailand Institute of Scientific and Technical research) in 2004, presented during the on-site visit
20.	Detailed description of the existing lagoons, their dimensions and time of retention, submitted to the TÜV SÜD Auditor during the on-site audits in October 2005
21.	Key Plan of the Biogas System, 2005, submitted to TÜV SÜD during the on-site audits in October 2005
22.	A presentation of the Ministry of Energy to the German Embassy on Perspectives of Energy Generation in Thailand, 2005, provided to TÜV SÜD validator during the on-site audits in October 2005
23.	Official declaration of the CPI policy on the Internal Rate of Return (IRR), submitted to the validator during the on-site audits in October 2005

Final Validation Report 2008-07-06	Validation of the “Chumporn Applied Biogas Technology for Advanced Waste Water Management” CDM project in Thailand Information Reference List	Page 7 of 10	 Industrie Service
---	--	-----------------	--


Reference No.	Document or Type of Information
24.	Confidential data concerning production capacity in the last 5 years, provided to TÜV SÜD validator during the on-site audits in October 2005
25.	Business plan for Chumporn Applied Biogas Technology for Advanced Waste Water Management” CDM project in Thailand, provided to TÜV SÜD validator during the on-site audits in October 2005
26.	Declaration of CPI declaration that the waste water shall be used exclusively for irrigation purposes
27.	List of stakeholders, October 2005, provided to the validator during the on-site audit in October 2005
28.	Declaration on the investment funds, October 2005, provided to the validator during the on-site audits in October 2005
29.	Confidential figure demonstrating the development of prices of the palm shells in 2005, provided to the validator during the on-site audits in October 2005.
30.	Separate Monitoring plan for “Chumporn Applied Biogas Technology for Advanced Waste Water Management, Thailand”, submitted December 2005
31.	Monitoring Plan for Minutes of the stakeholder meeting
32.	Estimation of Thai Emission Factor, December 2005, submitted to the validator in June 2006
33.	Summary of the Initial Environmental Evaluation, December 2006
34.	Non-technical project design document, September 2005
35.	Minutes of meeting and Discussion of the Group of Main Stakeholders

Final Validation Report 2008-07-06	Validation of the “Chumporn Applied Biogas Technology for Advanced Waste Water Management” CDM project in Thailand Information Reference List	Page 8 of 10	 Industrie Service
---	--	-----------------	--

Reference No.	Document or Type of Information
36.	Summary of the results from the Initial Stakeholder Consultation, October 2006
37.	Declaration of CPI concerning its environmental policy, October 2005
38.	IEA, “Energy Statistics Manual”, 2004
39.	Approved baseline methodology AM0013: “Forced methane extraction from waste water treatment plants for grid-connected electricity supply and/or heat production”, version 02, UNFCCC, May 13 th , 2005, used in the PDD published in the first GSP http://cdm.unfccc.int/UserManagement/FileStorage/AM0013version2.pdf
40.	Approved monitoring methodology AM0013: “Forced methane extraction from waste water treatment plants for grid-connected electricity supply and/or heat production”, version 02, UNFCCC, May 13 th , 2005, http://cdm.unfccc.int/UserManagement/FileStorage/AM0013version2.pdf
41.	Approved baseline methodology AM0013: “Avoided methane emissions from organic waste-water treatment”, version 04, UNFCCC, EB 28, valid from December 22 nd , 2006 onwards (upload possible until august 13 th , 2008) http://cdm.unfccc.int/UserManagement/FileStorage/CDMWF_AM_WF4J49OL5M4MVT95QZHT0Q1JZ7PA5K
42.	Approved monitoring methodology AM0013: “Avoided methane emissions from organic waste-water treatment”, version 04, UNFCCC, EB 28, valid from December 22 nd , 2006 onwards (upload possible until August 13 th , 2008) http://cdm.unfccc.int/UserManagement/FileStorage/CDMWF_AM_WF4J49OL5M4MVT95QZHT0Q1JZ7PA5K
43.	IPCC: Revised 1996 Guidelines for National Greenhouse Gas Inventories, http://www.ipcc-nggip.iges.or.jp/public/gl/invs1.htm
44.	IPCC: 2000, Good Practice Guidance, http://www.ipcc-nggip.iges.or.jp/public/gp/english/

Final Validation Report 2008-07-06	Validation of the “Chumporn Applied Biogas Technology for Advanced Waste Water Management” CDM project in Thailand Information Reference List	Page 9 of 10	 Industrie Service
---	--	-----------------	--

Reference No.	Document or Type of Information
45.	UNFCCC, CDM: “Tool for the demonstration and assessment of additionality”, approved by the EB (EB 16, annex 1), version 1, http://cdm.unfccc.int/EB/Meetings/016/eb16repan1.pdf (valid at the date of the first GSP)
46.	Validation and Verification Manual, IETA/World Bank (PCF), http://www.vvmanual.info
47.	UNFCCC, CDM, “Tool for the demonstration and assessment of additionality”, version 2, November 28 th , 2005, as well as subsequent versions of the tool (at the date of the second GSP version No. 3 of the tool was valid) http://cdm.unfccc.int/methodologies/PAmethodologies/AdditionalityTools/Additionality_tool.pdf
48.	Waste Water Management System for Chumporn Palm Oil Industry, Thailand, short documentation (Project Idea Note), 2004
49.	Anaerobic Waste Water Treatment System for Chumporn Palm Oil Industry (Feasibility study), April 2004
50.	Report of the wastewater characteristics (laboratory analysis), anaerobic digestion process and biogas potential for Chumporn Palm Oil Industrial (Public) Company, showcase for the period from June 15 th to June 18 th , 2005
51.	Answers on TÜV SÜD’s “Pre-check on consistency, completeness, evidence of data and sources, traceability”, submitted to the validator on August 28 th , 2005 as part of the completeness check for GSP
52.	The National Economic and Social Development Plan (NESDP) 2002 - 2006, National Economic and Social Development Board (NESDB), Office of the Prime Minister, Bangkok 2002
53.	Mrs. Aree Wattana Tummakird, presentation “CDM in Thailand”, CDM Cooperation Center, MONRE/ONEP, handed over by the Thai DNA and confirmed by Dr. Sirintornthep Towpryoorn (Advisor to Thai DNA, Assoc. Professor of the Joint Graduate School for Energy and Environment, King Mongkut’s University of Technology, Thonburi, Thailand); and Mr. Arrie Setiwan (Pelangi) – 22 nd August 2006.
54.	Bank of Thailand (2005): Economic Data, Table 29: Interest Rates in Financial Market, http://www.bot.or.th/bothomepage/databank/EconData/EconFinance/tab29e.asp , accessed January 15, 2006 and December 11th 2006.
55.	http://www.iges.or.jp/APEIS/RISPO/inventory/db/pdf/0073.pdf , accessed 28 July 2007. For a description of this project and the common practice of wastewater treatment in Thai palm oil industry see also Arul Rajoo: Thailand's

Final Validation Report 2008-07-06	Validation of the “Chumporn Applied Biogas Technology for Advanced Waste Water Management” CDM project in Thailand Information Reference List	Page 10 of 10	 Industrie Service
---	--	------------------	--

Reference No.	Document or Type of Information
	Energy And Money From Waste Water, Malaysian National News Agency (Bernama),
56.	Legal requirements for conducting EIAs are defined under the “Enhancement and Conservation of the Natural Environmental Quality Act of 1992”, Part 4, Section 46-51. This Act lists project types that require an EIA.
57.	2006 IPCC Guidelines for National Greenhouse gas Inventories
58.	Ibbotson Associates, International Cost of Capital Perspectives Report, 2005
59.	Aswath Damodaran, 2005: Equity Risk Premiums, Stern School of Business, http://pages.stern.nyu.edu/~adamodar/pdfiles/papers/riskprem.pdf
60.	Investment Analysis, “Chumporn Applied Waste Water System”, developed by perspectives and dated May 10 th , 2008
61.	Updated Calculations of Emission Reductions for “Chumporn Applied Biogas technology for advanced Waste Water Management project in Thailand”, dated April 21 st , 2008
62.	IRR Länderrisiko 2005, valid for the date of the investment decision for at the date of Investment Decision for “Chumporn Applied Biogas technology for advanced Waste Water Management project in Thailand”
63.	The National Economic and Social Development Plan (NESDP) 2002 - 2006, National Economic and Social Development Board (NESDB), Office of the Prime Minister, Bangkok 2002
64.	Bank of Thailand (2005): Thai Government Bond Tender – Historical Data (http://www.bot.or.th/BOTHomepage/BankAtWork/Bond/Data/BondAuction/BondResult/BondResultHistoricalPage1_E.htm)