



# ASSESSMENT

REGARDING POST REGISTRATION CHANGES  
COMPAÑÍA LICORERA DE NICARAGUA, S.A.  
(CLNSA)

VINASSE ANAEROBIC TREATMENT PROJECT –  
COMPAÑÍA LICORERA DE NICARAGUA, S.A.  
(CLNSA)

**Report No: 8000409291 – 12/160**

**Date: 2014-03-10**

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<b>Assessment Report on post registration changes</b>	<b>Report No.</b> 8000409291 – 12/160	<b>Rev. No.</b> 0	<b>Date of 1<sup>st</sup> issue:</b> 2014-03-10	<b>Date of this rev.</b> 2014-03-10
<b>Project:</b>	<b>Title:</b> Vinasse Anaerobic Treatment Project – Compañía Licorera de Nicaragua, S.A. (CLNSA)	<b>Registr. date:</b> 2007/03/09	<b>UNFCCC-No.:</b> <a href="#">0675</a>	
<b>Project Participant(s):</b>	<b>Name:</b> Compañía Licorera de Nicaragua, S.A. (CLNSA)	<b>Party:</b> Nicaragua		
<b>Applied methodology/ies:</b>	<b>Title:</b> Avoided methane emissions from organic waste-water treatment	<b>No.:</b> AM0013 ver. 3	<b>Scope:</b> 13 /13.1	
<b>Post Registration Changes:</b>	<b>Type of requested changes</b>	<b>Number of changes</b>	<b>Prior Approval required</b>	
	<input type="checkbox"/> Temporary deviations from the MP	-	<input type="checkbox"/>	
	<input type="checkbox"/> Temporary deviations from the MM	-	<input type="checkbox"/>	
	<input type="checkbox"/> Corrections that do not affect the project	-	<input type="checkbox"/>	
	<input type="checkbox"/> Change to the start date of the crediting p.	-	<input type="checkbox"/>	
	<input checked="" type="checkbox"/> Permanent changes from the MP	1	<input checked="" type="checkbox"/>	
	<input checked="" type="checkbox"/> Permanent changes from the MM	4	<input checked="" type="checkbox"/>	
	<input type="checkbox"/> Design changes to the project activity/PoA	-	<input type="checkbox"/>	
	<input type="checkbox"/> Changes specific to AR	-	<input type="checkbox"/>	
<b>Short description of PRC:</b>	<b>Description:</b>	<b>Registration date:</b>	<b>End date:</b>	
	No complete measurements of the the lagoon depth. Change to use fixed value verified annual by physical verification.	2003-06-03	2010-05-05	
	No measurements of the biogas flow rate at flare inlet. Change to use mass balance to determine the amount of biogas sent to the flare	2003-06-03	2010-05-05	
	Change of the calculation method and inputs used for the baseline and project emissions from methane generation in the lagoon system. These calculations will be based only on the total amount of wastewater volume entering the digester	2003-06-03	2010-05-05	
	No measurements for parameters M13 (flow rate of the flare stack gases) and M14 (methane content in stack gas of flare). Change to eliminate these monitoring parameters as the project uses an open flare.	2003-06-03	2010-05-05	
	No measurements for parameters M17 (flow rate of low pressure boiler equipment stack gases) and M18 (methane content in stack gas of low pressure boiler equipment). Change to eliminate these monitoring parameters as the project uses an open flare.	2003-06-03	2010-05-05	
<b>Revised PDD:</b>	<b>Title:</b> Vinasse Anaerobic Treatment Project – Compañía Licorera de Nicaragua, S.A. (CLNSA)	<b>Attached in TC:</b> <input checked="" type="checkbox"/>	<b>Attached clean:</b> <input checked="" type="checkbox"/>	
<b>Assessment team / Technical Review and Final Approval</b>	<b>Assessment Team:</b> Abraham Garza A. (TL) Raul Gonzalez (TM) Mitre	<b>Technical review:</b> Emilio Martin	<b>Final approval:</b> Emilio Martin	

<b>Assessment Opinion:</b>	<input checked="checked" type="checkbox"/>	The post registration changes require prior Approval by the Board
	<input type="checkbox"/>	The post registration changes do <b>not</b> require prior Approval by the Board
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## Abbreviations

<b>CA</b>	Corrective Action / Clarification Action
<b>CAR</b>	Corrective Action Request
<b>CDM</b>	Clean Development Mechanism
<b>CER</b>	Certified Emission Reduction
<b>CL</b>	Clarification Request
<b>CO<sub>2</sub></b>	Carbon dioxide
<b>CO<sub>2e</sub></b>	Carbon dioxide equivalent
<b>CP</b>	Certification Program
<b>DNA</b>	Designated National Authority
<b>EB</b>	CDM Executive Board
<b>GHG</b>	Greenhouse gas(es)
<b>PA</b>	Project activity
<b>PDD</b>	Project Design Document
<b>PoA</b>	Programme of Activities
<b>PRC</b>	Post Registration Changes
<b>QC/QA</b>	Quality control/Quality assurance
<b>UNFCCC</b>	United Nations Framework Convention on Climate Change
<b>VVS</b>	Validation and Verification Standard

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## **1 OBJECTIVE / SCOPE**

Compañía Licorera de Nicaragua, S.A. (CLNSA) has commissioned the TÜV NORD JI/CDM Certification Program (CP) to assess post registration changes of the project

*“Vinasse Anaerobic Treatment Project – Compañía Licorera de Nicaragua, S.A.  
(CLNSA)”*

This report serves for all kind of post registration changes as defined in the PS. This report serves as an annex to the Post-registration changes request form (F-CDM-PRC).

## 2 GENERAL CHARACTERISTICS

### 2.1 Project Characteristics

Vinasse Anaerobic Treatment Project – Compañía Licorera de Nicaragua, S.A. (CLNSA) consists in the operation of a wastewater treatment facility for the treatment of the vinasse produced by the distillery process at Compañía Licorera de Nicaragua, S.A. (CLNSA) through two anaerobic reactors.

The project implementation consists in the following:

- Two anaerobic reactors have been installed for the wastewater (vinasse) treatment. The necessary pipeline and treatments system have been implemented to collect the biogas produced from the anaerobic reactors and use it as a fuel in three boilers in order to produce heat (steam) required for the distillery process.
- In addition, one open flare had been installed to burn the excess biogas in case of any failure in the boiler or to operate during any maintenance works.

The key parameters of the project are given in Table 2-1:

**Table 2-1:** Technical data of the project activity

Parameter	Unit	Value
<u>Flare</u>		
Quantity		01
Type		Open Flare
Capacity	m <sup>3</sup> /h	3,000
<u>Anaerobic Biodigester</u>		
Quantity		02
Capacity	m <sup>3</sup>	10, 640
<u>Blowers</u>		
Quantity		2
Manufacturer		Continental Industrie S.A.
Type		03104 RT
Capacity motor	kW	45
Electric Power	r.p.m	3000
<u>Boiler</u>		
Quantity		01
Manufacturer		Cleaver Brooks
Model		CB 600-800
Serial number		L-94023
Capacity	BTU/hour	33476000
<u>Boiler</u>		
Quantity		02
Manufacturer		Steam Bloc
Model		44
Serial number		4P-195 & 4P-198

Parameter	Unit	Value
Capacity	Ton/hour	10.2 & 14.88

## 2.2 Overview of Post Registration Changes

Within this report post registration changes as listed in Table 2-2 are assessed.

**Table 2-2:** Overview Post Registration Changes

#	Applicable as of / from - to	Type of post registration change	Description
1	2003-06-03 to 2010-05-05	PCfrMM	No complete measurements of the the lagoon depth. Change to use fixed value verified annual by physical verification.
2	2003-06-03 to 2010-05-05	PCfrMM	No measurements of the biogas flow rate at flare inlet. Change to use mass balance to determine the amount of biogas sent to the flare
3	2003-06-03 to 2010-05-05	PCfrMM	Change of the calculation method and inputs used for the baseline and project emissions from methane generation in the lagoon system. These calculations will be based only on the total amount of wastewater volume entering the digester
4	2003-06-03 to 2010-05-05	PCfrMP	No measurements for parameters M13 (flow rate of the flare stack gases) and M14 (methane content in stack gas of flare). Change to eliminate these monitoring parameters as the project uses an open flare.
5	2003-06-03 to 2010-05-05	PCfrMM	No measurements for parameters M17 (flow rate of low pressure boiler equipment stack gases) and M18 (methane content in stack gas of low pressure boiler equipment). Change to eliminate these monitoring parameters as there is no monitoring equipment.

- 1) TDfrMP : Temporary deviation from registered monitoring plan  
 TDfMM : Temporary deviation from the monitoring methodology  
 CrPDD : Corrections to the registered PDD  
 ChSD : Change to the start date of the crediting period  
 PCfrMP : Permanent changes from registered Monitoring Plan  
 PCfMM : Permanent changes from Monitoring Methodology  
 CoPD : Changes to the project design of a registered project activity / PoA  
 CstAR : Changes specific to afforestation or reforestation



## 2.3 Assessment team members and technical reviewers

On the basis of a competence analysis and individual availabilities a validation team, consistent of one team leader and 2 additional team members, were appointed. Furthermore also the personnel for the technical review and the final approval were determined.

The list of involved personnel, the tasks assigned and the qualification status are summarized in the Table 2-3 below.

**Table 2-3:** Involved Personnel

	Name	Company	Function <sup>1)</sup>	Qualification Status <sup>2)</sup>	Scheme competence <sup>3)</sup>	Technical competence <sup>4)</sup>	Verification competence <sup>5)</sup>	Host country Competence	On-site visit
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Abraham Garza Alvarez	BRTÜV	TL <sup>A)</sup>	LA	<input checked="" type="checkbox"/>	13.1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Raul Gonzalez Mitre	BRTÜV	TM <sup>A)</sup>	SA	<input checked="" type="checkbox"/>	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Emilio Martin	TÜV NORD, Germany	FA/TR <sup>B)</sup>	SA	<input checked="" type="checkbox"/>	13.1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	-

<sup>1)</sup> TL: Team Leader; TM: Team Member, TR: Technical review; OT: Observer-Team, OR: Observer-TR; FA: Final approval

<sup>2)</sup> GHG Auditor Status: A: Assessor; LA: Lead Assessor; SA: Senior Assessor; T: Trainee; TE: Technical Expert

<sup>3)</sup> GHG auditor status (at least Assessor)

<sup>4)</sup> As per S01-MU03 or S01-VA070-A2 (such as 1.1, 1.2, ...)

<sup>5)</sup> In case of verification projects

<sup>A)</sup> Team Member: GHG auditor (at least Assessor status), Technical Expert (incl. Host Country Expert or Verification Expert), not ETE

<sup>B)</sup> No team member

All team members contributed to the review of documents, the assessment of the project activity and to the preparation of this report under the leadership of the team leader.

Technical experts contributed to the assessment of special aspects of the project activity, e.g. technical or host country aspects.

Statements of competence for the above mentioned team members are enclosed in Annex 3 of this report.

## 2.4 Assessment Steps

The *assessment of post registration changes* consisted of the following steps:

- Appointment of team members and technical reviewers
- A desk review of the registered and revised PDD<sup>/PDD/</sup> submitted by the client and additional supporting documents
- On-Site assessment (if required)
- Background investigation and follow-up interviews with personnel of the project developer and its contractors,
- Resolution of corrective actions (CARs / CLs) (if any)
- Final reporting
- Technical review
- Final approval.

## 2.5 Review of Documents

The registered as well as the revised PDD and supporting background documents related to the project design and the post registration changes were reviewed.

## 2.6 Follow-up Interviews

The validation team has carried out interviews in order to assess the information included in the project documentation and to gain additional information regarding the compliance of the project with the relevant criteria applicable for CDM.

During validation the validation team has performed interviews to confirm selected information and to resolve issues identified in the document review. The main topics of the interviews are summarized in table 3-3.

**Table 3-3:** Interviewed persons and interview topics

Interviewed Persons / Entities	Interview topics
Project proponent representatives Project consultant	<ul style="list-style-type: none"><li>- Details of the project validation and earlier verifications</li><li>- Project history</li><li>- Technical details of plant</li><li>- Intended / implemented changes from the previous project design</li><li>- Impact of changes on the additionality justification</li><li>- Impact on the monitoring of the project</li></ul>

Interviewed Persons / Entities	Interview topics
	- Editorial issues of the revised PDD

A comprehensive list of all interviewed persons is part of section 7 ‘References’.

## 2.7 Resolution of Clarification and Corrective Action Requests

### 2.7.1 Definition

A **Corrective Action Request (CAR)** will be established where:

- mistakes have been made in assumptions, application of the methodology or the project documentation which will have a direct influence the project results,
- the requirements deemed relevant for validation of the intended / implemented changes,
- there is a risk that the changes cannot be approved by the UNFCCC or that emission reductions would not be able to be verified and certified after the implementation of the changes.

A **Clarification Request (CL)** will be issued where information is insufficient, unclear or not transparent enough to establish whether a requirement is met.

### 2.7.2 Validation

After reviewing all relevant documents and taken all other relevant information into account, the validation team issues all findings (in the course of a draft report, if applicable) and hands over the findings to the project proponent in order to respond on the issues raised and to revise the documentation accordingly.

The final reporting step starts after resolution of the raised CARs and CLs. In case the findings from CARs and CLs cannot be resolved by the project proponent or the proposed action related to the FARs raised cannot be assessed as adequate, no positive assessment opinion can be issued by the validation team.

The CAR(s) / CL(s) / FAR(s) are documented in the context of the respective chapters.

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## 2.8 Technical review

Before submission of the final assessment report a technical review is carried out. The technical reviewer is a competent GHG auditor being appointed for the scope this project falls under. The technical reviewer is not considered to be part of the verification team and thus not involved in the decision making process up to the technical review.

As a result of the technical review process the assessment opinion as prepared by the validation team leader may be confirmed or revised. Furthermore reporting improvements might be achieved.

## 2.9 Final approval

After successful technical review of the final report an overall (esp. procedural) assessment of the requested post registration changes will be carried out by a senior assessor located in the accredited premises of TÜV NORD.

Only after this step the notification or the report can be forwarded to the UNFCCC (in case of a positive validation opinion).

### 3 CHANGES THAT DO NOT AFFECT THE PROJECT DESIGN

#### 3.1 Assessment of Changes

##### Requested Deviations / Changes #1

- Type of change(s):
- ☐ Temporary Deviation from Monitoring Plan
  - ☐ Temporary Deviation from Monitoring Methodology
  - ☐ Corrections that do not affect the project design
  - ☐ Permanent Change from Monitoring Plan
  - ☒ Permanent Change from Monitoring Methodology
  - ☐ Changes specific to afforestation or reforestation

##### A. Description of post registration change

<b>Start Date:</b> Please provide the start date of the change	2003-06-03	<b>End Date:</b> Please provide the end date of the change, if applicable	2010-05-05
<b>Description:</b> Please give a detailed description of the changes	<p>Since the start of the project activity (2003/06/03) the PP has not monitored the lagoon depth (parameter M5 of the MR). This facultative project lagoon receives the treated effluent from the anaerobic digester and a small by-passed fraction of untreated vinasse.</p> <p>According to methodology AM0013 Version 3 the depth of the lagoon shall be monitored <u>daily</u> in order to determine the value of the methane conversion factor (MCF) which affects directly the project emission reductions as it corresponds to the fraction of degradation under anaerobic conditions due to depth of sludge pit.</p> <p>The PP is proposing to apply a default lagoon depth value of 2.1 m (verified annually) and use a 50% value for the fraction of degradation under anaerobic conditions due to depth of sludge pit for the complete monitoring period.</p>		

##### B. Assessment of post registration change – Permanent changes from MP or MM

<b>Accuracy:</b> Please give a detailed assessment whether the deviation is likely to lead to a reduction in the accuracy of the ER calculation.	The accuracy of the monitoring is affected as no appropriate measurement has been performed. However, as assessed below, the PP has applied the most conservative assumption for the project activity.
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## Requested Deviations / Changes #1

### Conservative- ness:

Please give a detailed assessment whether conservative assumptions or discount factors have been applied to ensure that ER will not be overestimated.

According to page 7 of methodology AM00013 Version 3 only three lagoon depth ranges which can influence the outcome of project emission reductions are considered, which are as follows:

Lagoon Depth (m)	Fraction of degradation under anaerobic conditions due to depth of sludge pit
> 5	70%
1 < 5	50%
< 1	0

During site visit the verification team confirmed that the maximum depth of the lagoon is 2.1 m and therefore the depth range >5 m can be excluded. Hence, there are only two possible ranges: "< 1" with fully aerobic conditions and "1 < 5" with 50% anaerobic conditions.

As stated in the revised PDD the treated vinasse so as the by-passed fraction of untreated vinasse have a final application during dry season for the ferti-irrigation of the cane fields and for laminar (aerobic) irrigation during the wet season (May to November). This application (laminar irrigation) avoids methane project emissions from the effluent. Nevertheless, there is a lack of monitoring data available to evidence the final application of the effluent.

From July 1<sup>st</sup> 2008 to July 2<sup>nd</sup> 2009, a tape measure was used by the PP to monitor the depth of the lagoon. Then, on July 3<sup>rd</sup> 2009 a level sensor was installed. However, the PP has explained that during the rainy season the road to the lagoon was not always accessible, so sometimes it was not possible to reach the lagoon for several days, and therefore it was not possible to perform the measurements when they were made with the tape measure. After that, once the level sensor was installed, if several days passed without a visit to extract the data, the data logger would fill up and stop recording once it was full. Additionally, the lagoon is several kilometers away from the plant, and there is no electricity for the level sensor, so a solar panel was purchased. The solar panel was stolen and a new one had to be installed. This caused a gap in the data. Finally, at first, the depth recordings from the level sensor were made too close together (several measurements per second), and therefore the data logger would fill up after a few hours of measuring. Due to these difficulties the data is not complete for the entire monitoring period.

The verification team has checked the depth level measurements<sup>/DEPTH/</sup> and it has been confirmed that in fact there is a considerable lack of measurements which do not allow perform the monitoring arrangements as required by the monitoring plan.

Therefore, based on all the above, the PP has decided to apply the default lagoon depth value of 2.1 m and the 50% fraction of degradation under anaerobic conditions due to depth of sludge pit for the complete monitoring period.

### Requested Deviations / Changes #1

	<p>The verification team has checked the applicable methodology AM0013 Version 03 and it has been confirmed that the value of 50 % for the depth range "1 &lt; 5" is the most conservative assumption as it results in higher project emissions calculation assuming that all effluent leaving (or bypassing) the anaerobic digester has been directed to the lagoon and remained there under anaerobic conditions. This is a conservative assumption which reduces significantly the CER potential of the project throughout the second monitoring period.</p> <p>The proposed assumption results in additional project emissions, which reduces emission reductions during this second monitoring period. This is based on the assumption that during the wet season from May to November the effluent would be diverted to the laminar irrigation facility instead of the project lagoon (as foreseen in the PDD). The impact of the deviation is probably even higher, since the level of the project lagoon was probably below 1 m for some months during the dry season throughout the monitoring period (when the effluent is used for ferti-irrigation); but due to lack of lagoon depth measurements, it is not possible to quantify this difference. Therefore, the assumption made by the PP and the final ER calculation is found conservative and appropriate as the ER are not being overestimated.</p> <p>The same deviation has already been requested by the PP and it was approved by the EB on October 2009. Please, refer to the Request for Deviation for the Monitoring Plan (I-DEV0268<sup>1</sup>) "<i>Deviations to the monitoring plan in the registered PDD project no. 0675</i>".</p>
<p><b>Appendix 1 PS:</b> Check if the changes fall under one of the scenarios of appendix 1 of the PS.</p>	<p>The proposed change does not fall under any of the scenarios of the Appendix 1 of the Project Standard. Therefore, prior approval by the Board is required.</p>
<p><b>C. Revised PDD</b></p>	
<p><b>Rev. of PDD:</b> Check whether the changes have been fully addressed in a revised PDD.</p>	<p><input checked="" type="checkbox"/> The changes have correctly been reflected in the revised PDD.</p> <p><input type="checkbox"/> A revision of the PDD is not required (in case of temp. changes).</p> <p><input checked="" type="checkbox"/> The revised PDD has been forwarded in (i) track-change and (ii) clean version.</p>
<p><b>D. Prior Approval</b></p>	
<p><b>Prior approval:</b> Assess whether the change requires prior approval of the board</p>	<p><input checked="" type="checkbox"/> <i>The post registration change requires prior approval</i></p> <p><input type="checkbox"/> <i>The post registration change does not require prior approval</i></p>

<sup>1</sup> <http://cdm.unfccc.int/Projects/deviations/06803>

## Requested Deviations / Changes #2

- Type of change(s):
- ☐ Temporary Deviation from Monitoring Plan
  - ☐ Temporary Deviation from Monitoring Methodology
  - ☐ Corrections that do not affect the project design
  - ☐ Permanent Change from Monitoring Plan
  - ☒ Permanent Change from Monitoring Methodology
  - ☐ Changes specific to afforestation or reforestation

### A. Description of post registration change

<b>Start Date:</b> Please provide the start date of the change	2003-06-03	<b>End Date:</b> Please provide the end date of the change, if applicable	2010-05-05
<b>Description:</b> Please give a detailed description of the changes	<p>Since the start of the project activity (2003/06/03) the PP has not installed the flow meter required for the monitoring of the biogas flow rate at flare inlet (parameter M12)</p> <p>According to methodology AM0013 Version 3 the flow rate of the biogas entering the flare shall be measured and monitored continuously.</p> <p>The PP is proposing to calculate the biogas flow rate at flare inlet (parameter M12) using a mass balance. This value will be calculated as the difference between the biogas volume produced from the anaerobic digesters (total biogas produced) and the total biogas volume being combusted in the boilers for heat generation (measured by individual flow meters for each boiler).</p>		

### B. Assessment of post registration change – Permanent change from MP or MM

<b>Accuracy:</b> Please give a detailed assessment whether the deviation is likely to lead to a reduction in the accuracy of the ER calculation.	<p>The accuracy of the monitoring is affected as no direct measurement has been performed. However, as assessed below, the PP has applied the most conservative assumption for the project activity.</p>
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## Requested Deviations / Changes #2

### Conservative- ness:

Please give a detailed assessment whether conservative assumptions or discount factors have been applied to ensure that ER will not be overestimated.

As stated above no flow meter has been installed at the entrance of the flare to monitor the amount of biogas flared. However, gas flow meters have been installed at the outlet of the anaerobic reactor measuring the total biogas produced from the vinasse anaerobic treatment system. In addition, individual flow meters have been installed at the entrance of each boiler considered in the project activity.

Therefore, this configuration allows the performance of a mass balance analysis in order to determine the amount of biogas sent to the flaring system as the difference between the biogas volume produced from the anaerobic digesters (total biogas produced) and the total biogas volume being combusted in the boilers for heat generation (measured by individual flow meters for each boiler). The difference between both values shall be the volume of biogas that entered the flare system.

In addition to the above, the mass balance result will be cross-checked by the flame detection readings from the flare system indicating that the flare was operational whenever there was a difference between the digester's outflow and the boiler's inflow. In case there are no flame detection readings to confirm the mass balance analysis (digester outflow – boilers inflow is not = 0 +/- flow meter accuracy), it shall be assumed that the biogas has been released to the atmosphere unburnt.

The validation team has checked the proposed deviation and it is considered accurate and conservative. In fact, as the mass balance is based on biogas measurements performed with calibrated equipment<sup>/CC/</sup>. Furthermore, due to the utilization of measured data and that the flare is close to the total biogas production measuring point (less than 40 m difference) the proposed deviation is likely to come very close to reality.

All uncertainties related to the biogas flow meters at the outlet of the anaerobic digester and at the entrance of the boilers are already been addressed in the 2nd MP Verification Report and therefore the mass balance can be considered as adequate. The verification team has verified the continuous operation of the flare and the boiler during the monitoring period.

A potential overestimation of emission reductions related to uncertainties of the mass balance analysis due to pipeline and/or equipment biogas leakage is addressed by regular monitoring procedures and conservative assumptions in the calculation of project emissions. Therefore, the mass balance approach as described above is deemed to be conservative and is not expected to lead to an overestimation of emission reductions.

### Requested Deviations / Changes #2

	The same deviation has already been requested by the PP and it was approved by the EB on October 2009. Please, refer to the Request for Deviation for the Monitoring Plan (I-DEV0268 <sup>2</sup> ) " <i>Deviations to the monitoring plan in the registered PDD project no. 0675</i> ".
<b>Appendix 1 PS:</b> Check if the changes fall under one of the scenarios of appendix 1 of the PS.	The proposed change does not fall under any of the scenarios of the Appendix 1 of the Project Standard. Therefore, prior approval by the Board is required.
<b>C. Revised PDD</b>	
<b>Rev. of PDD:</b> Check whether the changes have been fully addressed in a revised PDD.	<input checked="" type="checkbox"/> The changes have correctly been reflected in the revised PDD. <input type="checkbox"/> A revision of the PDD is not required (in case of temp. changes). <input checked="" type="checkbox"/> The revised PDD has been forwarded in (i) track-change and (ii) clean version.
<b>D. Prior Approval</b>	
<b>Prior approval:</b> Assess whether the change requires prior approval of the board	<input checked="" type="checkbox"/> <i>The post registration change requires prior approval</i> <input type="checkbox"/> <i>The post registration change does not require prior approval</i>

### Requested Deviations / Changes #3

- Type of change(s):
- ☐ Temporary Deviation from Monitoring Plan
  - ☐ Temporary Deviation from Monitoring Methodology
  - ☐ Corrections that do not affect the project design
  - ☐ Permanent Change from Monitoring Plan
  - ☒ Permanent Change from Monitoring Methodology
  - ☐ Changes specific to afforestation or reforestation

### A. Description of post registration change

<b>Start Date:</b> Please provide the start date of the change	2003-06-03	<b>End Date:</b> Please provide the end date of the change, if applicable	2010-05-05
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<sup>2</sup> <http://cdm.unfccc.int/Projects/deviations/06803>

### Requested Deviations / Changes #3

<p><b>Description:</b> Please give a detailed description of the changes</p>	<p>The calculation method and inputs used in the registered PDD for the baseline and project emissions from methane generation in the lagoon system are based on the total amount of wastewater produced by the distillery.</p> <p>However, the calculation method of AM0013, Version 3 is based on the wastewater input to the digester (parameters M1 and M6) or directed to land application.</p> <p>Therefore, the PP is proposing to calculate the baseline and project emissions based only on the wastewater volume entering the digester. In addition, the flow of wastewater sent to laminar irrigation process (aerobic treatment) during the wet season (May to November) will be considered as always directed to the anaerobic lagoon, leading to higher project emissions as initially assumed.</p>
<p>B. Assessment of post registration change – Permanent change from MP or MM</p>	
<p><b>Accuracy:</b> Please give a detailed assessment whether the deviation is likely to lead to a reduction in the accuracy of the ER calculation.</p>	<p>There is no impact in the accuracy. The deviation is only related to how the formulas are applied for the calculation of the project emission reductions.</p>

### Requested Deviations / Changes #3

#### Conservative- ness:

Please give a detailed assessment whether conservative assumptions or discount factors have been applied to ensure that ER will not be overestimated.

Methodology AM0013 Version 3 uses exactly the same formula for lagoon baseline and project emissions (as shown in pages 6 and 10 of the methodology). Also, AM0013 Version 3 assumes that any wastewater stream bypassing the digester and flowing directly to the lagoon system would lead to the same amount of baseline and project emissions, cancelling each other in the emission reduction calculations.

Nevertheless, the calculation approach in the registered PDD has been developed by the PP due to the planned laminar irrigation process (aerobic treatment) during the wet season (May to November), which would eliminate project emissions from the lagoon system because the lagoon would be completely avoided in the wet season; and this would apply to the wastewater stream leaving the reactor as well as the wastewater stream bypassing the digester. Considering this simplification in the calculation approach the baseline and project emissions in the second monitoring report shall be based only on the wastewater volume entering the digester which is in line with AM0013 Version 3 and leads to a reduction in the emission reduction calculations as compared to ex-ante assumptions in the registered PDD. Thus applying the following equation:

$$\text{CH}_{4\text{lagoonbaseline}} = \text{COD}_{\text{available,m}} \times B_o \times \text{MCF}_{\text{baseline}}$$

Where:

$\text{CH}_{4\text{ lagoon baseline}}$  =  $\text{CH}_4$  from wastewater lagoon; (kg/month)

$\text{COD}_{\text{available,m}}$  = The monthly Chemical Oxygen Demand available for conversion which is equal to the monthly COD entering the digester plus COD carried on from the previous month.

$\text{COD}_{\text{baseline, m}}$  = Monthly Chemical Oxygen Demand of effluent entering Lagoons or directed to land application.

$B_o$  = Maximum methane producing capacity; (0.21 kg  $\text{CH}_4$ /kg COD)

$\text{MCF}_{\text{baseline}}$  = Monthly methane conversion factor

However, as explained in the change request for parameter M5 (lagoon depth) above, there is not enough monitoring data throughout the second monitoring period to verify the impact of laminar irrigation in reducing project emissions. Therefore, the PP is proposing in the revised PDD to conservatively assume that the wastewater is always directed to the anaerobic lagoon, leading to higher project emissions as initially assumed.

### Requested Deviations / Changes #3

	<p>Thus, the equation used for calculating the project emissions at the lagoon is:</p> $CH_{\text{lagoon project}} = (COD_{\text{dig out}}) \cdot (B_0) \cdot (MCF_{\text{baseline}}).$ <p>Where,</p> <p>CODdig out = The COD of effluent leaving the digester and entering the lagoon, (kg COD/yr)</p> <p>Bo = Maximum methane producing capacity (0.21 kg CH<sub>4</sub>/kg COD)</p> <p>MCFbaseleine = Monthly methane conversion factor</p> <p>Hence, it is concluded that this deviations from the monitoring plan in the registered PDD is correct and conservative. Furthermore, it is confirmed that the final ER calculation is in line with AM0013, Version 3 calculation procedure.</p> <p>The same deviation has already been requested by the PP and it was approved by the EB on October 2009. Please, refer to the Request for Deviation for the Monitoring Plan (I-DEV0268<sup>3</sup>) "<i>Deviations to the monitoring plan in the registered PDD project no. 0675</i>".</p>
<p><b>Appendix 1 PS:</b> Check if the changes fall under one of the scenarios of appendix 1 of the PS.</p>	<p>The proposed change does not fall under any of the scenarios of the Appendix 1 of the Project Standard. Therefore, prior approval by the Board is required.</p>
C. Revised PDD	
<p><b>Rev. of PDD:</b> Check whether the changes have been fully addressed in a revised PDD.</p>	<p><input checked="" type="checkbox"/> The changes have correctly been reflected in the revised PDD.</p> <p><input type="checkbox"/> A revision of the PDD is not required (in case of temp. changes).</p> <p><input checked="" type="checkbox"/> The revised PDD has been forwarded in (i) track-change and (ii) clean version.</p>
D. Prior Approval	
<p><b>Prior approval:</b> Assess whether the change requires prior approval of the board</p>	<p><input checked="" type="checkbox"/> <i>The post registration change requires prior approval</i></p> <p><input type="checkbox"/> <i>The post registration change does not require prior approval</i></p>

### Requested Deviations / Changes #4

<sup>3</sup> <http://cdm.unfccc.int/Projects/deviations/06803>

#### Requested Deviations / Changes #4

- Type of change(s):
- ☐ Temporary Deviation from Monitoring Plan
  - ☐ Temporary Deviation from Monitoring Methodology
  - ☐ Corrections that do not affect the project design
  - ☒ Permanent Change from Monitoring Plan
  - ☐ Permanent Change from Monitoring Methodology
  - ☐ Changes specific to afforestation or reforestation

#### A. Description of post registration change

<b>Start Date:</b> Please provide the start date of the change	2003-06-03	<b>End Date:</b> Please provide the end date of the change, if applicable	2010-05-05
<b>Description:</b> Please give a detailed description of the changes	<p>The monitoring plan of the registered PDD considers the measurement of parameters M13 (flow rate of the flare stack gases) and M14 (methane content in stack gas of flare). However, it is not possible to measure these parameters since the project activity uses an open flare.</p> <p>The PP is proposing to use a conservative destruction factor of 50% to calculate the project emissions from the flare operation.</p>		

#### B. Assessment of post registration change – Permanent change from MP or MM

<b>Accuracy:</b> Please give a detailed assessment whether the deviation is likely to lead to a reduction in the accuracy of the ER calculation.	The accuracy is not affected. The default value defined in the applicable methodology will be applied which leads to a more conservative calculation for the project emission reductions.
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#### Requested Deviations / Changes #4

<p><b>Conservative-ness:</b> Please give a detailed assessment whether conservative assumptions or discount factors have been applied to ensure that ER will not be overestimated.</p>	<p>According to page 10 of methodology AM0013 Version 3 and as per the description of project emission calculation formulas under Section B.6.1 of the revised PDD, a conservative destruction factor of 50% should be used for open flares in cases where the efficiency of the flare can not be measured.</p> <p>The change request is based on a conservative default value of 50% for destruction efficiency of the flare. It can be assumed that this value leads to a conservative discount in emission reductions since the efficiency of the installed flare at the project site is expected to have a higher destruction efficiency than 50%. An exact quantification of the difference between the real flare efficiency and the default value is not possible. Nevertheless, as the applied default value of 50% is in line with AM0013 Version 3 the verification team concludes that the requested change is correct and conservative.</p> <p>The same deviation has already been requested by the PP and it was approved by the EB on October 2009. Please, refer to the Request for Deviation for the Monitoring Plan (I-DEV0268<sup>4</sup>) "<i>Deviations to the monitoring plan in the registered PDD project no. 0675</i>".</p>
<p><b>Appendix 1 PS:</b> Check if the changes fall under one of the scenarios of appendix 1 of the PS.</p>	<p>The proposed change does not fall under any of the scenarios of the Appendix 1 of the Project Standard. Therefore, prior approval by the Board is required.</p>
<p><b>C. Revised PDD</b></p>	
<p><b>Rev. of PDD:</b> Check whether the changes have been fully addressed in a revised PDD.</p>	<p><input checked="" type="checkbox"/> The changes have correctly been reflected in the revised PDD.</p> <p><input type="checkbox"/> A revision of the PDD is not required (in case of temp. changes).</p> <p><input checked="" type="checkbox"/> The revised PDD has been forwarded in (i) track-change and (ii) clean version.</p>
<p><b>D. Prior Approval</b></p>	
<p><b>Prior approval:</b> Assess whether the change requires prior approval of the board</p>	<p><input checked="" type="checkbox"/> <i>The post registration change requires prior approval</i></p> <p><input type="checkbox"/> <i>The post registration change does not require prior approval</i></p>

#### Requested Deviations / Changes #5

<sup>4</sup> <http://cdm.unfccc.int/Projects/deviations/06803>



### Requested Deviations / Changes #5

- Type of change(s):
- ☐ Temporary Deviation from Monitoring Plan
  - ☐ Temporary Deviation from Monitoring Methodology
  - ☐ Corrections that do not affect the project design
  - ☐ Permanent Change from Monitoring Plan
  - ☒ Permanent Change from Monitoring Methodology
  - ☐ Changes specific to afforestation or reforestation

### A. Description of post registration change

<b>Start Date:</b> Please provide the start date of the change	2003-06-03	<b>End Date:</b> Please provide the end date of the change, if applicable	2010-05-05
<b>Description:</b> Please give a detailed description of the changes	<p>The monitoring plan of the registered PDD considers the measurement of parameters M17 (flow rate of low pressure boiler equipment stack gases) and M18 (methane content in stack gas of low pressure boiler equipment). However, these parameters have not been measured throughout the monitoring period.</p> <p>The PP is proposing to use the default efficiency factors from the boilers manufacturer specification to calculate the project emissions from the boilers operation.</p>		

### B. Assessment of post registration change – Temporary deviations from MP or MM

<b>Accuracy:</b> Please give a detailed assessment whether the deviation is likely to lead to a reduction in the accuracy of the ER calculation.	The accuracy is not affected. The default efficiency value defined by the boiler manufacturer will be applied which leads to a more conservative calculation for the project emission reductions.
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## Requested Deviations / Changes #5

### Conservative- ness:

Please give a detailed assessment whether conservative assumptions or discount factors have been applied to ensure that ER will not be overestimated.

The description of project emission calculation formulas under Section B.6.1 of the PDD suggests a default factor of 95% for boiler No. 2 and No. 3 and 80% for boiler No. 1 as destruction efficiency for the heat generation equipment. Hence, the PP is proposing to use these default values for the emission reduction calculation.

The verification team has checked the registered PDD so as the applicable methodology AM0013 Version 3 (page 10) and it has been confirmed that the application of the default destruction efficiency factor for the boilers as per the manufacturers specification is appropriate.

These destruction efficiency values were taken from the boilers manufacturer specification<sup>/Boiler/</sup>:

- Technical Datasheet - “Cleaver Brooks” Boiler Model CB, issued by Equipos Industriales SA de CV page 7 – Boiler 1
- Technical Datasheet (STEAMBLOC UK/09/06/GPR) - “SETAMBOLV” Boiler BWD Series, issued by Babcock Wanson UK Ltd page 1 – Boilers 2 and 3

The validation team has checked the documents and has confirmed that the efficiency factors for the boilers are correct.

The change request is based on the conservative default values defined by the manufacturer for destruction efficiency of the boilers. It can be assumed that this value leads to a conservative discount in emission reductions since the efficiency of the installed boilers at the project site is expected be higher. As the applied default values are in line with AM0013 Version 3 the verification team concludes that the requested change is correct and conservative.

The same deviation has already been requested by the PP and it was approved by the EB on October 2009. Please, refer to the Request for Deviation for the Monitoring Plan (I-DEV0268<sup>5</sup>) “*Deviations to the monitoring plan in the registered PDD project no. 0675*”.

### Appendix 1 PS:

Check if the changes fall under one of the scenarios of appendix 1 of the PS.

The proposed change does not fall under any of the scenarios of the Appendix 1 of the Project Standard. Therefore, prior approval by the Board is required.

## C. Revised PDD

### Rev. of PDD:

Check whether the changes have been fully addressed in a revised PDD.

- ☒ The changes have correctly been reflected in the revised PDD.
- ☐ A revision of the PDD is not required (in case of temp. changes).
- ☒ The revised PDD has been forwarded in (i) track-change and (ii) clean version.

## D. Prior Approval

<sup>5</sup> <http://cdm.unfccc.int/Projects/deviations/06803>

## Requested Deviations / Changes #5

### Prior approval:

Assess whether the change requires prior approval of the board

- ☒ The post registration change requires prior approval
- ☐ The post registration change does not require prior approval

## 3.2 Related Findings

Finding	CAR A1
<b>Classification</b>	<input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL
<b>Description of finding</b> Describe the finding in unambiguous style; address the context (e.g. section)	<p>Section B.2.1 of the MR includes information of the deviation performed to the MP during the 1<sup>st</sup> MP. These deviations were approved applying the VVM procedures.</p> <p>For the current 2<sup>nd</sup> MP some of the deviations remain. Nevertheless, the current procedures to be applied correspond to the VVS, and for the case of temporary deviations the Clean development mechanism project standard Version 02.1 has to be applied. As per the information given by the PP it has been identified that some of the deviations (e.g. Problem with M12 and problem with M1/M6) do not fall under Appendix 1 and therefore a prior approval from the EB is required.</p> <p>Based on the above the following issues have been identified:</p> <ol style="list-style-type: none"> <li>1. Parameter M13 in section D.2 refers to a calculation based on the parameter Combustion efficiency of the flare. The combustion efficiency can only be applied for calculating the amount of CH<sub>4</sub> that remains undestroyed for the project emissions, but it makes no sense for the calculation of the flow rate at the flare stack gases. Actually, the calculation of this parameter makes no sense and will not be used in the further calculation of ER. The same applies for M14, M17 and M18.</li> <li>2. The calculation method for parameter M3 refers to a parameter "Flow rate of untreated vinasse" which is not considered in the monitoring plan. Please, further explain this and revise accordingly.</li> <li>3. Parameter B2 introduces in the calculation method a new parameter called "hours of operation" which is not considered in the monitoring plan. Please, clarify how this will be measured and why it is not considered in the monitoring plan.</li> </ol> <p>The PP is requested to clarify whether a new deviation for the MP or a revision of the MP will be performed.</p>

Finding	CAR A1
<p><b>Corrective Action #1</b></p> <p><i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i></p>	<p><b>1.</b> A revision to the monitoring plan will be presented, as the parameters M13, M14, M17 and M18 are not measured, these are not used in the calculation of the emission reductions, therefore will be removed from the monitoring plan.</p> <p><b>2.</b> The parameter M3 has been corrected, it is determined as an indirect measurement, it is a result of the following two direct measurements:</p> <p>a) Flow rate of organic wastewater into the digester (<b>M1, measured</b>); which is multiplied by</p> <p>b) COD concentration in discharged effluent from digester (<b>M7, measured</b>).</p> <p>The consideration “Flow rate of untreated vinasse” has been removed, as it has no impact in the calculation of the emission reductions due to the fact that any wastewater stream bypassing the digester and flowing directly to the lagoon system would lead to the same amount of baseline and project emissions (i.e. the untreated wastewater remained with the same emissions with or without the project as it is not treated), therefore the portion of wastewater bypassing the digester (30% from the distillery) can be removed.</p> <p>It has been delivered to the DOE the monthly monitoring reports in which has been applied this consideration, as can be seen in the ER’s spreadsheet, there is no impact in the ER’s amount.</p> <p><b>3.</b> The magnetic flow meter shows the measurement in m<sup>3</sup>/hr, as can be seen in the monthly reports all the values are reported in m<sup>3</sup>/hr, the statement “* hours of operation” has been removed from the monitoring report.</p>

Finding	CAR A1
<p><b>DOE Assessment #1</b></p> <p><i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i></p>	<p>The request for revision of the MP has been checked as follows:</p> <ol style="list-style-type: none"> <li>1. The PP is requesting to remove parameters M13, M14, M17 and M18 as they are not being measured and therefore default values will be used for the determination of project emissions from flare combustion and heat generation. The proposed change has been assessed as follows: <p><b>Parameters M13 (<math>FR_{f,s}</math> - Flow rate of the flare stack gases) and M14 (<math>P_{CH_4,f,s}</math> - Methane content in stack gas of flare) =</b> These parameters cannot be measured by the project activity due to lack of monitoring equipment available. However, according to page 10 of methodology AM0013 Version 3 and as per the description of project emission calculation formulas under Section E.2 of the registered PDD (p. 61), a conservative destruction factor of 50% should be used for open flares in cases where the efficiency of the flare can not be measured.</p> <p>The project activity has installed an open flare. Therefore, the default value of 50% for destruction efficiency of the flare will be used. It can be assumed that this value leads to a conservative discount in emission reductions since the efficiency of the installed flare at the project site is expected to have a higher destruction efficiency than 50%. An exact quantification of the difference between the real flare efficiency and the default value is not possible. Nevertheless, as the applied default value of 50% is in line with AM0013 Version 3 and with the emission reduction calculation approach applied in the registered PDD the verification team concludes that the requested deviation is correct and conservative.</p> <p>Nevertheless, no revised PDD has been provided in which this situation is explained showing the new calculation procedure for the flare project emissions and where parameters M13 and M14 are removed. (formulas and parameters used for the actual ER calculation).</p> <p><b>Parameters M17 (<math>FR_{e,s}</math> - Flow rate of heat generation equipment stack gases) and M18 (<math>P_{CH_4,e,s}</math> - Methane content in stack gas of heat generation equipment) =</b> These parameters cannot be measured by the project activity due to lack of monitoring equipment available. However, according to the description of project emission calculation formulas under Section E.2 of the registered PDD (p. 61), a conservative destruction factor of 99% should be used for enclosed flares/heat generation equipment in cases where the efficiency cannot be measured.</p> </li> </ol>

Finding	CAR A1
	<p>Methodology AM0013 Version 3 states in <b>Stack emissions from the flare or energy generation</b> (page 10) “ <i>If efficiency for the flares cannot be measured a conservative destruction efficiency factor should be used – 99% for enclosed flares and 50% for open flare</i>”. No specific default value is given for heat generation boilers. Nevertheless, page 51 states that the efficiency boiler is 80%. Therefore, clarification is required on why a 99% efficiency value is considered appropriate and conservative for the calculation of project emissions from energy generation.</p> <p>In addition, no revised PDD has been provided in which this situation is explained showing the new calculation procedure for the energy generation project emissions and where parameters M17 and M18 are removed. (formulas and parameters used for the actual ER calculation).</p> <p><b>2. Parameter M3 (COD<sub>a,in</sub>) - COD that enters the lagoon:</b> The verification team has checked methodology AM0013 ver. 3 and it has been confirmed that ER comes only from the wastewater treated under the digester. Therefore, any wastewater stream bypassing the digester and flowing directly to the lagoon system would lead to the same amount of baseline and project emissions, cancelling each other in the emission reduction calculations.</p> <p>Therefore, the correction made by the PP in which parameter M3 is calculated as Parameter M3 = Flow rate of organic wastewater into the digester (M1) * COD concentration in discharged effluent from digester (M7), is found correct.</p> <p>The verification team has checked the new ER calculation spreadsheet so as the revised monthly monitoring reports and has confirmed that there is no impact in the final ER value as the wastewater treated in the project activity remains the same</p> <p>Nevertheless, in the new MR provided by the PP parameter M3 has been deleted from Section D.2. In addition, no revised PDD has been provided in which this situation is explained showing the final calculation procedure for parameters M3</p> <p><b>3.</b> The PP states that no revision is required for the monitoring procedure of parameter B2, as the magnetic flow meter shows directly the measurement in m<sup>3</sup>/hr. The verification team has checked the photos of the measuring equipment so as the equipment technical data<sup>/TECH/</sup> and has confirmed this situation. Therefore no revision is required for parameter B2. The MR has been properly corrected. This issue is closed.</p>

Finding	CAR A1								
	<p>Other changes to the monitoring plan have also been assessed as follows:</p> <p><b>4. Parameter M5 (<math>D_{lag}</math>) - Depth of wastewater in the lagoon =</b> This parameter refers to the depth of the lagoon, and pending on the lagoon depth the fraction of degradation (fd) under anaerobic conditions due to depth of sludge pit is determined. During the project validation the fraction of degradation (fd) for the baseline scenario was defined as 50% and remained fixed ex-ante. Therefore, parameter M5 is monitored to determine the fraction of degradation (fd) for the project scenario which will impact in the value of project methane emissions from lagoons.</p> <p>Methodology AM00013 Version 3 considers only three lagoon depth ranges which can influence the calculation of project methane emissions from lagoons, which are as follows:</p> <table border="1"> <thead> <tr> <th>Lagoon Depth (m)</th><th>Fraction of degradation under anaerobic conditions due to depth of sludge pit</th></tr> </thead> <tbody> <tr> <td>&gt; 5</td><td>70%</td></tr> <tr> <td>1 &lt; 5</td><td>50%</td></tr> <tr> <td>&lt; 1</td><td>0</td></tr> </tbody> </table> <p>During site visit the verification team confirmed that the maximum depth of the lagoon is 2.1 m (See reference: "Maximum Lagoon Depth.pdf") and therefore the depth range &gt;5 m can be excluded. Hence, there are only two possible ranges: "&lt; 1" with fully aerobic conditions and "1 &lt; 5" with 50% anaerobic conditions.</p> <p>As stated in page 9 of the methodology a significant majority of the COD load will have been reduced by anaerobic digestion and the ponds are expected to operate under largely aerobic conditions, which means that project methane emissions from lagoons are expected to be zero (0).</p> <p>During the wet season from May to November the effluent from the project activity would be diverted to the laminar irrigation facility instead of the project lagoon (as foreseen in the PDD). In addition, the project lagoon was probably below 1 m for some months during the dry season throughout the monitoring period (when the effluent is used for ferti-irrigation). Hence, this situation confirms that in several months the fraction of degradation (fd) for the project scenario was zero (0) as the depth would be lower than 1 m. Nevertheless, as no complete measurements are available for the project activity due to the situations described on the document "Request for revision of MP - UNFCCC Ref. No. 0675.pdf" a fixed value of 2.1 m for the lagoon depth will be used, as this value corresponds to the maximum depth of the lagoon at its deepest point.</p>	Lagoon Depth (m)	Fraction of degradation under anaerobic conditions due to depth of sludge pit	> 5	70%	1 < 5	50%	< 1	0
Lagoon Depth (m)	Fraction of degradation under anaerobic conditions due to depth of sludge pit								
> 5	70%								
1 < 5	50%								
< 1	0								



Finding	CAR A1
	<p>The verification team has checked the applicable methodology AM0013 Version 03 and it has been confirmed that the fixed value of 2.1 m lagoon depth is the most conservative assumption as it results in higher project emissions calculation scenario, reducing significantly the CER potential of the project throughout the monitoring period.</p> <p>Nevertheless, no revised PDD has been provided in which this situation is explained and where the new monitoring arrangements (parameter estimated, calculated or measured; crosscheck based on annual confirmation of lagoon dimensions; source of data, etc.) for parameter M5 are described in the corresponding PDD Sections (B.7.2).</p> <p><b>5. Parameter M12 (<math>FR_{f,inlet}</math>) - Biogas flow entering flare</b> = The validation team has checked the proposed deviation and it is considered accurate and conservative.</p> <p>In fact, as the mass balance is based on biogas measurements performed with calibrated equipment (please, refer to the verification report for the detail information about the flow meters calibration). Furthermore, due to the utilization of measured data and that the flare is close to the total biogas production measuring point (less than 40 m difference) the proposed deviation is likely to come very close to reality.</p> <p>All uncertainties related to the biogas flow meters at the outlet of the anaerobic digester and at the entrance of the boilers are already been addressed in the 2nd MP Verification Report and therefore the mass balance can be considered as adequate.</p> <p>Nevertheless, no revised PDD has been provided in which this situation is explained and where the new monitoring arrangements (parameter estimated, calculated or measured; crosscheck procedures; source of data, etc.) for parameter M12 are described in the corresponding PDD Sections (B.7.2).</p> <p><b>6. Parameter M1 (<math>F_{dig}</math>) / M6 (<math>F_{dig,out}</math>) - Wastewater flow into the digester</b> = The new calculation approach for the baseline and project emissions based only on the wastewater volume entering the digester was checked and it has been confirmed that it is in line with AM0013 Version 3 and leads to a reduction in the emission reduction calculations as compared to ex-ante assumptions in the registered PDD.</p> <p>These deviations from the monitoring plan in the registered PDD are correct and conservative. Furthermore, it is confirmed that the final ER calculation is in line with AM0013, Version 3 calculation procedure.</p>

Finding	CAR A1
	<p>Nevertheless, no revised PDD (information in Section B.6) has been provided in which this situation is explained and where the new calculation approach based on parameters M1 and M6 is specified (formulas and parameters used for the actual ER calculation).</p> <p>No revised PDD (using the latest PDD template) has been provided in which all changes to the monitoring plan explained and where the new calculation procedures and changes in the monitoring parameters are shown, as required by the Clean development mechanism project standard - Version 02.1 (12.8.3.3. Permanent changes from the registered monitoring plan or applied methodology)</p> <p><b><u>CAR A1 remains open</u></b></p>



Finding	CAR A1
<p><b>Corrective Action #2</b></p> <p><i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i></p>	<p><b>1. For parameters M13 and M14:</b></p> <p>A revised PDD has been available to the DOE in which the situation is explained for parameters M13 and M14; also it has been clearly shown how the emission reduction calculation has been performed.</p> <p><b>For parameters M17 and M18:</b></p> <p>A revised PDD has been delivered to the DOE in which the situation of parameter M17 and M18 is explained, both parameters were removed due the following considerations:</p> <p>The methodology does not provide specific default values for heat generation boilers efficiency;</p> <p>The efficiency at this point cannot be measured; and</p> <p>Any of both parameters are applied in the emission reduction calculation.</p> <p>Also, it has been clearly shown how the emission reduction calculation has been performed.</p> <p><b>2. Parameter M3 was deleted by mistake from section D.2., the Monitoring Report has been corrected to properly include M3.</b></p> <p>Also, a revised PDD has been made available to the DOE explaining the situation of this parameter and showing the details of its determination.</p> <p><b>4. A revised PDD has been made available to the DOE in which the situation is explained and where the new monitoring arrangements for parameter M5 are described in section B.7.2.</b></p> <p><b>5. A revised PDD has been made available to the DOE in which the situation is explained and where the new monitoring arrangements for parameter M12 are described in section B.7.2.</b></p> <p><b>6. A revised PDD has been made available to the DOE in which the situation is explained and information in section B.6. is included.</b></p>

Finding	CAR A1
<p><b>DOE Assessment #2</b></p> <p><i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i></p>	<p><b>PDD Version 5 issued on 21/10/2013</b></p> <p>The PP has provided an updated PDD in which the requested changes have been applied. The validation team has checked the new PDD and the following issues were identified:</p> <ol style="list-style-type: none"> <li>1. Page 46 Section “(iii) <b>Stack emissions from the flare or energy generation</b>” does not describe why the Flow rate of the flare stack gases, Methane content in stack gas of flare, Flow rate of heat generation equipment stack gases and Methane content in stack gas of heat generation equipment cannot be monitored and why the proposed calculation method using the default values of destruction efficiency is correct and conservative.</li> </ol> <p>No reference for the 99% heat generation boilers efficiency has been provided.</p> <p>Section B.7.1 (Page 81 and 82) of the PDD includes information about parameters M13, M14, M17 and M18. Nevertheless, these parameters have been deleted. As per the Project Standard Version 2.1 procedures the revised PDD has to show the final project information.</p> <ol style="list-style-type: none"> <li>2. Parameter M3 is now included in the new PDD and it clearly describes the final calculation procedure. This issue is closed.</li> <li>4. Section B.7.1, parameter M5. The monitoring table states in “Source of data” that default data will be applied. Nevertheless, as per the PDD template the valid options are estimated, calculated or measured.</li> </ol> <p>In section “Value(s) applied” no default value has been specified, instead the PDD makes reference to an Excel file</p> <p>In addition, in section “additional comment” a request for revision is being performed. Nevertheless, as per the Project Standard Version 2.1 procedures the revised PDD has to show the final project information clarifying the appropriateness and conservativeness of the assumptions made for the project activity. Paragraph 218 of the Project Standard states “...project participants shall describe the nature and extent of the non-conforming monitoring in a revised PDD and the proposed alternative monitoring of the project activity (unless the registered PDD already contains this description).”</p> <p>Also, section “additional comment” does not include any crosscheck activity to confirm that the default value used is appropriate.</p>

Finding	CAR A1
	<p>5. Section B.7.1, parameter M12. Section “additional comment” of the Monitoring table includes a request for revision of the monitoring plan. Nevertheless, as per the Project Standard Version 2.1 procedures the revised PDD has to show the final project information clarifying the appropriateness and conservativeness of the assumptions made for the project activity.</p> <p>6. Section B.7.1, parameter M1 and M6. Section “additional comment” of the Monitoring table includes a request for revision of the monitoring plan. Nevertheless, as per the Project Standard Version 2.1 procedures the revised PDD has to show the final project information clarifying the appropriateness and conservativeness of the assumptions made for the project activity.</p> <p>In addition, Section B.6.1, which is the Section where the calculation procedures and formula are explained, does not includes the clarification and explanation about the appropriateness and conservativeness of the calculation method and inputs used in the PDD for baseline and project emissions from methane generation in the lagoon system which are based on the total amount of wastewater produced by the distillery, instead of using the calculation method of AM0013 Version 3 which is based on the wastewater input to the digester or directed to land application.</p> <p>7. The final ER calculation has been changed. Even information that was not complete at the time of the registration of the PDD (i.e. data from May 2005 – Dec 2005) has been included in the PDD. Also, some inconsistencies in the calculated ex-ante emission reductions have been amended (see for example table 16). Nevertheless, the revised PDD has to be updated applying only the changes requested to the project activity and the data used at the time of the project validation has to remain the same.</p> <p>In case the ER changes the PP has to explain this situation and follow paragraph 220 of the CDM Project Standard Version 2.1 “<i>Project participants shall apply conservative assumptions or discount factors to the calculations to the extent required to ensure that GHG emission reductions will not be over-estimated as a result of the change</i>”</p> <p><b><u>CAR A1 remains open</u></b></p>

Finding	CAR A1
<p><b>Corrective Action #3</b></p> <p><i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i></p>	<p><b>1.</b> It has been included in page 46 section “(iii) Stack emissions from the flare or energy generation” of the updated PDD an explanation of why the:</p> <ul style="list-style-type: none"> <li>- Flow rate of the flare stack gases,</li> <li>- Methane content in stack gas of flare,</li> <li>- Flow rate of heat generation equipment stack gases, and</li> <li>- Methane content in stack gas of heat generation equipment.</li> </ul> <p>, cannot be monitored, explanation is as follows:</p> <p>“As indicated in “Tool to determine project emissions from flaring gases containing methane”, Project Emissions from flaring residual gases are calculated based on both flare combustion efficiency and flow of residual gases. The flare efficiency is calculated as a comparison between the methane content in the exhaust gas (stack gas) of the flare and the methane content of the residual gas entering the flare.</p> <p>In the case of an open flare, stack gases (which include remaining methane) are mixed with external air, making unreliable the measure of efficiency. The same rationale applies to the measure of the flow in the flare stack, as the exhaust flow is constantly mixed with external air, making unreliable the measure of the flow rate”.</p> <p>AM0013 Version 03 indicates that 99% can be used for enclosed flares and 50% can be used for open flares as destruction efficiency factor. Since the biogas is either combusted in enclosed boilers or cogeneration unit, a 99% destruction efficiency factor is used (refer to page 10 of the applied methodology, section (iii) numeral (iv).</p> <p>Section B.7.1 of the PDD (page 81 and 82) has been revised, all information of parameters M13, M14, M17 and M18 have been removed to comply with the project standard version 2.1 showing the final project information.</p> <p><b>4.</b> Table of the parameter M5 included in Section B.7.1 of the PDD has been revised; the “Source of data” has been corrected to “measured”.</p> <p>The “Value(s) applied” line has been corrected to show the value used in the emission reduction calculation (2.1 m, rounded up for conservativeness from 2.05 m), which is the deepest lever that the lagoon can reach to the top of the wall, if more water came in, then the lagoon would overflow.</p> <p>Also, it has been included in the “Additional comment” raw, the following: “An annual physical verification of the maximum lagoon depth will be performed to confirm that the value used is appropriate and conservative in terms of project emissions (i.e. tape measure or other method available), evidence of this verification task will be presented to the verification DOE”.</p>

Finding	CAR A1
	<p><b>5.</b> Information on “Additional Comment” row in the table of parameter M12 included in section B.7.1 has been corrected as per the requirements of the Project Standard version 2.1.</p> <p><b>6.</b> Information on “Additional Comment” row in tables of parameters M1 and M6 included in section B.7.1 has been corrected as per the requirements of the Project Standard version 2.1.</p> <p>The following note has been included in section B.6.1 in regards to the baseline and project emissions from methane generation in the lagoon:</p> <p>The calculation method and inputs used in the PDD for baseline and project emissions from methane generation in the lagoon system are based on the total amount of wastewater produced by the distillery. However, the calculation method of AM0013, Version 3 is based on the wastewater input to the digester or directed to land application.</p> <p>Given the fact that AM0013 uses exactly the same formula for lagoon baseline and project emissions, AM0013 assumes that any wastewater stream bypassing the digester and flowing directly to the lagoon system would lead to the same amount of baseline and project emissions, cancelling each other in the emission reduction calculations. The calculation approach has been developed due to the planned laminar irrigation process during the wet season, which would eliminate project emissions from the lagoon system because the lagoon would be completely avoided in the wet season.</p> <p>However, as explained above, there is not enough monitoring data to verify the impact of laminar irrigation in reducing project emissions. Therefore, it is conservatively assumed that the wastewater is always directed to the anaerobic lagoon, leading to higher project emissions. (Also refer to project emissions explanation of choices).</p> <p><b>7.</b> For the referred data applied from May to December 2005 of the CH<sub>4</sub> lagoon project sheet in the emission reductions spreadsheet, it should be noticed that these values were “assumed” in accordance with the request of revision of the MP; if it is correct the approach of the DOE that any value unknown prior to the registration of the project activity should be used, in the registered PDD these values were considered zero, because it was assumed that this effluent was sent to laminar irrigation (there were no emissions associated); however, due to lack of measurements it has been assumed that any untreated vinasse is sent to the lagoon, therefore the formula was applied also for these months (cells D46 to D53 of the “Project lagoon sheet”).</p>

Finding	CAR A1
	<p>If we apply for those months a value of “0” the project emissions decrease from 297,174 tCO<sub>2</sub> to 156,712 and therefore the emission reductions increase from 1,193,191 tCO<sub>2</sub> to 1,333,652 tCO<sub>2</sub> (in the crediting period), and this would not be conservative.</p> <p>It is not that these values were known after the project registration and used during the revision of the MP; it is that these values were assumed as conservative as it was considered that all the vinasse was sent to the lagoon and therefore associates its emissions.</p> <p>The comment included in cell D46 of the “Project lagoon” sheet of the emission reductions spreadsheet has been extended to further clarify this finding.</p> <p>A summary of the changes applied to the emission reductions calculation spreadsheet has been included in section B.6.1 of the updated PDD.</p>

Finding	CAR A1
<p><b>DOE Assessment #3</b></p> <p><i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i></p>	<p><b>PDD Version 6 issued on 13/01/2014</b></p> <p>The PP has provided an updated PDD in which the requested changes have been applied. The validation team has checked the new PDD and the following was identified:</p> <ol style="list-style-type: none"> <li>1. Page 46 Section “(iii) <b>Stack emissions from the flare or energy generation</b>” of the PDD includes now an explanation about why it is not possible to directly monitor the stack emissions from the flare and boiler.  Nevertheless, page 46 of the PDD and the ER calculation spreadsheet only includes the calculation for the stack emissions from boiler. The stack emissions calculation for the flare is missing in the PDD and in the ER calculation. Hence, further corrections are required.  In addition, the default efficiency of 99% for the boiler cannot be accepted. The request for deviation approval performed for the 1st Monitoring period of the project activity states “<i>The DOE verifies that choosing the 99% destruction efficiency is conservative, either by comparing it with the manufacturer’s specification or by comparing with measured values</i>”. Hence, manufacturer’s specifications of the boiler or boiler efficiency measurements have to be provided in order to verify the correctness and appropriateness of the value.  All information for parameters M13, M14, M17 and M18 has been deleted from the PDD in accordance with the post registration change request for changing the monitoring plan.</li> <li>4. Section B.7.1, parameter M5, the monitoring table has been revised and the source of data so as the value applied have been correctly specified.  In addition, it has been included that in order to crosscheck the depth of the lagoon, an annual physical verification of the maximum lagoon depth will be performed to confirm that the value used is appropriate and conservative in terms of project emissions (i.e. tape measure or other method available), evidence of this verification task will be presented to the verification DOE during every verification.  Nevertheless, the sections “measurement method and procedures” and “monitoring frequency” do not contain the corresponding information. This issue remains open</li> <li>5. Section B.7.1, parameter M12. The monitoring table has been revised all corresponding monitoring data have been correctly specified. This issue is closed.</li> </ol>



Finding	CAR A1
	<p><b>6.</b> Section B.7.1, parameter M1 and M6. The monitoring tables have been revised all corresponding monitoring data have been correctly specified.</p> <p>In addition, Section B.6.1 includes an explanation about the appropriateness and conservativeness of the calculation method and inputs used in the PDD for baseline and project emissions from methane generation in the lagoon system. The explanation provided by the PP is found correct, conservative and in line with AM0013 Version. This issue is closed.</p> <p><b>7.</b> As per the explanation given by the PP, the utilization of the values assumed for the period from May 2005 – Dec 2005 is found appropriate and conservative, as this gives a more extensive vision of the project indicators and also it results in lower emission reductions for the project activity.</p> <p>All changes performed in the ER calculation and in the PDD calculation procedures have been explained and clarified as per paragraph 220 of the CDM Project Standard Version 2.1. This issue is closed.</p> <p><b><u>CAR A1 remains open</u></b></p>



Finding	CAR A1
<p><b>Corrective Action #4</b></p> <p><i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i></p>	<p><b>1.</b> The PDD and the emission reduction calculation spreadsheet have been corrected to include the formula that should be used when a portion of the biogas volume at the outlet of the biodigester goes to the flare instead of going to the boilers.</p> <p>At the time of the registration of the PDD for the ex-ante calculation, it was assumed that all the biogas at the outlet of the biodigester goes to the boiler and no portion goes to the flare, this is because it was expected to send the minimum possible volume to the flare, including those cases where any of the three boilers are not in service or in cases of emergencies.</p> <p>At the time of the PDD registration it was not possible to know in advance the volume that will go to the boilers and the volume that will go to the flare, therefore it was assumed that all the volume goes to the boilers and no calculation of stack emissions from the flare was made.</p> <p>However, at the time of the monitoring, it will be calculated the stack emissions for the biogas volume going to the flare and the stack emissions for the biogas volume going to the boilers.</p> <p>In regards to the boiler efficiency, as correctly stated by the DOE the efficiency used for the boilers should correspond to the efficiency stated by the manufacturers (delivered to the DOE).</p> <p>There are three boilers within the project activity:</p> <ul style="list-style-type: none"> <li>- Boiler 1 has an efficiency of 80% (the oldest equipment), and</li> <li>- Boiler 2 and 3 have an efficiency of 95% (the newest equipment)</li> </ul> <p>The ex-ante calculation has been corrected, a 95% boiler efficiency has been applied, because it is expected to use mainly the newest boilers (boilers 2 and 3); however, if during the monitoring period boiler 1 is used, then for that biogas volume the efficiency of this equipment will be applied (80%).</p> <p><b>4.</b> Rows “Measurement methods and procedures” and “Monitoring frequency” have been corrected; it has been specified that an annual physical verification of the maximum lagoon depth will be performed to confirm that the value used is appropriate and conservative in terms of project emissions (i.e. tape measure or other method available).</p>

Finding	CAR A1
<p><b>DOE Assessment #4</b></p> <p><i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i></p>	<p><b>PDD Version 7 issued on 31/01/2014</b></p> <p>The PP has provided an updated PDD in which the requested changes have been applied. The validation team has checked the new PDD and the following was identified:</p> <p><b>1.- Page 46 Section “(iii) Stack emissions from the flare or energy generation”</b> of the PDD is complete including also the calculation procedure for the stack emissions for the flare. As stated by the PP, this emission source is considered as zero as it is expected to sent the biogas to the boilers and it is now possible to ex-ante determine the share of biogas that will be sent to the flare. The above assumption is considered correct.</p> <p>Regarding the boiler efficiency, the PP has chosen to use the default efficiency of 95% for boiler No. 2 and No. 3 and 80% for boiler No. 1. These values were taken from the boilers manufacturer specification:</p> <ul style="list-style-type: none"> <li>• Technical Datasheet - “Cleaver Brooks” Boiler Model CB, issued by Equipos Industriales SA de CV page 7 – Boiler 1</li> <li>• Technical Datasheet (STEAMBLOC UK/09/06/GPR) - “SETAMBOLV” Boiler BWD Series, issued by Babcock Wanson UK Ltd page 1 – Boilers 2 and 3</li> </ul> <p>The validation team has checked the documents and has confirmed that the efficiency factors for the boilers are correct. This issue is closed.</p> <p><b>4.- Section B.7.1, monitoring table for parameter M5</b> has been revised. It has been specified that an annual physical verification of the maximum lagoon depth will be performed. Sections “measurement method and procedures” and “monitoring frequency” are complete and correct. This issue is closed.</p> <p><b><u>CAR A1 is closed</u></b></p>
<p><b>Conclusion</b></p> <p><i>Tick the appropriate checkbox</i></p>	<p><input type="checkbox"/> Additional action should be taken (finding remains open)</p> <p><input checked="" type="checkbox"/> The finding is closed</p>

#### **4 CHANGE TO THE START DATE OF THE CREDITING PERIOD**

The post registration changes do not fall under this category.

## **5 CHANGES TO THE PROJECT / PROGRAMME DESIGN**

The post registration changes do not fall under this category.

## 6 SUMMARY OF ASSESSMENT OPINIONS

The below listed changes have occurred after the registration of the project / PoA.

Type of Change occurred	Total No. of changes	No. of changes which require prior approval
<input type="checkbox"/> Temporary deviations from the MP		
<input type="checkbox"/> Temporary deviations from the MM		
<input type="checkbox"/> Corrections that do not affect the project		
<input type="checkbox"/> Change to the start date of the crediting p.		
<input checked="" type="checkbox"/> Permanent changes from the MP		1
<input checked="" type="checkbox"/> Permanent changes from the MM		4
<input type="checkbox"/> Design changes to the project activity / PoA		
<input type="checkbox"/> Changes specific to AR projects		

All the changes cited above require prior approval of the Board.

Essen, 2014-03-10



Abraham Garza Alvarez  
TÜV NORD JI/CDM CP  
Assessment Team Leader

Essen, 2014-03-10



Emilio Martin  
TÜV NORD JI/CDM CP  
Final Approval

## 7 REFERENCES

**Table 7-1:** Documents provided by the project participant(s)

Reference	Document
<b>/Boilers/</b>	<ul style="list-style-type: none"> <li>Technical Datasheet - “Cleaver Brooks” Boiler Model CB, issued by Equipos Industriales SA de CV page 7 – Boiler 1</li> <li>Technical Datasheet (STEAMBLOC UK/09/06/GPR) - “SETAMBOLV” Boiler BWD Series, issued by Babcock Wanson UK Ltd page 1 – Boilers 2 and 3</li> </ul>
<b>/CC/</b>	<p><b><u>Wastewater Flow meters – yearly</u></b></p> <ul style="list-style-type: none"> <li>Technical Report No. 99 306-205 issued on 2008/04/10 by Centro de Metrologia de Fluidos. <ul style="list-style-type: none"> <li>ROSEMOUNT Flow Meter TAG: FT-101 A - Sensor S/N 02-FM-1023. Calibrated on 2008/02/28. Validity until 2009/02/27.</li> <li>ROSEMOUNT Flow Meter TAG: FT-101 B - Sensor S/N 02-FM-1024. Calibrated on 2008/02/28. Validity until 2009/02/27.</li> <li>ROSEMOUNT Flow Meter TAG: FT-101 - S/N 05-FM-E150. Calibrated on 2008/02/28. Validity until 2009/02/27.</li> </ul> </li> <li>Calibration Certificate – Rosemount Flow meter - TAG: FT-101 A - Sensor S/N 02-FM-1023 – issued by Endress+Hauser. Calibration date: 2010/01/20. Validity until 2011/01/19.</li> <li>Calibration Certificate – Rosemount Flow meter - TAG: FT-101 B - Sensor S/N 02-FM-1024 – issued by Endress+Hauser. Calibration date: 2010/01/20. Validity until 2011/01/19.</li> <li>Calibration Certificate – Rosemount Flow meter - TAG: FT-101 – S/N: 5FME150 – issued by Endress+Hauser. Calibration date: 2010/01/20. Validity until 2011/01/19.</li> </ul> <p><b><u>Spectrophotometers – yearly</u></b></p> <ul style="list-style-type: none"> <li>Calibration certificate No. LPG422.99.00002 – HACH Spectrophotometer – Model: DR 2800 – S/N: 1209668 – issued by CLNSA on 2007/07/18 – valid till: 2008/07/17.</li> <li>Calibration certificate No. BD-SPECT-161 – HACH Spectrophotometer – Model: DR 2800 – S/N: 1209668 – issued by CLNSA on 2007/12/21 – valid till: 2008/012/20.</li> <li>Calibration certificate No. BD-SPECT-180 – HACH Spectrophotometer</li> </ul>

Reference	Document
	<p>– Model: DR 2800 – S/N: 1209668 – issued by CLNSA on 2008/06/18 – valid till: 2009/06/17.</p> <ul style="list-style-type: none"> <li>• Calibration certificate No. CC-ESP-045 – HACH Spectrophotometer – Model: DR 2800 – S/N: 1209668 – issued by CLNSA on 2008/12/27 – valid till: 2009/12/26.</li> <li>• Calibration certificate No. CC-ESP-097 – HACH Spectrophotometer – Model: DR 2800 – S/N: 1209668 – issued by CLNSA on 2009/06/08 – valid till: 2010/06/07.</li> <li>• Calibration certificate No. CC-ESP-145 – HACH Spectrophotometer – Model: DR 2800 – S/N: 1209668 – issued by CLNSA on 2009/12/26 – valid till: 2010/12/25.</li> </ul> <p><b><u>Power meters – yearly</u></b></p> <ul style="list-style-type: none"> <li>• Shark Calibration and Final Test Report – S/N: 0021874426 - issued by Electro Industries / Gauge Tech on 2007/10/09 valid until : 2008/10/08</li> <li>• Conformity and Verification Certificate – SHARK power meter – S/N: 0021874426 - issued by ENATREL on 2012/10/22 valid until : 2013/10/21</li> <li>• Shark Calibration and Final Test Report – S/N: 0021874527 - issued by Electro Industries / Gauge Tech on 2007/10/05 valid until : 2008/10/04</li> <li>• Conformity and Verification Certificate – SHARK power meter – S/N: 0021874527 - issued by ENATREL on 2012/10/22 valid until : 2013/10/21</li> </ul> <p><b><u>Fossil Fuel Flow meter – yearly</u></b></p> <ul style="list-style-type: none"> <li>• Calibration Certificate – Coriolis Mass Flow meter - S/N 305484-001-01 – issued by Endress+Hauser. Calibration date: 2010/01/21. Validity until 2011/01/20.</li> <li>• Calibration Certificate – Coriolis Mass Flow meter - S/N 3111168-001-02 – issued by Endress+Hauser. Calibration date: 2010/01/20. Validity until 2011/01/19.</li> <li>• Calibration Certificate – Coriolis Mass Flow meter - S/N 3111168-001-03 – issued by Endress+Hauser. Calibration date: 2010/01/20. Validity until 2011/01/19.</li> </ul> <p><b><u>Biogas Flow meters (Biodigester) – every five years</u></b></p> <ul style="list-style-type: none"> <li>• Calibration Certificate No. 199/08 – Differential Pressure Transmitter - TAG: FT-103 - S/N 1259143 – issued by Instituto de Pesquisas</li> </ul>

Reference	Document
	<p>Tecnologicas. Calibration date: 2008/02/26. Validity until 2013/02/25.</p> <ul style="list-style-type: none"> <li>• Calibration Certificate – Differential Pressure Transmitter - TAG: FT-103 - S/N 1259143 – issued by Endress+Hauser. Calibration date: 2010/01/21. Validity until 2015/01/20.</li> </ul> <p><b><u>Chromatograph – yearly</u></b></p> <ul style="list-style-type: none"> <li>• Calibration Certificate No. PA-GAS-001 – Gas Chromatograph Model 3800/3380 - S/N 103739 – issued by CLNSA. Calibration date: 2008/08/21. Validity until 2009/08/20.</li> <li>• Calibration Certificate No. PA-GAS-002 – Gas Chromatograph Model 3800/3380 - S/N 103739 – issued by CLNSA. Calibration date: 2009/08/31. Validity until 2010/08/30.</li> <li>• Calibration Certificate No. PA-GAS-003 – Gas Chromatograph Model 3800/3380 - S/N 103739 – issued by CLNSA. Calibration date: 2010/01/19. Validity until 2011/01/18.</li> </ul> <p><b><u>Temperature Sensor – Yearly</u></b></p> <ul style="list-style-type: none"> <li>• Calibration certificate No. CCTT-012/2008 – Thermocouple Type K – Model 956550 –S/N: 00051662210021500533 –issued by IPROCEN S.A. Calibration date: 2008/06/08. Valid till 2009/06/07.</li> <li>• Calibration certificate No. CCTT-200/2009 – Thermocouple Type K – Model 956550 –S/N: 00051662210021500533 –issued by IPROCEN S.A. Calibration date: 2009/06/09. Valid till 2010/06/08.</li> </ul> <p><b><u>Biogas Flow meters (Boilers) – yearly</u></b></p> <ul style="list-style-type: none"> <li>• Technical Report No. 99 306-205 issued on 2008/04/10 by Centro de Metrologia de Fluidos. <ul style="list-style-type: none"> <li>○ dTrans p02 DELTA Flow Meter TAG: FT-701 A - S/N 66503201002390001. Calibrated on 2008/02/28. Validity until 2009/02/27.</li> <li>○ dTrans p02 DELTA Flow Meter TAG: FT-701 B - S/N 63129301002180003. Calibrated on 2008/02/28. Validity until 2009/02/27.</li> <li>○ dTrans p02 DELTA Flow Meter TAG: FT-701 c - S/N 63129301002180004. Calibrated on 2008/02/28. Validity until 2009/02/27.</li> </ul> </li> <li>• Calibration Certificate – Differential Pressure Transmitter - TAG: FT-701 A - Sensor S/N 66503201002390001 – issued by Endress+Hauser.</li> </ul>



Reference	Document
	<p>Calibration date: 2010/01/21. Validity until 2011/01/20.</p> <ul style="list-style-type: none"> <li>Calibration Certificate – Differential Pressure Transmitter - TAG: FT-701 B - Sensor S/N 63129301002180003 – issued by Endress+Hauser. Calibration date: 2010/01/21. Validity until 2011/01/20.</li> <li>Calibration Certificate – Differential Pressure Transmitter - TAG: FT-701 B - Sensor S/N 63129301002180004 – issued by Endress+Hauser. Calibration date: 2010/01/21. Validity until 2011/01/20.</li> </ul> <p><b><u>Level Sensor – no further maintenance or calibration required</u></b></p> <ul style="list-style-type: none"> <li>Kobold Level Sensor Datasheet</li> </ul> <p><b><u>Manufacturers recommendations</u></b></p> <ul style="list-style-type: none"> <li>Waste water Flow meter Rosemount Model 570TM – yearly calibration – email issued by Diego Obando Murillo (diego.obando@elvatron.com) from the Industrial Instrumentation Unit</li> <li>Biogas Flow meter Rosemount Model 3051 – every five years calibration – Technical Data Sheet 00813-0100-4001, Rev HA issues on March 2008.</li> <li>HACH Spectrophotometers – yearly calibration – email issued by Gioconda Gavarrete (ventas2@grober.com.ni) from Gröber &amp; Cía.</li> <li>Lambrecht Thermometer manual – lifelong guarantee.</li> <li>Shark Power meter– yearly calibration – email issued by Eduardo Lorenzo (elorenzo@electroind) from Electroind</li> <li>Chromatograph– yearly calibration – email issued by Marisol Casas (Marisol.casas@bruker.com) from Bruker Mexicana S.A. de C.V.</li> <li>Thermocouple– yearly calibration – email issued by Rainer Molina (Rainer.Molina@jumo.net) from JUMO GmbH Co. KG</li> </ul>
<b>/DEPTH/</b>	<ul style="list-style-type: none"> <li>Lagoon depth monitoring records</li> <li>Maximum Lagoon Depth.pdf</li> </ul>
<b>/ISO/</b>	<ul style="list-style-type: none"> <li>ISO 9001:2008 Certificate</li> <li>ISO 14001:2004 Certificate</li> </ul>

Reference	Document
/Irrigation/	<ul style="list-style-type: none"> <li>Laminar irrigation monitoring records</li> </ul>
/LAB/	<p><b><u>Internal Analysis for COD determination</u></b></p> <ul style="list-style-type: none"> <li>Laboratory Test Results covering the monitoring period</li> <li>Report No. FSI-153.1.4.2 – Daily Report for Biodigester Process “<i>Reporte Diario de Proceso del Biodigester</i>”.</li> <li>Operational Instruction: ITSI-153.1.4 – Biodigester Analysis Methods “<i>Métodos de Análisis del Biodigester</i>” issued on 2008/07/25</li> </ul> <p><b><u>Internal Analysis for CH<sub>4</sub> content (Chromatography)</u></b></p> <ul style="list-style-type: none"> <li>Laboratory Test Results covering the monitoring period</li> <li>Operational Instruction: ITSI-153.1.4 – Biodigester Analysis Methods “<i>Métodos de Análisis del Biodigester</i>” issued on 2008/07/25</li> </ul>
/LIC/	<p><b><u>Licenses</u></b></p> <ul style="list-style-type: none"> <li>Administrative Resolution No. 007-2001 issued on 2002/04/10 by the Ministry of Environment and Natural Resources.</li> </ul>
/logbook/	Operational Logbook records covering the monitoring period.
/MR/	<ul style="list-style-type: none"> <li>Monitoring Report “Vinasse Anaerobic Treatment Project – Compañía Licorera de Nicaragua, S.A. (CLNSA)” – version 1 – Period: from 2008-07-01 to 2010-05-05 (both days included) – hosted on 2012-07-13</li> <li>Monitoring Report “Vinasse Anaerobic Treatment Project – Compañía Licorera de Nicaragua, S.A. (CLNSA)” – version 2 – Period: from 2008-07-01 to 2010-05-05 (both days included) – hosted on 2013-02-06</li> <li>Monitoring Report “Vinasse Anaerobic Treatment Project – Compañía Licorera de Nicaragua, S.A. (CLNSA)” – version 4 – Period: from 2008-07-01 to 2010-05-05 (both days included) – hosted on 2013-05-09</li> <li>Monitoring Report “Vinasse Anaerobic Treatment Project – Compañía Licorera de Nicaragua, S.A. (CLNSA)” – version 5 – Period: from 2008-07-01 to 2010-05-05 (both days included) – hosted on 2013-06-17</li> </ul>
/Mtto/	Maintenance records
/photo/	Miscellaneous Photographic records taken by verification team during site

Reference	Document
	visit.
<b>/PDD/</b>	<ul style="list-style-type: none"> <li>Project Design Document for CDM project: “<i>Vinasse Anaerobic Treatment Project - Compañía Licorera de Nicaragua, S. A. (CLNSA)</i>” version 4.1, dated 2006-09-14</li> <li>Project Design Document for CDM project: “<i>Vinasse Anaerobic Treatment Project - Compañía Licorera de Nicaragua, S. A. (CLNSA)</i>” version 5, dated 2013-10-21</li> <li>Project Design Document for CDM project: “<i>Vinasse Anaerobic Treatment Project - Compañía Licorera de Nicaragua, S. A. (CLNSA)</i>” version 6, dated 2014-01-13</li> <li>Project Design Document for CDM project: “<i>Vinasse Anaerobic Treatment Project - Compañía Licorera de Nicaragua, S. A. (CLNSA)</i>” version 7, dated 2014-01-31</li> </ul>
<b>/PRO/</b>	<p><b><u>Organization, roles and positions</u></b></p> <ul style="list-style-type: none"> <li>Operation Manual – Wastewater treatment – Document: PRJ. No 5102 Rev. 0 issued on 2002/10/29.</li> </ul> <p><b><u>Operational procedures</u></b></p> <ul style="list-style-type: none"> <li>Operation Manual – Wastewater treatment – Document: PRJ. No 5102 Rev. 0 issued on 2002/10/29.</li> <li>Operational Procedure: PSI-153.1 – Biogas Generation –issued on 2009/01/22</li> <li>Operational Instruction: ITSI-153.0.2 – Preparation of standard solutions for waste water treatment.</li> <li>Operational Instruction: ITSI-153.0.9 – Failure of the Automatic Control System</li> <li>Operational Instruction: ITSI-153.1.2 – Start-up of the Biodigester Plant</li> <li>Operational Instruction: ITSI-153.1.5 – Stoppage of the Biodigester Plant</li> <li>Operational Instruction: ITSI-153.1.6 – Consumption of biogas in the Boilers</li> <li>Operational Instruction: ITSI-153.1.7 – Manual start-up of the Flare</li> </ul>
<b>/SCADA/</b>	Screenshots of the Biogas Plant SCADA system

Reference	Document
/TECH/	<p><b><u>Process Description</u></b></p> <ul style="list-style-type: none"> <li>Project Description: Operation Manual – Wastewater treatment – Document: PRJ. No 5102 Rev. 0 issued on 2002/10/29.</li> </ul> <p><b><u>Equipment Technical Data &amp; Manuals</u></b></p> <ul style="list-style-type: none"> <li>Photos taken to the equipment name plate;</li> <li>Blowers technical data sheet issued by Continental Industrie S.A. on September 1997</li> <li>Spectrophotometer DR 2800 Manual – Ref: DOC027.61.00791.MR207 – issued by HACH on March 2007, 1<sup>st</sup> Edition.</li> <li>Power Meter Shark 200-S – Doc #: E149721 – Installation &amp; Operation Manual – Revision 1.03 issued on 2009/11/18</li> <li>Power Meter Brochure – Shark 200.</li> <li>Fossil fuel flow meter – User’s Manual IM 01R04B04-00E-E, 6<sup>th</sup> Edition, issued on June 2007</li> <li>Biogas Flow meter Manual – Rosemont 3051 Pressure Transmitter – Product Data Sheet 00813-0100-4001 – Rev HA issued on March 2008</li> <li>Cromatograph Data Sheet – CP-3800 Gas Chromatograph – No. WCI-0026.r2 issued by VARIAN on September 2003.</li> <li>Thermocouple Data Sheet No. 95.6550 issued by JUMO on September 2002.</li> <li>Pressure Transmitter (Biogas Flow Meters) dTRANS p02 DELTA - Operation Manual No. B 40.4382.0 - issued on August 2001 by Jumo</li> <li>Pressure Transmitter (Biogas Flow Meters) dTRANS p02 DELTA – Data Sheet No. 40.4382 - issued on December 2004 by Jumo.</li> </ul>
/TEMP/	On-site ambient temperature records. Excel file “Temp Rev. 1 - 17_06_13”
/TRAIN/	<p><b><u>Training Certificates</u></b></p> <ul style="list-style-type: none"> <li>Utilization of laboratory equipment, preparation of standard solutions and performance of physicochemical analysis.</li> <li>Measuring equipment calibration</li> <li>Laboratory Technician in Chemical Analysis</li> </ul>

Reference	Document
<b>/XLS/</b>	Emission reduction calculation spreadsheets

**Table 7-2:** Background investigation and assessment documents

Reference	Document
<b>/AM0013/</b>	AM0013. version 03 – Avoided methane emissions from organic waste.water treatment
<b>/CPM/</b>	TÜV NORD JI / CDM CP Manual (incl. CP procedures and forms)
<b>/EB52-60/</b>	Guidelines for Assessing compliance with the calibration frequency requirements, version 01. EB 52, Annex 60.
<b>/GCMRF/</b>	Guidelines for completing the monitoring report form (CDM-MR) Version 2, EB 66, Annex 20.
<b>/IPCC/</b>	<ol style="list-style-type: none"> <li>1. 1996 IPCC Guidelines for National Greenhouse Gas Inventories: work book</li> <li>2. 2006 IPCC Guidelines for National Greenhouse Gas Inventories: work book</li> </ol>
<b>/KP/</b>	Kyoto Protocol (1997)
<b>/LEG/</b>	<ul style="list-style-type: none"> <li>• Decree No. 45-94 Environmental Impact Assessment Regulation</li> <li>• Decree No. 76-2006 Environmental Evaluation System, issued on 2006/12/22</li> <li>• Law No. 217 General Law of Environment and Natural Resources</li> </ul>
<b>/MA/</b>	Decision 3/CMP. 1 (Marrakesh – Accords & Annex to decision (17/CP.7))
<b>/MRT/</b>	Monitoring Report Form (F-CDM-MR) Version 2.0
<b>/PS/</b>	Project Standard (EB 65 Annex 5)
<b>/RDEV/</b>	Request for Deviation for the Monitoring Plan (I-DEV0268) “ <i>Deviations to the monitoring plan in the registered PDD project no. 0675</i> ” approved by the EB on 2009/07/10
<b>/VAL/</b>	Validation Report for CDM project “ <i>Vinasse Anaerobic Treatment Project -</i>

Reference	Document
	<i>Compañía Licorera de Nicaragua, S. A. (CLNSA)™</i> version 0, dated 2006-09-28
<b>/VER/</b>	Documents of previous verifications (Monitoring report, verification report, ER calculation sheet)
<b>/VVS/</b>	CDM Validation and Verification Standard (Version 0.2 as per EB 65, Annex 4)

**Table 7-3:** Websites used

Reference	Link	Organization
<b>/dna/</b>	<a href="http://www.marena.gob.ni">www.marena.gob.ni</a>	DNA of Nicaragua
<b>/ineter/</b>	<a href="http://www.ineter.gob.ni">www.ineter.gob.ni</a>	Nicaraguan Institute of Territorial Studies "Instituto Nicaragüense de Estudios Territoriales"
<b>/ipcc/</b>	<a href="http://www.ipcc-nggip.iges.or.jp">www.ipcc-nggip.iges.or.jp</a>	IPCC publications
<b>/unfccc/</b>	<a href="http://cdm.unfccc.int">http://cdm.unfccc.int</a>	UNFCCC

**Table 7-4:** List of interviewed persons

Reference	Mol <sup>1</sup>		Name	Organization / Function
<b>/IM01/</b>	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms	Francisco Salgado	CLNSA / Plant Chief
<b>/IM01/</b>	V	<input type="checkbox"/> Mr. <input checked="" type="checkbox"/> Ms	Elianne Peñalba	CLNSA / International Operation Chief
<b>/IM01/</b>	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms	Julio Monjarrez	CLNSA / Supervisor
<b>/IM01/</b>	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms	Modesto Carcamo	CLNSA / Boiler Operator
<b>/IM01/</b>	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms	Roman Morales	CLNSA / Quality Control Chief
<b>/IM01/</b>	T	<input type="checkbox"/> Mr. <input checked="" type="checkbox"/> Ms	Ivette Reyes	CLNSA / Environmental Coordinator

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Reference	Mol <sup>1</sup>		Name	Organization / Function
/IM02/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms	Adolfo Mejía Lanza	Eco Ressources / CDM Consultant

<sup>1)</sup> Means of Interview: (Telephone, E-Mail, Visit)

# ANNEX

- A1:** Assessment of Financial Parameters
- A2:** Assessment of Barrier analysis
- A3:** Competence statements of involved personnel



## ANNEX 1: ASSESSMENT OF FINANCIAL PARAMETERS

**Table A-1:** Assessment of Financial Parameters (VVS, v. 2.0, §§ 120, 121 / in case financial parameters stem from FSR §122)

<input type="checkbox"/>	No financial parameters are used for additionality justification					
<input checked="" type="checkbox"/>	Assessment of all financial parameters see below					
Parameter	Value applied	Unit	Source of Information (please indicate document and page)	Reference	DOE ASSESSMENT	
					Correctness of value applied	Comment
				//	<input type="checkbox"/>	
				//	<input type="checkbox"/>	

**Note:** The changes only relate to the project monitoring equipment and measuring points. Hence, as no impacts or changes were identified in any of the project financial values the assessment has not been performed.

## ANNEX 2: ASSESSMENT OF BARRIER ANALYSIS

**Table A-2:** Assessment of Barrier Analysis (VVS, v. 2.0, §§ 124-127)

<input checked="" type="checkbox"/>		No barrier parameters are used for additionality justification		
<input type="checkbox"/>		Assessment of barriers see below		
Kind of Barrier (invest, tech, other)	Description of Barrier	Evidence used	Assessment of validation team	
			Appropriateness of information source	Explanation of final result
			<input checked="" type="checkbox"/>	
			<input checked="" type="checkbox"/>	

**Note:** The changes only relate to the project monitoring equipment and measuring points. Hence, as no impacts or changes were identified in any of the project barriers the assessment has not been performed.

### **ANNEX 3: STATEMENTS OF COMPETENCE OF INVOLVED PERSONNEL**