CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-SSC-PDD)
Version 03 - in effect as of: 22 December 2006

CONTENTS

Annexes

Revision history of this document

Version Number	Date	Description and reason of revision
01	21 January 2003	Initial adoption
02	8 July 2005	• The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document. • As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at <http://cdm.unfccc.int/Reference/Documents>.
03	22 December 2006	• The Board agreed to revise the CDM project design document for small-scale activities (CDM-SSC-PDD), taking into account CDM-PDD and CDM-NM.

SECTION A. General description of small-scale project activity

A.1 Title of the small-scale project activity:

Avelino Bragagnolo - Wastewater Treatment using Aerobic System
PDD version 02
30 December 2008

A.2. Description of the small-scale project activity:

The project developer - Avelino Bragagnolo *S/A* Indústria e Comércio - is a paper manufacturing industry, founded in 1963 and located in the State of Santa Catarina, Brazil. The project activity is a wastewater treatment project that avoids the methane production through the replacement of lagoons that treat the effluent in an anaerobic way by biological aerobic system through forced aeration.

The wastewater is produced in the project developer's facilities and is composed mainly by cellulose pulp and small pieces of leftover paper. The actual wastewater treatment plant has all the environmental licenses that permits its operation, and it is in accordance with the local regulation. The applicable legislation does not restrict greenhouse gases emissions and therefore, the wastewater is treated anaerobically. The scenario that would happen without CDM revenues (baseline) is the continuation of anaerobic treatment by the current lagoons. After the treatment, the effluent is directed to Chapecozinho River. This process complies with all the applicable environmental standards.

The proposed project activity comprehends the installation of a new wastewater treatment system, that uses a more complex treatment, with the addition of powerful aerators, changing the anaerobic condition into aerobic. Due to a higher oxygenation of the wastewater, during the organic matter degradation, biogenic Carbon Dioxide (CO_2) production will occur instead of methane (CH_4). The global warming potential of CH_4 is 21 times higher than CO_2. The estimated volume of wastewater to be delivered to the new aerobic system is 203 m^3/h and the expected chemical oxygen demand (COD) is 3,860.5 mg/L.

In Anaerobic Treatment the biogenic organic matter is highly converted to methane, which is currently released to the atmosphere and no major resources are required to operate the system. However, the installation of an aerobic system needs additional investments to support the aeration structure and energy consumption to continuously supply oxygen into the lagoons. The CDM revenue is determinant to this investment, since it will be the only source of revenues to finance the project.

The by-product of the aerobic wastewater treatment, the activated sludge, can be used as a fertilizer or incinerated. No associated emission is expected. The project developer is studying the possibility to incinerate the sludge in their boilers or even sell it to another paper company within the region, so they can incinerate in theirs. However, if it is not possible to incinerate the sludge, it will be sent to a landfill, and the methane emissions will be considered during the verification.

The most important incentive for changing the treatment system is the maintenance of Bragagnolo image as an environmental responsible company. The company's values and responsibilities have always been part of its trademarks, helping the host country achieve sustainable development.

The project is helping Brazil fulfil its goals by promoting sustainable development due to:

- Increases employment opportunities in the area where the project is located during the construction and operation;
- Uses clean and efficient technologies;

- Acts as a clean technology demonstration project;
- Improves the overall management practices of the wastewater treatment.

A.3. Project participants:

Name of party involved (*) ((host) indicates a host party)	Private and/or public entity(ies) Project participants (*) (as applicable)	Kindly indicate if the party involved wishes to be considered as project participant (Yes/No)
Brazil (host)	Avelino Bragagnolo *S/A* Indústria e Comércio	No
	AMBIO Participações Ltda.	No

(*) In accordance with the CDM modalities and procedures, at the time of making the CDM-PDD public at the stage of validation, a Party involved may or may not have provided its approval. At the time requesting registration, the approval by the Party(ies) involved is required.

A.4. Technical description of the small-scale project activity:

A.4.1. Location of the small-scale project activity:

A.4.1.1. Host Party(ies):

Brazil

A.4.1.2. Region/State/Province etc.:

South region, Santa Catarina State.

A.4.1.3. City/Town/Community etc:

Faxinal dos Guedes city, Barra Grande.

A.4.1.4. Details of physical location, including information allowing the unique identification of this small-scale project activity :

Rodovia FAG 050, km. 13 – Distrito de Barra Grande
ZIP 89.696-000 - Faxinal dos Guedes - SC
GPS coordinates 26º46’16”S, 52º11’23”W

A.4.2. Type and category(ies) and technology/measure of the small-scale project activity:

According to Annex A of the Kyoto Protocol, this project fits in Sectoral Scope 13 (Waste handling and disposal).

The project activity is included in type III – Other activities.

The organic wastewater effluent is currently being treated in an anaerobic way, which produces methane that is emitted directly into the atmosphere. The project activity will install a new aerobic system to treat the effluent aerobically.

The aeration system comprises of 120 air diffusers and 01 blower type "roots" (another one will be available for back-up) installed at the mixer and another 768 air diffusers and 03 blower type "roots" (another one will be available for back-up) at the aeration tank. A floater and a decanter system will also be installed.

This technology and equipments are developed by national companies and reliable. The company contracted for designing and installing the project has also participated in other CDM project in the region (see UNFCCC ref 1410).

A.4.3 Estimated amount of emission reductions over the chosen crediting period:

Years	Annual estimation of emission reductions over the chosen crediting period*
2009	8,368
2010	16,736
2011	16,736
2012	16,736
2013	16,736
2014	16,736
2015	16,736
2016	16,736
2017	16,736
2018	16,736
2019	8,368
Total estimated reductions (tonnes of CO_2)	167,360
Total number of crediting years	10
Annual average over the crediting period of estimated reductions (tonnes of CO_2)	16,736

A.4.4. Public funding of the small-scale project activity:

The project will not receive any public funding from Parties included in Annex I of the UNFCCC.

A.4.5. Confirmation that the small-scale project activity is not a debundled component of a large scale project activity:

According to the Appendix C of the Simplified Modalities and Procedures for Small-Scale CDM project Activities: Determining the occurrence of debundling, the following conditions should be addressed for project activities (registered or under validation) with the same project participants:

Conditions	Status
In the same project category and technology/measure	No
Registered within the previous 2 years	No
Another project boundary within a radius of 1km	No

If at least one condition is not satisfied, the proposed project activity cannot be a considered a debundled component of a large project activity.

SECTION B. Application of a baseline and monitoring methodology

B.1. Title and reference of the approved baseline and monitoring methodology applied to the small-scale project activity:

- The project uses the approved methodology AMS-III.I, Avoidance of methane production in wastewater treatment through replacement of anaerobic lagoons by aerobic systems, Version 06.
- For methane correction factor (MCF) value, was used guidance provided by the approved methodology AMS-III.H., Methane recovery in wastewater treatment, version 09.
- The grid emission factor was calculated using the approved "Tool to calculate the emission factor for an electricity system", EB35 annex 12. Version 01.1

B.2 Justification of the choice of the project category:

The project qualifies as a small-scale project activity and will remain under the limits of the emission reduction cap of 60 $ktCO_2e$ for type III projects during every year of the crediting period.

The project activity consists of the change from an anaerobic to aerobic wastewater treatment system thus falling under the "type III – Other project activities" small scale category and sectoral scope 13.

B.3. Description of the project boundary:

According to the III.I methodology used for this project activity, the project boundary is the physical, geographical site where the wastewater treatment takes place. For this project activity, this includes emissions associated exclusively to the lagoon area, from the equipment that monitors the volume of wastewater that will be discharged into the lagoon until the end of aerators influence radius.

B.4. Description of baseline and its development:

The project activity consists of the change from an anaerobic to aerobic wastewater treatment system thus falling under the "type III – Other project activities" small scale category and sectoral scope 13.

The baseline scenario is the situation where, in the absence of the project activity, degradable organic matter in wastewater is treated in an anaerobic way and methane is emitted into the atmosphere. Baseline emissions are calculated as the amount of methane that would be produced in the current system.

There are three alternatives to the project scenario to be considered:

Alternative 1: The proposed project activity without CDM. Modification of the former wastewater treatment system, establishing a new wastewater treatment system based on aerobic digestion of the organic matter, implemented without considering CDM revenue.

This alternative would face investment and other barriers outlined in section B.5 below, therefore is not considered viable without CDM revenues.

Alternative 2: Continuation of the current practice. The wastewater would continue to be treated in an anaerobic way.

Continuation of the current situation would require no investments on the part of the project developer, and would not face any technological or other barriers. The wastewater would continue to be treated by

anaerobic digestion of the organic matter in ponds deeper than 2 meters (as discussed in section B.5 below).

Alternative 3: Construction of an alternative treatment system, such as anaerobic treatment with methane recovery or composting.

This alternative would faces more complexity than alternative 1. The construction of other wastewater treatment systems with methane capture would require a high investment and a significant deviation from the core business of the project developer. The activity involves changes in the current practise of the industry and the employees must be trained to deal with another treatment technology. It is not common practice in the industry to collect the methane from lagoons as in the project plant.

Moreover, methane capture and composting involve technologies not well established in the sector in the region, and would completely change the current wastewater treatment system. Given that this alternative would require significant additional investments to be made and given the technologies that could be applied are not well established in the region, this alternative is not considered as a feasible baseline scenario.

Results: Alternatives 1 and 3, construction of a new wastewater aerobic treatment system or an alternative treatment system, face more barriers than Alternative 2 – continuation of the current practice, and therefore are unlikely to be implemented in the absence of the CDM (i.e. would not be the baseline scenario). Alternative 2, continuation of the current practice, faces no barriers, and is therefore identified as the most likely scenario and thus, the baseline scenario.

B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered small-scale CDM project activity:

The starting date milestone of the project activity is the elaboration of the engineering project of the new wastewater treatment system dated as 07/02/2008. The CER purchase contract started to be negotiated in 2007 and the final ERPA is dated from 07/01/2008.

The project developer started to study the possibility of changing the treatment system after another company in the region registered the project under the CDM. An expert started to develop the PDD even before the technical project was finished by TECNOSAN, the consultancy company responsible for the project in Bragagnolo and Celulose Irani S.A. (ref 1410). As the project developer was in contact with CDM possibilities before requesting the engineering project, this project is in compliance with paragraph 13 of Decision 17/CP.7.

The project activity consists in reducing methane emissions by switching from an anaerobic wastewater treatment system to an aerobic system using activated sludge. The project activity could not be executed without carbon credit revenue as it implies high investment costs. It is demonstrated in this section that the proposed project activity is additional as per options provided under attachment A to Appendix B of the simplified modalities and procedures for small-scale CDM project activities.

Three alternatives were evaluated in order to demonstrate the baseline scenario, as shown in section B.4 above. However, Alternative 3 (construction of an anaerobic treatment with methane recovery) would demand higher investments and face more risks and barriers as detailed below.

Technologies other than Alternatives 1 and 2 present much higher risks for the company, such as lack of working-knowledge of the host country and of the region of the project activity, meaning significant diversion of the company's core business. Moreover, within the technologies available in the host country, this industrial sector traditionally uses open anaerobic lagoons or activated sludge with a

biological filter[1], fact that corroborates the information above. Therefore, as the majority of companies of this industrial sector in the host country do not choose other technologies to treat their wastewater, this project will not consider Alternative 3 to analyze additionality.

In order to demonstrate that the proposed project activity is additional to the baseline scenario chosen, a Barrier Analysis is performed below, using the simple cost approach.

Table: Scenarios considered in barrier analysis.

Scenarios	Description
Alternative 1	Proposed project activity without CDM
Alternative 2	Continuation of current practice

Investment Barrier

- *Alternative 1*: The installation of aerators requires high investments and there are operational costs for the project lifetime. As the change of treatment system has no incomes, besides the CDM revenues, the project activity is not economically feasible and therefore, investment poses a major barrier for this alternative.

Cost	Description
R$ 860,000	Equipment cost of aerobic system supplied by Tecnosan
R$ 689,470 /year	Electricity used for pumping and aerators cost

- *Alternative 2*: There are no investments needed for this alternative. The continuation of current practice would require no investments or changes in the wastewater treatment system or O&M. Therefore, there are no investment barriers for this alternative.

Technological Barrier

According to the Brazilian Science and Technology Ministry[2], the wastewater from paper industry has historically been treated using anaerobic lagoons or activated sludge and biologic filters. Since these two practices are common in Brazil, there is available technology in the host country to allow both alternatives to happen, and thus, there are no barriers to either alternative.

Barrier due to prevailing practice

Generally anaerobic ponds are the most used treatment system in warm weather countries, whereas the aerobic process is more used in developed countries[3]. However, the same arguments used above can be used here. As the industries in this sector have been using the two options for wastewater treatment system for a long time, they are already practiced in the sector. Therefore, there are no barriers due to prevailing practice for either of the alternatives.

Other barriers

- *Alternative 1:* the construction of the new wastewater treatment system involves changes in the actual treatment system. Decanters must be installed; lagoons must be changed and destroyed in order to be transformed from anaerobic to aerobic. This kind of work is not part of the company's core business and constructions of this sort would cause a disturbance in the day-to-day activities of the factory. Moreover, the company would need to train its employees to work with the new

[1] Vieira, S.M.M. & Silva, J.W. (2006). Residues Treatment. In: Brazilian Science and Technology Ministry (MCT). Methane emissions in residues treatment and disposal. First Brazilian inventory of greenhouse gases anthropic emissions: Reference reports. 84p.
[2] Vieira, S.M.M. & Silva, J.W. (*op. cit.*).
[3] Vieira, S.M.M. & Silva, J.W. (*op. cit.*).

equipment and technology. Therefore, there are other barriers, as stated in this paragraph, to this alternative.

- *Alternative 2:* the continuation of current practice does not involve any construction, systematic changes or additional training or labour. Therefore, there are no other barriers to this alternative.

Table: Summary of barrier analysis.

Barriers	1 – Proposed project activity without CDM	2 – Continuation of previous activities
Investment barrier	**Yes**	No
Technological barrier	No	No
Prevailing practice	No	No
Other barriers	**Yes**	No

Since the project activity is subject to financial and other barriers while the current treatment system is not, **the baseline is confirmed as the continuation of current wastewater treatment system practice and, therefore, the project is deemed additional.**

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

The approved methodology AMS-III.I. Version 06 is applicable to the proposed project activity, as it is applicable to measures that avoid the production of methane from biogenic organic matter in wastewater being treated in anaerobic lagoons. The project activity does not recover or combust methane in wastewater treatment facilities.

The lagoons present at the facility fit the criteria for the definition of an anaerobic lagoon as stated in the methodology:

- Anaerobic lagoons are ponds deeper than 2 meters, without aeration, with a temperature above 15° C, at least during part of the year, on a monthly average basis;
- The volumetric loading rate of Chemical Oxygen Demand is 2.73 and above 0.1 kg COD/m^3/day. For the calculations, the lagoon volume used is 6,878m^3 according to the engineering plants. Calculations are provided in section B.6.3.

The project activity involves a change from the current anaerobic wastewater treatment system to an aerobic system, therefore reducing the methane emissions from anaerobic ponds. Also, as stated in section B.2, the project activity will not reduce more than 60 ktCO_2e in any year of the crediting period.

The historical data of temperature at the project plant proves that, during the majority of the year, the monthly average temperature is beyond 15ºC. According to "The Weather Channel" webpage, 2 months per year (June and July) have average temperature under 15°C. The city of Chapecó was selected because it is the nearest big city with monitored average temperatures available.

The project activity emissions consist of:

$$PE_y = PE_{y,ww,treatment} + PE_{y,power} + PE_{y,sludge}$$

Where:

PE_y Project activity emissions in the year "y" (tCO_2e)
$PE_{y,ww,treatment}$ Project emissions from the aerobic wastewater treatment in the year "y"
$PE_{y,power}$ Emissions on account of electricity consumption in the year "y"
$PE_{y,sludge}$ Emissions from anaerobic decay of the sludge produced in the year "y"

For the aerobic treatment emissions:

$$PE_{y,ww,treatment} = Q_{ww,y} * COD_y * B_o * MCF_{aerobic} * GWP\_CH_4$$

Where:

$PE_{y,ww,treatment}$	Project emissions from the aerobic wastewater treatment in the year "y"
$Q_{ww,y}$	Volume of the wastewater treated (including months with temperature <15ºC) (m^3)
COD_y	Chemical oxygen demand of effluent entering the lagoons in the year y (ton/m^3)
B_o	Methane producing capacity for the wastewater (IPCC default value for domestic wastewater of 0.21 kg CH_4/kg.COD)
$MCF_{aerobic}$	Methane correction factor for the wastewater treatment in aerobic systems
GWP_CH_4	Global Warming Potential for CH_4 (value of 21)

And for the electricity consumption component, we have:

$$PE_{y,power} = EC_y * EF_y$$

Where:

$PE_{y,power}$	Emissions on account of electricity consumption in the year "y"
EC_y	Electricity consumed by the project activity devices, in the year "y" (MWh/yr)
EF_y	Emission factor of the applicable energy source (tCO_2e/MWh)

The grid emission factor for the project activity will be determined using the combined margin and calculated ex-post for the year (y-1). The weighting used is w_{OM}=50% and w_{BM}=50%.

Despite the fact that $EF_{grid,CM}$ will be monitored ex-post, for the purposes of the ex-ante emission reduction calculations it has been assumed that this parameter would remain constant throughout the crediting period as a simplicity measure. This assumption is supported by data from the Operation Plan (2008) of the National Electric System from National Electric System Operator (ONS). According to this plan, for the years 2008 – 2012, 45% of new electricity offers would come from renewable sources (42% from hydro resources and 3% from wind) and the remaining 55% would come from thermoelectric sources. These fairly symmetric capacity additions render a low impact in the grid emission factor.

For the sludge emissions component:

$$PE_{y,sludge} = S * DOC_{y,s} * MCF_s * DOC_f * F * 16/12 * GWP\_CH_4$$

It is expected that all the sludge produced will not be disposed in an anaerobic way. In case it is not possible, the appropriate monitoring values will be applied according to the landfill that will receive this material.

The baseline emissions from the lagoon are estimated using the procedure defined under category AMS III.H.:

$$BE_y = \Sigma (Q_{ww,y,m} * COD_{y,m}) * B_o * MCF_{lagoon} * GWP\_CH_4$$

Where:

BE_y	Baseline emissions in the year "y" (tCO_2e)
$Q_{ww,y,m}$	Volume of the wastewater treated during the months m, during year "y", for the months with average lagoon temperature above 15°C (m^3)
$COD_{y,m}$	Chemical oxygen demand of influent entering the lagoons in the year y (tonnes/m^3) for the months with average lagoon temperature above 15ºC.
B_o	Methane producing capacity for the wastewater (IPCC default value for domestic wastewater of 0.21 tCH_4/tCOD)

MCF_{lagoon} Methane correction factor for the wastewater treatment in anaerobic lagoons
GWP_CH_4 Global Warming Potential for CH_4 (value of 21 tCO_2e/tCH_4)

The volumetric loading rate of Chemical Oxygen Demand is calculated using the following formula:

$$VLR = Q_{ww,day} * COD / V_{lagoon}$$

Where:
VLR Volumetric Load Rate (in kg COD/m^3/day)
$Q_{ww,day}$ Volume of wastewater (in m^3/day)
COD Chemical Oxygen Demand (in kg COD/m^3)
V_{lagoon} Lagoon volume (in m^3)

The emission Reduction is calculated as follow:

$$ER = BE – PE$$

B.6.2. Data and parameters that are available at validation:

Data / Parameter:	B_o
Data unit:	$tCH_4/tCOD$
Description:	Methane Producing Capacity (industrial wastewater)
Source of data used:	IPCC 2006
Value applied:	0.21
Justification of the choice of data or description of measurement methods and procedures actually applied :	Default value at the methodology
Any comment:	

Data / Parameter:	$MCF_{aerobic}$
Data unit:	-
Description:	Methane Correction Factor for the Wastewater Treatment in Aerobic System
Source of data used:	UNFCCC approved baseline methodology AMS-III.H.
Value applied:	0.1
Justification of the choice of data or description of measurement methods and procedures actually applied :	Default value at the methodology for well managed systems
Any comment:	

Data / Parameter:	GWP_CH_4
Data unit:	tCO_2e/tCH_4
Description:	Methane Global Warming Potential
Source of data used:	IPCC 2006

Value applied:	21
Justification of the choice of data or description of measurement methods and procedures actually applied :	Default value at the methodology
Any comment:	

Data / Parameter:	MCF_{lagoon}
Data unit:	-
Description:	Methane Correction Factor for Anaerobic Systems
Source of data used:	UNFCCC approved baseline methodology AMS-III.H.
Value applied:	0.8
Justification of the choice of data or description of measurement methods and procedures actually applied :	Value suggested by the methodology
Any comment:	

Data / Parameter:	F
Data unit:	-
Description:	Fraction of CH_4 in landfill gas
Source of data used:	IPCC default value
Value applied:	0.5
Justification of the choice of data or description of measurement methods and procedures actually applied :	Value suggested by the methodology
Any comment:	

Data / Parameter:	DOC_f
Data unit:	-
Description:	Fraction of DOC dissimilated to biogas
Source of data used:	IPCC default value
Value applied:	0.5
Justification of the choice of data or description of measurement methods and procedures actually applied :	Value suggested by the methodology
Any comment:	

B.6.3 Ex-ante calculation of emission reductions:

Project activity emissions consist of methane emissions during the aerobic wastewater treatment, as discussed in section B.6.1. The formula used to calculate project emissions is:

$$PE_y = PE_{y,ww,treatment} + PE_{y,power} + PE_{y,sludge}$$

For the aerobic treatment emissions:

$$PE_{y,ww,treatment} = Q_{ww,y} * COD_y * B_o * MCF_{aerobic} * GWP\_CH_4$$

$PE_{y,ww,treatment}$= 1,778,280m³ * 3,860.5*10^{-6}tCOD/m³ * 0.21tCH_4/tCOD * 0.1 * 21tCO_2/tCH_4= 3.027tCO_2e

And for the electricity consumption component:

$$PE_{y,power} = EC_y * EF_y$$

$PE_{y,power}$ = 2,276MWh * 0.1842tCO_2e/MWh = 419 tCO_2e

The grid emission factor for the project activity will be determined using the combined margin and calculated *ex-post* for the year (y-1). The weighting used is w_{OM}=50% and w_{BM}=50%.

For the sludge emissions component:

$$PE_{y,sludge} = S * DOC_{y,s} * MCF_s * DOC_f * F * 16/12 * GWP\_CH_4$$

$$PE_{y,sludge} = 0$$

It is expected that all the sludge produced will not be disposed in an anaerobic way. In case it is not possible, the appropriate monitoring values will be applied according to the landfill that will receive this material.

Average PEy,power	tCO_2/year	**419**
Average PEy,ww,treatment	tCO_2/year	**3,027**
Average PEy,sludge	tCO_2/year	**0**
Average project emissions (PE)	tCO_2/year	**3,447**

The baseline emissions from the lagoon are estimated using the procedure defined under category AMS III.H.:

$$BE_y = \Sigma (Q_{ww,y,m} * COD_{y,m}) * B_o * MCF_{lagoon} * GWP\_CH_4$$

BE_y = 1,481,900m³ * 3,860.5*10^{-6}tCOD/m³ * 0.21tCH_4/tCOD * 0.8 * 21tCO_2/tCH_4 = 20,183 tCO2e

According to the methodology, the leakage should only be considered if the aerobic treatment equipment was transferred from another activity or if the existing equipment is transferred to another activity. Therefore, as none of these situations occur, leakage is not considered as per this project.

The volumetric loading rate of Chemical Oxygen Demand is calculated using the following formula:

$$VLR = Q_{ww,day} * COD / V_{lagoon}$$

$$VLR = 4,872 * 3,860.5 / 6,878 = 2.73 \text{ kg COD/m}^3\text{/day}$$

ER = BE – PE = 20,183 – 3,447 = 16,736

B.6.4 Summary of the ex-ante estimation of emission reductions:

Years	Estimation of project activity emissions (tonnes of CO_2e)	Estimation of baseline emissions (tonnes of CO_2e)	Estimation of leakage (tonnes of CO_2e)	Estimation of overall emission reductions (tonnes of CO_2e)
2009	1,723	10,091	0	8,368
2010	3,447	20,183	0	16,736
2011	3,447	20,183	0	16,736
2012	3,447	20,183	0	16,736
2013	3,447	20,183	0	16,736
2014	3,447	20,183	0	16,736
2015	3,447	20,183	0	16,736
2016	3,447	20,183	0	16,736
2017	3,447	20,183	0	16,736
2018	3,447	20,183	0	16,736
2019	1,723	10,091	0	8,368
Total (tonnes of CO_2)	34,470	201,830	0	167,360

B.7 Application of a monitoring methodology and description of the monitoring plan:

B.7.1 Data and parameters monitored:

Data / Parameter:	S_y
Data unit:	Tonnes
Description:	Amount of sludge generated by the wastewater treatment in the year y
Source of data to be used:	Weighting
Value of data	0
Description of measurement methods and procedures to be applied:	The sludge directed to the landfill or any other place for anaerobic disposal will be weighted.
QA/QC procedures to be applied:	The weight bridge will be regularly calibrated following national standards.
Any comment:	This sludge is expected to be burned in the boiler or disposed in clearly aerobic conditions. Therefore was not accounted in project emission calculations since no methane generation is expected.

Data / Parameter:	Temperature
Data unit:	ºC
Description:	Average monthly temperature
Source of data to be used:	Public data
Value of data	Higher than 15ºC during 10 months in a year
Description of measurement methods and procedures to be applied:	The project developer will collect the ambient temperature daily, using thermometers.
QA/QC procedures to be applied:	Data will be cross checked by public data for nearby cities.
Any comment:	According to historical measurements, on average temperatures are

	above 15ºC for ten months of the year.

Data / Parameter:	$COD_{y,m}$
Data unit:	mg/L
Description:	Chemical Oxygen Demand of the effluent entering the system
Source of data to be used:	Chemical analysis report from external laboratory or from the project developer laboratory.
Value of data	3,860.5
Description of measurement methods and procedures to be applied:	The COD of the wastewater entering the boundary of the project activity will be measured monthly using calibrated equipments. The calibration certificate will be available for verifications.
QA/QC procedures to be applied:	The measuring procedures will follow the procedures recommended by the equipment supplier. Periodic external laboratory analysis will be used for cross-checking the results every 3 months in case it is analysed internally by the project developer.
Any comment:	The samples are collected at the entrance of the treatment system. The project developer is considering the costs of installing an internal laboratory.

Data / Parameter:	Q_{ww}
Data unit:	m^3/month
Description:	Volume of Wastewater treated
Source of data to be used:	Direct measurements from Project Developer, at least monthly.
Value of data	148,190
Description of measurement methods and procedures to be applied:	The volume of the wastewater entering the boundary of the project activity will be regularly measured using a flow meter.
QA/QC procedures to be applied:	The flow meter will be calibrated according to the manufacturer specifications.
Any comment:	For monitoring, only the months with temperature equal or higher than 15ºC will be accounted to calculate baseline emissions.

Data / Parameter:	EC_y
Data unit:	MWh
Description:	Electricity consumed by all devices installed in result of Project Activity implementation, in the year “y”
Source of data to be used:	Direct measurements from Project Developer or working hours times installed capacity control.
Value of data	2,276
Description of measurement methods and procedures to be applied:	Direct readings from the electricity meter or the installed capacity available at the equipment plate times the working hours. The

	electricity consumed that will be monitored will be consolidated monthly.
QA/QC procedures to be applied:	The meter used will be calibrated according to national standards.
Any comment:	

Data / Parameter:	EF_{CM}
Data unit:	tCO_2e/MWh
Description:	Combined margin CO_2 emission factor of the national grid
Source of data to be used:	Average value of 2007 as published by Brazilian DNA – CIMGC. The "Tool to calculate the emission factor for an electricity system, EB35" is used for this calculation
Value of data	0.1842
Description of measurement methods and procedures to be applied:	The Brazilian DNA will publish this factor regularly. If this data is not available during the verification process, the most recent data will be used. If the public information cannot be assessed and validated by the DOE, the dispatch data analysis will be used as alternative option. For the ER calculation, the emission factor will be calculated ex-post.
QA/QC procedures to be applied:	This is an official data and is publicly available.
Any comment:	OM = 0.2909 and BM = 0.0775 for 2007

Data / Parameter:	$DOC_{y,s}$
Data unit:	-
Description:	Degradable organic content of the sludge generated by the wastewater treatment
Source of data to be used:	IPCC default value
Value of data	0.09
Description of measurement methods and procedures to be applied:	Measured by sampling and analysis of the sludge produced, if an international procedures is available. Otherwise the 0.09 value will be used.
QA/QC procedures to be applied:	
Any comment:	

Data / Parameter:	MCF_s
Data unit:	-
Description:	Methane correction factor of the landfill that receives the final sludge
Source of data to be used:	IPCC default value
Value of data	1.0

Description of measurement methods and procedures to be applied:	
QA/QC procedures to be applied:	
Any comment:	The MCF_s will be determined according to the landfill/ conditions that will receive the sludge.

B.7.2 Description of the monitoring plan:

All measurements will be performed by Project developer's staff which will be controlled by the Effluent Sector. The personnel involved in monitoring activities will be trained to recognize the importance of the CDM to the project activity and to perform all monitoring tasks as described in Monitoring Plan.

- The Effluent Sector will centralize all monitoring information. In this office, the computers will be backed-up regularly.
- All equipments used for monitoring purposes will be calibrated and maintained according to the manufacturer specifications.
- The flow of the wastewater will be measured, with daily and monthly averages available. It will be measured by the project developer, with calibrated flow meter installed at the entrance of the treatment system.
- The COD will be measured at least monthly, by the project developer using a calibrated spectrophotometer or by an external laboratory.
- The amount of sludge to be discarded for anaerobic conditions will be monitored by calibrated weighting bridge located at the entrance of the project plant.

B.8 Date of completion of the application of the baseline and monitoring methodology and the name of the responsible person(s)/entity(ies)

The baseline study and the monitoring methodology were concluded on 18/11/2008 and AMBIO Participações Ltda. was the responsible entity, represented by Luis Filipe Kopp - kopp@ambiosa.com.br and Marcelo Duque – marcelo@ambiosa.com.br.

SECTION C. Duration of the project activity / crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity:

07/02/2008 (date of equipment purchase confirmation)

C.1.2. Expected operational lifetime of the project activity:

30 years 0 months

C.2 Choice of the crediting period and related information:

C.2.1. Renewable crediting period

C.2.1.1. Starting date of the first crediting period:

Not applicable

C.2.1.2. Length of the first crediting period:

Not applicable

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

01/06/2009 (but not earlier than registration)

C.2.2.2. Length:

10 years 0 months

SECTION D. Environmental impacts

D.1. If required by the host Party, documentation on the analysis of the environmental impacts of the project activity:

The project developer is in compliance with all laws and regulations applicable. All applicable licenses were obtained and all conditions were obeyed. The State Environmental Authority, i.e. Fundação do Meio Ambiente do Estado de Santa Catarina (FATMA/SC), requests Environmental Impact Assessment (EIA) for all activities with a high potential to harm the environment. However, as this project does not have a high potential to harm the environment, an EIA was not requested for this project activity.

The environmental license LAP#607/2008 issued by FATMA/SC permits the installation of the new effluent treatment system.

Therefore, given that the project activity will not induce significant impacts, no impact assessment was undertaken.

D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

Not applicable

SECTION E. Stakeholders' comments

E.1. Brief description how comments by local stakeholders have been invited and compiled:

According to Resolution #1 dated December 2nd, 2003 from the Brazilian Inter-Ministerial Commission of Climate Change (Comissão Interministerial de Mudança Global do Clima - CIMGC), any CDM project must send a letter with a description of the project and an invitation for comments by local stakeholders. In this case, letters were sent to the following local stakeholders:

- City Hall of Faxinal dos Guedes;
- Chamber of Deputy of Faxinal dos Guedes;

- District Attorney (known in Portuguese as Ministério Público, i.e. the permanent institution essential for legal functions responsible for defending the legal order, democracy and social/individual interests);
- Environment agencies from the State and Local Authority;
- Brazilian Forum of NGOs;
- Local community association(s).

Local stakeholders were invited to raise their concerns and provide comments on the project activity for a period of 30 days after receiving the letter of invitation.

E.2. Summary of the comments received:

To date, no comments received.

E.3. Report on how due account was taken of any comments received:

To date, no comments received.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

This project will not receive any public funding from Annex 1 parties.

Annex 3

BASELINE INFORMATION

Please refer to section B.4 to all necessary baseline information.

Annex 4

MONITORING INFORMATION

Please refer to section B.7.2 to all necessary monitoring information.

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