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:

Revision history of this project

Version Number	Date	Description and reason of revision
01	18/02/2008	Initial adoption GSP PDD
02	03/03/2008	Validation Protocol
03	21/05/2008	Validation Protocol
04	25/07/2008	Certification Body - Revision

Project title: Project JBS S/A – Slaughterhouse Wastewater Aerobic Treatment – Vilhena Unit
Number of PDD Version: 04
Date: 25/07/2008

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

The JBS S/A, Latin America's biggest beef producer, owns 21 facilities and 3 ranches distributed in 8 states: São Paulo, Rio de Janeiro, Minas Gerais, Goiás, Mato Grosso, Mato Grosso do Sul, Acre and Rondônia. Its current slaughter and processing capacity reaches 22,600 head of cattle per day in 21 production units. This makes the Group the largest Brazilian beef exporter with its products being consumed in more than 100 countries. The JBS S/A ranks among the four biggest meat packers in the world, and is the largest beef producer in South America.

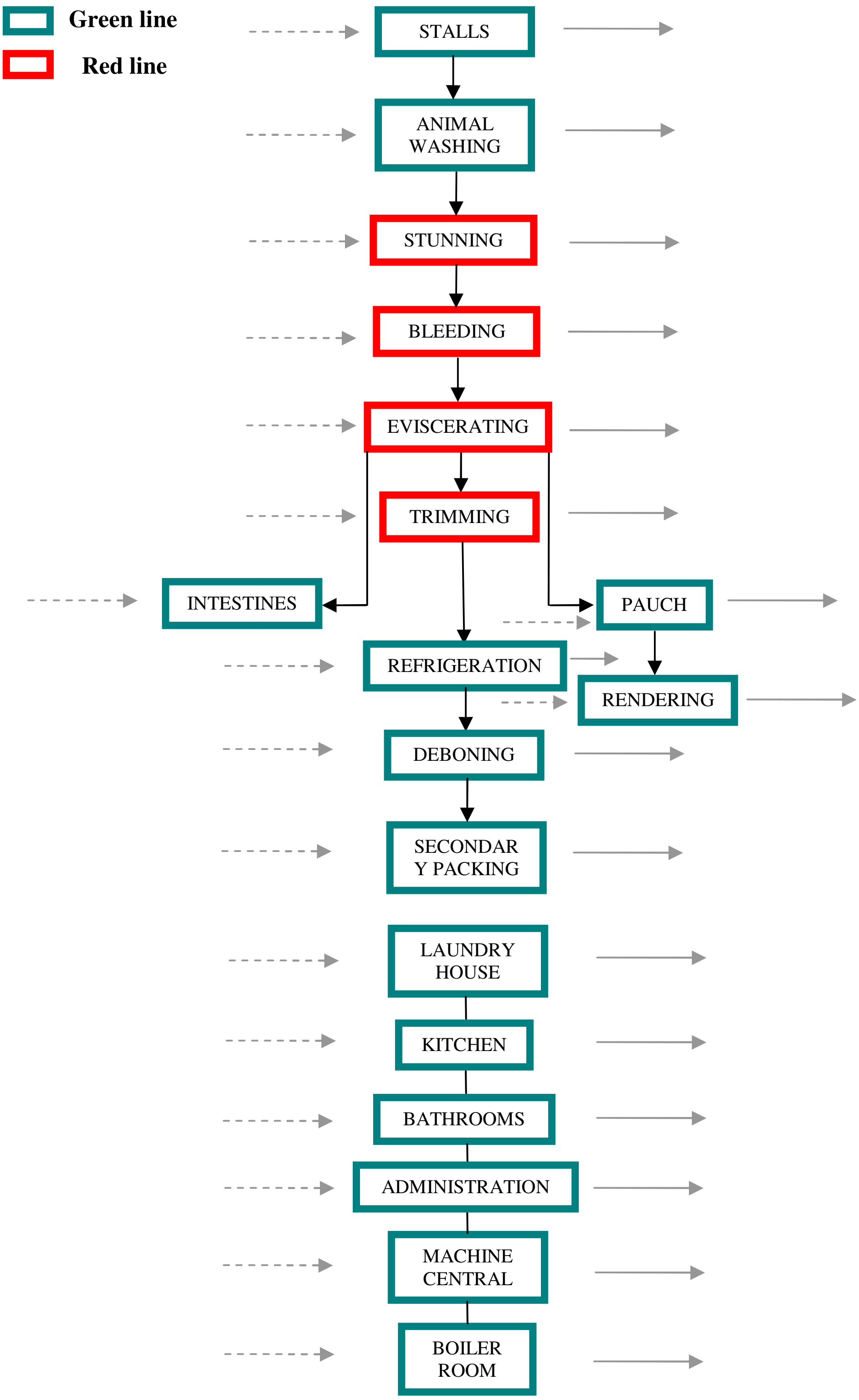
The company operates in the Food segment (fresh meat, processed and canned products) and Transportation, and employs more than 20,000 people.

The Group's strategic vision, determination and expansion politics resulted in acquisition of Swift Argentina in 2005, consequently transforming the Group into the first Brazilian multinational company in beef sector. In 2007, the company restructured its business segments and expanded its participation to foreign markets. During this transition phase the company adopted the name of JBS S/A, while keeping the two brands separated. Eventhough Friboi continues to be the name for its meat products.

There are 2 lines of effluents operating at the Unit: the "red line" and the "green line". The red line consists of effluents from slaughter and animal processing, generally those associated with blood. The green line consists of animal waste and associated stomach residues. In the following paragraphs the baseline scenario and the project activity will be detailed and thereby differenced. The chain diagram indicated below intends to clearly differentiate the green line from the red line.

Figure 01. Chain diagram of the production units, illustrating the consumption of each unit and the effluent that is generated.

CHAIN DIAGRAM OF THE GENERATED WASTEWATER FROM THE SLAUGHTERING PROCESS OF VILHENA



IN - electricity, water, cleaning products and packing materials.

OUT – effluent, sub-products and products that are generated

In the baseline scenario 950 head of cattle are currently being slaughtered per day that generates an average flow rate of 2,375 m³/day considering that an approximate 2.5 m³ of effluent is generated per animal. The baseline scenario considers an increase of 163 % to a future average of 2,500 head of cattle per day until August 2008 and thus clearly before the starting date of the crediting period which will produce an estimated daily flow rate of 6,250 m³/day and 5,000 mg/L of COD. Initially the red and green line goes through a filtering screen where the big size particles are retained. Then the effluent carries on to a solid separator where the grease and solids are removed however this process is not efficient allowing great part of the dissolved solids to carry on to the lagoon system. Following to an open lagoon treatment system made up of two anaerobic lagoons, one facultative[1] lagoon and one lagoon for polishing purposes. This treatment system consists of an anaerobic treatment which is composed of a lagoon system, with four lagoons. The first two lagoons are over 4 m deep and work under anaerobiosis conditions, the third and fourth lagoons that are 2.1 m and 1.8 m deep and act as a facultative and polishing stage. The first three lagoons are mainly responsible for the reduction of the organic content (measured as COD) and the fourth lagoon polishes the effluent until it is finally discharge.

The project activity consists of effluent treatment at the Vilhena meat processing unit, at a future average 2,500 head of cattle per day which will produce an estimated daily flow rate of 6,250 m³/day and 5,000 mg/L of COD. The treatment process will involve two separate filtering screens that will retain big sized particles followed by a physical flotation system with a very low efficiency level of solid removal. The effluent follows to a physico-chemical flotation system that presents an efficiency of 80% of solid removal that acts as a solid separator. The generated sludge (solid portion) generated throughout the entire process will then be applied for soil purposes. The effluent generated during the sludge dewatering process will return to the equalization tank and then will go through the entire process again. The clarified effluent will follow on to the lagoons that will act as aerobic and polishing stages until its final discharge in the river. The diagram illustrating the project activity is shown in figure 3.

The project activity aims to modify the effluent treatment system by altering the anaerobic lagoon treatment to an aerobic system which consists of a physico-chemical treatment by air diffusion avoiding methane emissions generated from the anaerobic lagoons. This modification in the wastewater treatment is responsible for the emissions reductions and is viable due to the CER's income.

The project activity contributes to sustainable development once it avoids methane emissions by altering the wastewater treatment from an anaerobic lagoon system to an aerobic system, which can be seen as an environmental and social benefit.

The open lagoons used in the wastewater treatment in the baseline scenario already resulted in an effluent within the quality specified by CONAMA resolutions to be discharged in the final body of water. However the aerobic treatment will improve the quality of the final effluent as well as diminish the emissions of methane.

The project activity contributes to sustainable development once it is based in three main pillars: environmental, social and economic sustainability. From the environmental point of view the open

[1] Facultative lagoons are able to provide a home for both aerobic and anaerobic bacteria. In the upper layer of water aerobic bacteria can survive and anaerobic bacteria live comfortably in the lower levels of the lagoon. In the top layers (aerobic zone) bacteria use organic matter as food, consuming oxygen and producing carbon dioxide. Algae then convert the carbon dioxide to oxygen via photosynthesis. Solids settle at the bottom of the lagoon to form a sludge deposit. Here anaerobic bacteria use organic matter as food and produce gases such as methane, ammonia and carbon dioxide. (Reference 1 – Annex 7)

anaerobic lagoons used in the effluent treatment in the baseline scenario are considered to be hazardous. Whereas the aerobic treatment applied in the project activity is considered to be a clean technology and presents many environmental benefits like methane emissions reduction which will result in odour reduction and improvement of the quality of the effluent that will be discharged in the river.

Furthermore the project activity will contribute to environmental sustainability through wastewater treatment and by disposing its residues such as sludge in an environmentally correct manner. Other residues such as metal, paper, plastic and glass are recycled.

The environmental improvements achieved with this project activity, are completely linked to the environmental positive impacts which are described in section D.1. Other than the environmental benefits there are significant social benefits due to the project activity. The project activity will increase the employment rate and consequently increase the income distribution and purchasing rate of the population.

The economic development based on the premises of sustainability will also be achieved due to the implementation of this project activity where the environmental and social benefits will add value to the company. The economical sustainability will be achieved while linking the implementation of the project to the CDM revenues. The obtaining of Carbon Credit through this project activity will allow JBS to add the economical aspect of this project, thus completing the triple bottom line of sustainable development. Hence the image of JBS S.A. will be linked to sustainability and therefore will result as a positive vision for the market.

JBS S.A has always shown great effort in Social Actions such as free social services for the local community and employees. Healthwise the participants have free access to gynecological, odontological and pediatric assistance. The participants can still run preventive exams and receive nutritional information, among others. In addition cultural activities are offered such as: painting, dance and theatre classes. Educational activities like children's recreation, talks about recycling and the environment are also offered. The implementation of the project activity will only add to the company's environmental and social actions.

Table 01. Summary of the sustainability strands.

Environmental Sustainability	Social Sustainability	Economical Sustainability
• Odour reduction; • Reduction of the environmental impacts; • Recycling; • Clean technologies like the employed in the project activity; • Effluent and residue treatment.	• Support the growth of the community through social actions; • Income distribution; • Employment rate increase; • Purchasing rate increase.	• The value of the company will increase; • Sustainability will be achieved after implementing the project activity.

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	JBS S/A - Private Entity	No
Brazil	Instituto Totum Ltda. – Private Entity	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 of requesting registration, the approval by the party (ies) involved is required.

For further details of the project participants, please see Annex 1.

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.:

Rondônia

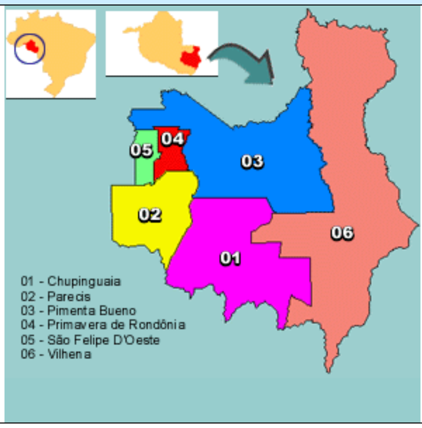
A.4.1.3. City/Town/Community etc:

Vilhena

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

JBS S/A address	
⇒ **JBS S/A Headquarters** Marginal Direita do Tietê, 500 São Paulo – SP	⇒ **Vilhena Facility** Vilhena - RO Rodovia BR 364, Km 18 Distrito Industrial Caixa Postal 441 CEP 78995-000 Tel.: (69) 3316 1300 Homepage: www.jbs.com.br **Geographic coordinates of the general site** *(Source: PRAD* - Plan for Recovery of Degraded Areas*)***:** **Latitude:** 12º43'41.08" **Longitude:** 60º10'10.49"

Characteristics of Vilhena



Founded : 1977
Elevation : 600 m
Population : 46,482 habitants
Total Area : 11,411.2 km²
Density : 4.07 hab/km²

FIGURE 02.
Political division of Brazil. State of Rondônia and Vilhena municipality nº 06
(Source: www.citybrazil.com.br)

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

The project activity falls under the following type and category:
Type (III): Other project activities
Category I: ***Avoidance of methane production in wastewater treatment through replacement of anaerobic lagoons by aerobic systems***

The project activity consists of the installation of an aerobic system for effluent treatment according to the schematic diagram shown in Figure 3.

Methodology to be applied to the project in reference is AMS III I "*Avoidance of methane production in wastewater treatment through replacement of anaerobic lagoons by aerobic systems*" with applicability criteria of up to 60 kt of Annual Emission Reductions.

The technology applied in this project activity is made up of a compressed air diffuser system. There was no technology transference involved in this project activity whereas all the equipment provided by FAST are produced in the southern region of Brazil more specifically *Capinzal – Santa Catarina*.

The project activity treatment system consists of:

Two separate filtering screens will substitute the existing filtering system where the green line and red line effluents will be filtered separately. The red and green line goes through a filtering screen where the big size particles are retained. Then the effluent carries on to a physical flotation system with a very low efficiency level of solid removal. Thereon the mixture is sent to an equalization tank and then submitted to the physico-chemical treatment by air diffusion. This new treatment system has an 80% efficiency of solid removal. The diagram illustrating the project activity is shown in figure 3.

- Thereafter chemical products are added to the effluent such as coagulants and flocculants (polymers) in order to agglomerate the suspended and dissolved solids until floc formation which is made up of the portion of organic matter that are both dissolved and suspended. Liquefied air is injected under high pressure conditions into the effluent before this one enters into the flotation system. Then air and effluent goes through an expansion valve where the pressure is reduced and the air goes from a liquid state to a gas state inside the sludge floc forcing its flotation. The floating sludge is removed by a mechanical scraper located on top of the flotation unit. The effluent then goes to a tri decanter tank where the deposited sludge, water and oil will be separated. The sludge will be dried and the donated to local farms to be used for composting purposes and soil application.

- The oil stored in a tank located after the tri decanter tank will be sent to the rendering unit. The water from the tri decanter tank will be which is considered to be clarified effluent will follow to the lagoons that will act as aerobic and polishing stages until its final discharge in the river. The effluent generated during the drying of the sludge will be pumped back to the equalization tank and go through the entire process.

The slaughterhouse located in Vilhena – Rondônia is in accordance with environmental and safety regulations which are verified through an operating license. The new technology ensures environmental safety by improving the quality of the treated effluent which will be discharged in the river and by reducing the emissions of methane. The project activity substitutes the anaerobic lagoon system for an aerobic system which consists of a physico-chemical treatment by air diffusion which is the new technology. The environmental impacts were evaluated and described in the section D.2.

The schedule for the implementation of the CDM project activity is detailed in table 1 bellow.

Table 01. Time schedule for the implementation of the CDM project activity

Months	2007			2008				
	04	09	12	01	02	03	04	05
CDM Consideration								
Commercial Agreement								
Start of works								
Works of structure and waterproofing								
Equipment Installation								
Start up								
Full system operation								

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

Year	Estimated annual CO_2 emission reductions (tCO_2e/year)
01/01/2009 - 01/01/2010	29,912
02/01/2010 - 01/01/2011	29,912
02/01/2011 - 01/01/2012	29,912
02/12/2009 - 01/01/2013	29,912
02/01/2013 - 01/01/2014	29,912
02/01/2014 - 01/01/2015	29,912
02/01/2015 - 01/01/2016	29,912
Total estimated emission reductions (tonnes of CO_2 e)	**209,381**
Total number of crediting years	**7**
Average annual reductions estimated for the first crediting period (tonnes of CO_2 e)	**29,912**

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

The project does not and will not involve any public funding.

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

The project activity is exclusive to the slaughterhouse of Vilhena. Other JBS S/A slaughterhouses are still evaluating the type of treatment system to be installed. In any event, those treatment systems would be completely independent, located in different meat processing units and are specified in the following table.

Table 02. Debundling information regarding other JBS S/A facilities.

Regarding the other JBS S/A slaughterhouses:	Please mention the following debundling criteria or deny them when possible:
Are the project participants the same?	For all the JBS S/A projects the project participants will be Instituto Totum and JBS S/A.
Do the other project activities comprise the same project category and technology/measure?	All the projects involve wastewater treatment systems. The other JBS S/A slaughterhouses are still evaluating the type of treatment system that will be installed.
Are any of these other projects registered within previous two years? Or in registration process?	Yes there are a couple of projects going through the validation process and that will soon be registered.
Is the boundary within 1 km of the project boundary of the small scale project activity under consideration?	No

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 following approved baseline and monitoring methodology is applied:
AMS III.I – ***Avoidance of methane production in wastewater treatment through replacement of anaerobic lagoons by aerobic systems*** – Version 6, EB 33 valid from 10 Aug 07 onward

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

The Project meets all the applicability conditions of the methodologies, as described below.

Table 03 - Applicability conditions for AMS-III.I.

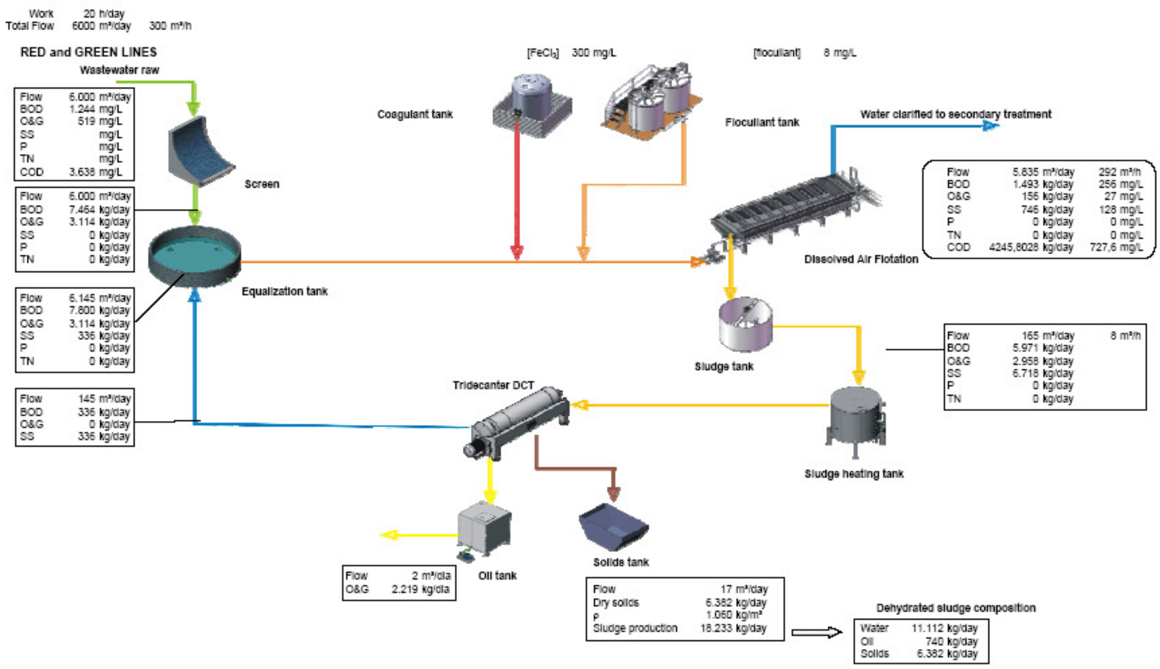
Applicability Condition	Project Case
This project category comprises measures that avoid the production of methane from biogenic organic matter in wastewaters being treated in anaerobic lagoons. Due to the project activity, the anaerobic lagoons (without methane recovery), are substituted by aerobic systems. The project activity does not recover or combust methane in wastewater treatment facilities	The Project involves the introduction of an aerobic system for wastewater treatment. This aerobic system replaces an anaerobic lagoon treatment that is responsible for emitting methane, therefore the project activity will avoid the generation of methane that could only be possible while considering this CDM project. The project activity does not recover and / or combust methane in the wastewater treatment facility once the effluent will be aerobically treated by means of a physico-chemical treatment by air diffusion; therefore methane will no longer be generated by this treatment.
Measures are limited to those that result in emission reductions of less than or equal to 60 kt CO2 equivalent annually.	Emission reductions of the project are estimated as 29,912 t CO_2e per year. Therefore, the Project activity will result in less than 60 kt CO_2 equivalent annually.

B.3. Description of the project boundary:

In line with the methodology AMS-III.I., the project boundary encompasses the following:

The physical and geographical site where the wastewater and sludge treatment takes place is part of the project boundary, shown in figure 03. However the soil application of the sludge will not be considered within the project boundary.

Figure 03. Schematic diagram of the aerobic system for effluent treatment applied in the project activity which encompasses the project boundary.



B.4. Description of how the baseline scenario is identified and description of the identified baseline scenario:

There are four plausible alternatives available that can be applied on effluents with a COD of 5,000 mg/L and a flow rate of 6,250 m³/day, which are:

Alternative 1 - The untreated wastewater being discharged into sea, river, lake, stagnant sewer or flowing sewer;

Alternative 2 - Effluent treatment with an anaerobic open lagoon system and without methane recovery;

Alternative 3 - Installation of another aerobic wastewater treatment system such as biological filters, biodisks (rotating biological contactors) and processes like activated sludge;

Alternative 4 - Installation of the purposed aerobic wastewater treatment system, without CDM consideration.

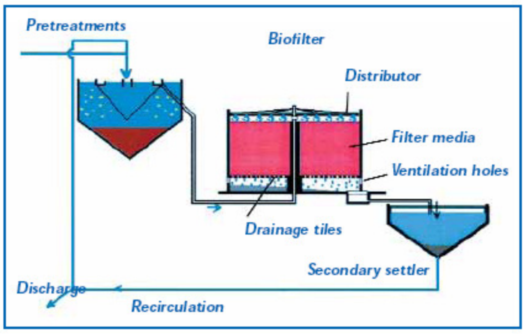
After analyzing the alternatives above under Sub-step 1.b (***Consistency with mandatory laws and regulations***) described in section B.5, alternative 1 cannot be applied. In each region there are a series of laws and regulations that are mandatory which are established by CONAMA where all generated industrial effluents must be in accordance with the environmental legislations in order to be discharged in a river, sea, lake or flowing sewer.

As for alternative 2 it is known that the Brazilian climate optimizes this process once the need for high temperature is required in order to insure the bacteria proliferation that will reduce the amount of organic matter in the effluent. This is an economically viable option once its system is very simple made up of lagoons.

Alternative 3 states other forms of wastewater treatment and it is not plausible when analyzed in terms of the different technologies applied and in order to better explain this conclusion the alternative types of wastewater treatment that are mentioned in alternative 3 will be discussed as follows:

- ***Biological Filters[2]:***

The operating principle of a biological filter [also called biofilter, trickling filter or bacteria bed] consists in running waste water that has been previously settled through a bed of porous stone or open plastic material that serves as a support for purifying micro-organisms (bacteria) (see the drawing below).



Aeration is carried out either by natural aspiration or by forced ventilation. It is a question of supplying the oxygen that is necessary for maintaining aerobic bacteria in proper working order. The polluting matter contained in the water and the oxygen in the air are diffused, through the biological film, and assimilated by micro-organisms. The biological film has aerobic bacteria on the surface and anaerobic bacteria near the support media. By-products and carbon dioxide produced by purification are disposed of in gaseous and liquid fluids.

Biological filters present sensitivity to clogging similar to RBCs.

- ***Biodisks (Rotating Biological Contactors)[3]:***

Another technique that makes use of fixed cultures consists of rotating biological disks (see the diagrams below). These are called Rotating Biological Contactors (RBCs) or Biodisks. Micro-organisms develop and form a purifying biological film on the surface of the disks. As the disks are

[2] Reference 2 – Annex 7.

[3] Reference 2 – Annex 7.

partially immersed, their rotation allows the fixed biomass film to be oxygenated. With this type of installation, the following are necessary:

- the mechanical reliability of the frame (gradual starting of the drive, support properly attached to the axis);
- the sizing of the surface of the disks (this must be made with large safety margins).

Diagram 01. Synoptic of a treatment plant with an RBC (according to a Cartel internet site - http://www.oieau.fr/ service guide section)

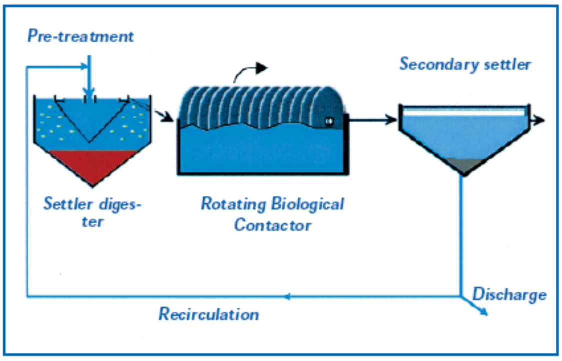
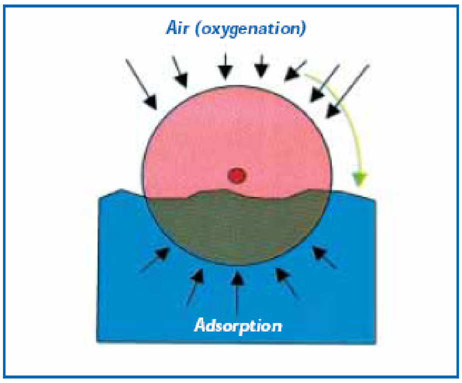


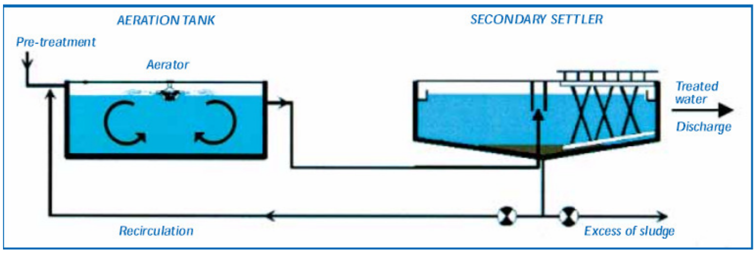
Diagram 02. Diagram of the principle of an RBC.



There are rather high capital costs and there is sensitivity of clogging since it is a filter. This type of treatment requires a very effective pre-treatment. When compared to activated sludge this technique presents a lower performance. Large-sized structures are required when requirements for removing nitrogen are imposed.

- ***Activated Sludge*[4]*:***

. The principle of activated sludge is based upon intensification of the self-purification processes that are found in nature (see the figure below).



The "activated sludge" process consists of mixing and stirring raw sewage with recycled activated sludge, which is bacteriologically very active. Aerobic degradation of the pollution takes place by thoroughly mixing the purifying micro-organisms and the influent to be treated. Then, the "purified water" and "purifying sludge" phases are separated.

A treatment plant of this type includes the following steps:

- preliminary and, sometimes, primary treatment;
- activation basin (or aeration basin);
- the secondary settlement tank where a part of the sludge is re-cycled;
- disposal of treated water;
- the digestion of excess sludge coming from the settlement tanks.

This treatment involves relatively high capital costs, elevated energy consumption, skilled personnel and regular monitoring. This technique presents sensitivity to hydraulic overloads. Another problem which is encountered when applying activated sludge is the settling property of sludge which is not also easy to control due to the high production of sludge that must be thickened.

After explaining the different types of aerobic treatment techniques it is possible to conclude that alternative 3 can not be undertaken as the baseline scenario where there are many costs involved (skilled personnel, an efficient monitoring system, equipment, among others) as well as additional technological difficulties encountered by each technique. Furthermore the project owners did not consider any of the mentioned technologies detailed in section B.4 as a potential project activity. In addition, some of the treatments mentioned above that involve filters can be sensitive to hydraulic overloads or can encounter clogging problems which are some of the technological difficulties that can be faced.

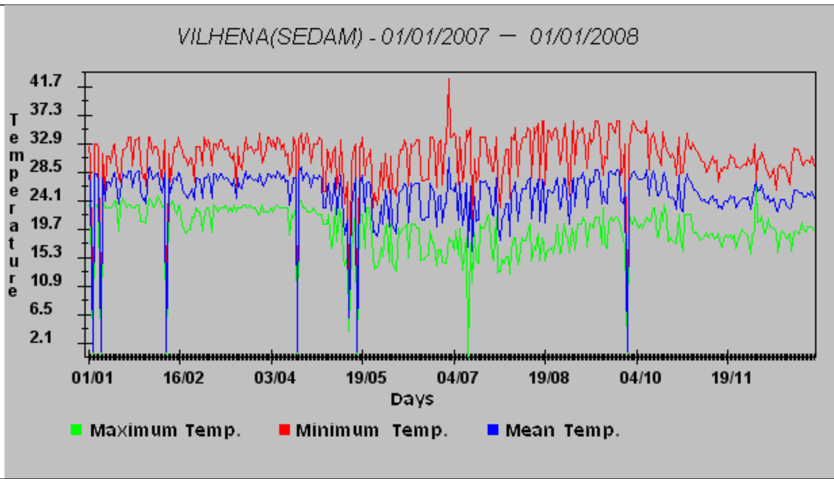
Alternative 4 is unfeasible once the implementation of the project activity depends entirely on the proposed CDM project once the project will be financially supported by the CER's income. The CDM was considered before implementing the project activity which is clearly evidenced in the JBS S.A contract dated 18/04/2007. The investments regarding the equipments involved in the project activity are detailed in section B.5 in sub-step 2b under an investment comparison analysis.

[4] Reference 2 – Annex 7.

Therefore, alternative 2 is determined as the baseline scenario of this project, in other words, the organic matter in the wastewater is treated in anaerobic lagoons where the emission of methane takes place.

The mean temperature at project activity site is around 25ºC, as shown in graphic below.

Graphic 1 – Average temperature at the region of Vilhena.



Source: Agritempo[5]
http://www.agritempo.gov.br

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:

To demonstrate the additionality of the project activity in a transparent manner, the Methodological Tool “***Tool for the demonstration and assessment of additionality”*** version 4 was applied.

Step 1. Identification of alternatives to the project activity consistent with current laws and regulations

Sub-step 1a. Define alternatives to the project activity:

Alternatives to the project activity have been defined in section B.4 as follows.

Alternative 1 - The untreated wastewater being discharged into sea, river, lake, stagnant sewer or flowing sewer;

Alternative 2 - Effluent treatment with an anaerobic open lagoon system and without methane recovery readjusted to the current slaughtering scenario of 2,500 head of cattle per day, which considers an increase of 163%.

Alternative 3 - Installation of another aerobic wastewater treatment system such as biological filters, bio disks and processes like activated sludge;

[5] Reference 3 – Annex 7.

Alternative 4 - Installation of the purposed aerobic wastewater treatment system, without CDM consideration.

Sub-step 1.b - *Consistency with mandatory laws and regulations*:

When considering alternative 1 there are mandatory laws and regulations that prohibit the untreated wastewater of being discharged in a river, sea, lake, stagnant sewer or flowing sewer. The effluent must be in accordance with the environmental legislations established in article 11 of the Regulation of the State Law number 997/76, approved by the decree number 8468/76 and by the article 15 of CONAMA Resolution number 357/05 due to it's characteristics like Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Solid Content, among others.

Step 2. Investment analysis

An investment analysis will be conducted for the proposed project activity in order to compare the scenario where the open lagoon would be readjusted to the current slaughtering scenario due to the increase of 163 % to the project activity scenario. The Net Present Value (NPV) was calculated and compared between both scenarios this clearly demonstrates that the value that would have been invested in the readjustment of the open lagoon treatment system to the current slaughtering scenario would be much lower than the invested in the aerobic system as detailed in **Sub-step 2b**.

Sub-step 2a. ***Determine appropriate analysis method***

According to "Tool for the demonstration and assessment of additionality", version 4 there are three analysis methods recommended, including investment comparison analysis (Option I), investment comparison analysis (Option II) and benchmark analysis (Option III).

Option I: Simple cost analysis. This analysis method can be used if the project activity produces no economic benefits other than CDM related income.

Option II: Investment comparison analysis. This analysis method can be only used if the alternatives to the project are similar investment projects. However, this option is not applicable to this project once the project activity is considered one of a kind.

Option III: The financial benchmark, if Option III (benchmark analysis) is used. If the CDM project activity has a less favourable indicator (e.g. lower IRR) than the benchmark, then the CDM project activity cannot be considered as financially attractive.

Option II will be used in order to perform an investment analysis comparison between alternatives 2 and 4.

Sub-step 2b. ***Option II. Investment Comparison Analysis***

Since JBS would have no other choice than to make an investment in order to be readjust the wastewater treatment system to the current slaughtering scenario due to the 163 % increase. Therefore an investment comparison analysis was applied in order to demonstrate how the proposed project activity is additional when compared to the baseline scenario.

Alternative 2: Effluent treatment with an anaerobic open lagoon system and without methane recovery readjusted to the current slaughtering scenario of 2,500 head of cattle per day, which considers an increase of 163%. JBS would have no other option than to invest in the extension of the current anaerobic wastewater treatment in order to fulfill environmental regulations. However this investment is smaller than the investment required by alternative 4 since it demands minimum operational and maintenance activities (O&M). Table 5 shows that the NPV value of alternative 4 is 75% more expensive than this alternative.

Alternative 4: Installation of the purposed aerobic wastewater treatment system, without CDM consideration. In this investment analysis all the costs related to the entire treatment were accounted for. From the monthly consumption of chemical products to the civil engineering, equipment, machineries were accounted for. Therefore it is possible to show that in the baseline scenario the effluent treatment with anaerobic lagoons would not involve any of the costs with polymers and equipment that the aerobic treatment demands. There is no profit/income expected without CDM as a result of this project activity which re-enforces how the CDM incentive will be important to decide for the project activity.

Table 04. Investments involved in both alternatives 2 and 4.

Financial Data[6]	Investments – Alternative 2		Investments – Alternative 4	
	US$[7]	R$	US$	R$
Civil Engineering	791,764	1,341,961.90	633,937	1,074,461.00
Equipment	-	-	701,001	1,189,822.20
O&M	37,105	62,890.68	76,008	125,485.93
Total	**828,870.48**	**1,404,852.58**	**1,335,939.11**	**2,264,283.20**

Table 05. Investments involved in Vilhenas' project activity.

Alternative Scenarios	NPV[8] 10 years	
	US$	R$
Readjusted Baseline Scenario – Alternative 2	**-1,008,017.53**	**-1,708,488.91**
Full Implantation of the Project Activity – Alternative 4	**-1,767,429.02**	**-2,995,615.45**

Please verify Annex 6 for additional information regarding the Financial Analysis Data.

6 Where US$ 1 is equivalent to approximately R$.1.6949 (Exchange Rate from 09/05/08). Reference 4 – Annex 7

7 Data was provided by Giuliano Conde which works in JBS's Environmental Department in Vilhena.

8 SELIC rate (Special system of Clearance sale and of Custody). There was no SELIC rate established in 04.09.2007 therefore the value of 11.25% from 05/09/2007 was applied. Reference 6 – Annex 7

Step 3. Barrier Analysis

For the Project in reference Step 2 was chosen so that the application of Step 3 is no longer necessary to analyze additionality.

Step 4. Common practice analysis

In section B.4 the various types of aerobic processes stated in alternative 3 were detailed and in accordance with a study developed by *FIESP* there are no Brazilian slaughterhouses that owns a physico-chemical treatment by air diffusion. To the project owners' best of knowledge this fact is reassured. This guarantees that a common practice is effluent treatment in anaerobic lagoons without methane recovery. Therefore this wastewater treatment process is the first of its kind in cattle slaughterhouses in the host country (Brazil) which is demonstrated in a declaration provided by FAST.

The only slaughterhouse that presents the same treatment system as Vilhena is another JBS unit also seeking CDM registration.

Application of the Additionality Tool demonstrated that the project activity is additional because the project activity is not a common practice and needs CMD to be implemented.

Sub-step 4a - ***Analyze other activities similar to the proposed project activity:***

According to the study developed by *FIESP*[9] the only aerobic treatments implemented in cattle slaughterhouses are biological filters, bio disks and processes such as activated sludge which were detailed in section B.4 that ensures that the final effluent is in accordance with the regulations established by the local environmental laws. Moreover there are no articles or studies that indicate that the aerobic effluent treatment system set as the project activity has been applied in other meat processing industries.

Flotation systems like those stated in alternative 3 are well known and are already existing treatment processes. Similar treatment systems have been applied in other countries when considering the equipment (flotation unit) which is being used in this project activity such as in Argentina, where this type of treatment process has been implemented in a chicken farm as a CDM project. The project proponent did not identify its application in cattle slaughterhouse wastewater treatment.

The technology applied of compressed air diffuser system is therefore considered the first of its kind applied in the treatment of wastewater from cattle slaughterhouses, specifically the host country (Brazil).

For this reason this project is the first of its kind, which will stimulate other industries to develop the same type of wastewater treatment system.

Sub-step 4.b - ***Discuss any similar options that are occurring:***

The environmental concern has and is increasing as slaughterhouse industries generate more and more residues and effluent. It is to everyone's knowledge that the wastewater generated in slaughterhouses is considered extremely hazardous due to the elevated amount of organic matter.

[9] Reference 5 - Annex 7

As stated before there is no register that this wastewater treatment is being applied cattle slaughterhouses; therefore no similar option to the proposed project activity was found once it is considered a recent concern.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

The methodology AMS III.I was used in order to calculate the baseline emissions, project emissions and leakage as follows:

1. Baseline Emissions from the lagoon are estimated using the procedure defined under category AMS III.H

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

Where:

BE_y = Baseline emissions in the year "y".

$Q_{ww, y, m}$ = Volume of the wastewater treated during the months m, during year "y", for the months with ambient average temperature above 15°C.

$COD_{y, m}$ = Chemical oxygen demand of effluent entering the lagoons in the year y for the months with ambient average temperature above 15ºC.

MCF_{lagoon} = methane correction factor for the wastewater treatment in anaerobic lagoons (MCF lower value of 0.8 as per table III.H.1 under AMS III.H).

B_o = methane producing capacity for the wastewater (IPCC default value for domestic wastewater of 0.21 kg CH_4/kg.COD)

GWP_CH_4 = Global Warming Potential for CH4.

2. Project Activity Emissions

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

Where:

PE_y = project activity emissions in the year "y".

$PE_{y,power}$ = CO_2 emissions on account of electricity or diesel consumption in the year "y" by the project activity facilities.

$PE_{y,ww,treatment}$ = Methane emissions from the aerobic wastewater treatment in the year "y".

$PE_{y,sludge}$ = Methane emissions from the decay of the sludge generated by the aerobic system, if the sludge is disposed to decay anaerobically in a landfill without methane recovery.

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

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".

EF_y = Ex ante emission factor calculated by project Developers based on data provided by ONS – National Operator of the Electrical System. .

$$PE_{y,ww,treatment} = Q_{ww,y} * COD_y * Bo * MCF_{aerobic} * GWP\_CH4$$

Where:

$PE_{y,ww,treatment}$ = Project emissions from the aerobic wastewater treatment in the year "y".

$Q_{ww,y}$ = Volume of the wastewater treated during the year "y".

COD_y = Chemical oxygen demand of effluent entering the lagoons in the year "y".

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 CH4.

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

Where:

$PE_{y,sludge}$ = Methane emissions from the anaerobic decay of the final sludge generated in the wastewater system in the year "y" (tCO2e)

S_y = Amount of sludge generated by the wastewater treatment in the year y (tonnes).

$DOC_{y,s}$ = Degradable organic content of the sludge generated by the wastewater treatment in the year y (fraction). It shall be measured by sampling and analysis of the sludge produced, and estimated ex-ante using the IPCC default values of 0.05 for domestic sludge (wet basis, considering a default dry matter content of 10 percent) or 0.09 for industrial sludge (wet basis, assuming dry matter content of 35 percent).

MCF_s = Methane correction factor of the landfill that receives the final sludge.

DOC_F = Fraction of DOC dissimilated to biogas (IPCC default value is 0.5).

F = Fraction of CH4 in landfill gas (IPCC default is 0.5).

The project emissions from sludge will not be considered since the sludge will be donated to local farmer for aerobic soil application.

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

3. Leakage

The aerobic treatment technology does not involve equipment that is transferred from another activity or the existing equipment is not transferred to another activity; therefore leakage effects at the site of the other activity are not considered. In Vilhena the installed equipment is new. There is no leakage involved in this project activity.

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

Data / Parameter:	**B_o**
Data unit:	kg CH_4 / kg.COD
Description:	Methane Producing Capacity (domestic 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 :	Data suggested by the methodology.
Any comment:	

Data / Parameter:	**$MCF_{aerobic}$**
Data unit:	-
Description:	Methane Correction Factor for the wastewater treatment in Aerobic Systems
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 :	The aerobic system implemented in the wastewater treatment is considered to be well managed since all of the parameters considered and the personnel involved in the maintenance and handling of the equipment and chemical products must follow a detailed monitoring plan.

Data / Parameter:	**GWP_CH_4**
Data unit:	-
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 :	Data suggested by the methodology.
Any comment:	

Data / Parameter:	**MCF_{lagoon}**
Data unit:	-
Description:	Methane Correction Factor for the wastewater treatment in anaerobic lagoons
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	Data suggested by the methodology.

and procedures actually applied :	
Any comment:	

Data / Parameter:	***$EF_{e,y}$***
Data unit:	tCO_2e / MWh.
Description:	Emission factor for energy generation
Source of data used:	Official host country emission factor or, in the absence of official data, calculation based on the "**Tool to calculate the emission factor for an electricity system"** based on the ONS – National Operator of the Electrical System. The value applied is based on a work sheet prepared by a few project developers in Brazil following the tool methodology.
Value applied:	The ex ante value of 0,2826 will be applied.
Justification of the choice of data or description of measurement methods and procedures actually applied :	Calculation is based on the "**Tool to calculate the emission factor for an electricity system".** Since host country official emission factor is under discussion, project used a most conservative value existent that is the value calculated by some project developers in Brazil for the region where the Project will be implemented, considering that energy for the Vilhena unit is bought from grid. In order to guarantee that the calculations are conservative $\mathbf{EF_{e,y}}$ = 0.2826 t of CO_2e / MWh, therefore this value will be applied throughout the entire crediting period. A summary of the calculations can be verified in Annex 5.
Any comment:	Calculated in accordance with the latest approved version of the "Tool to calculate the emission factor for an electricity system"

B.6.3 Ex-ante calculation of emission reductions:

1. Baseline Emissions

$$BE_y = \Sigma (Q_{ww, y, m} * COD_{y, m}) * Bo * MCF_{lagoon} * GWP\_CH_4 \quad \text{Equation 1}$$

Where:

$\mathbf{BE_y}$ **=** Baseline emissions in the year "y".

$\mathbf{Q_{ww, y, m}}$ **=** Volume of the wastewater treated during the months m, during year "y", for the months with ambient average temperature above 15°C.

$\mathbf{COD_{y, m}}$ **=** Chemical oxygen demand of effluent entering the lagoons in the year y for the months with ambient average temperature above 15ºC.

$\mathbf{MCF_{lagoon}}$ **=** methane correction factor for the wastewater treatment in anaerobic lagoons (MCF lower value of 0.8 as per table III.H.1 under AMS III.H).

$\mathbf{B_o}$ **=** methane producing capacity for the wastewater (IPCC default value for domestic wastewater of 0.21 kg CH_4/kg.COD)

$\mathbf{GWP\_CH_4}$ **=** Global Warming Potential for CH4.

Parameter	Value	Unit
BE_y	**34,398**	tCO2e
B_o	0.21	kg CH_4/kg.COD
$Q_{ww, y, m}$	1,950,000	m^3/year
$COD_{y, m}$	0.005	tonnes/ m^3
MCF_{lagoon}	0.8	-
GWP_CH_4	21	-

2. Project Activity Emissions

$PE_y = PE_{y,power} + PE_{y,ww,treatment} + PE_{y,sludge}$	**Equation 2**

Where:

PE_y = project activity emissions in the year "y".

$PE_{y,power}$ = emissions on account of electricity or diesel consumption in the year "y".

$PE_{y,ww,treatment}$ = emissions from the aerobic wastewater treatment in the year "y".

$PE_{y,sludge}$ = emissions from anaerobic decay of the sludge produced in the year "y".

Parameter	Value	Unit
PE_y	**4,486**	tCO2e/year
$PE_{y,power}$	187	tCO2e/year
$PE_{y,ww,treatment}$	4,300	tCO2e/year
$PE_{y,sludge}$	0	tCO2e/year

$PE_{y,power} = EC_y * EF_y$	**Equation 3**

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"**.**

EF_y = Emission factor of the applicable grid, calculated by project developers based on data provided by ONS – National Operator of the Electrical System..
Calculated for the Brazilian grid for the region where the Project will be implemented, considering that energy for the Vilhena unit is bought from grid. In order to guarantee that the calculations are conservative $EF_{e,y}$ = 0.2826 tonnes of CO_2e / MWh, therefore this value will be applied throughout the entire crediting period.

Parameter	Value	Unit
$PE_{y,power}$	**187**	tCO2e
EC_y	660	MWh / year
EF_y	0.2826	t CO_{2e} / MWh

$$PE_{y,ww,treatment} = Q_{ww,y} * COD_y * B_o * MCF_{aerobic} * GWP\_CH_4 \quad \textbf{Equation 4}$$

Where:

$PE_{y,ww,treatment}$ = Project emissions from the aerobic wastewater treatment in the year "y".

$Q_{ww,y}$ = Volume of the wastewater treated during the year "y".

COD_y = Chemical oxygen demand of effluent entering the lagoons in the year "y".

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 CH4.

Parameter	Value	Unit
$PE_{y,ww,treatment}$	**4,300**	tCO2e/year
$Q_{ww,y}$	1,950,000	m³/year
COD_y	0.005	tonnes/m³
B_o	0.21	kg CH_4 / kg.COD
$MCF_{aerobic}$	0.1	-
GWP_CH_4	21	-

$$PE_{y,sludge} = S_y * DOC_{y,s} * MCF_s * DOC_F * F * 16/12 * GWP\_CH_4 \quad \textbf{Equation 5}$$

Where:

$PE_{y,sludge}$ = Methane emissions from the anaerobic decay of the final sludge generated in the wastewater system in the year "y".

S_y = Amount of sludge generated by the wastewater treatment in the year y.

$DOC_{y,s}$ = Degradable organic content of the sludge generated by the wastewater treatment in the year y (fraction). It shall be measured by sampling and analysis of the sludge produced, and estimated ex-ante using the IPCC default values of 0.05 for domestic sludge (wet basis, considering a default dry matter content of 10 percent) or 0.09 for industrial sludge (wet basis, assuming dry matter content of 35 percent).

MCF_s = Methane correction factor of the landfill that receives the final sludge, estimated as described in category AMS III.G.

DOC_F = Fraction of DOC dissimilated to biogas (IPCC default value is 0.5).

F = Fraction of CH4 in landfill gas (IPCC default is 0.5).

The emissions related to sludge are null once it will donated to local farmers for soil application.

3. Leakage

The aerobic treatment technology does not involve equipment that is transferred from another activity or the existing equipment is not transferred to another activity; therefore leakage effects at the site of the other activity are not considered. In Vilhena the installed equipment is new. There is no leakage involved in this project activity.

4. Emission Reduction

$$ER_y = BE_y - (PE_y + Leakage_y) \quad \text{Equation 6}$$

Where:

ER_y = Emissions reductions of the project activity during the year *y*.

BE_y= Baseline emissions in the year "y".

PE_y = project activity emissions in the year "y".

$Leakage_y$ = Leakage emissions during the year *y*.

Parameter	Value	Unit
ER_y	**29,912**	tCO2e / year
BE_y	34,398	tCO2e / year
PE_y	4,486	tCO2e / year
$Leakage_y$	0	tCO2e / year

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

Year	Baseline scenario GHG emissions estimative (tCO_2e)	Project scenario GHG emissions estimative (tCO_2e)	Leakage estimative (tCO_2e)	Total GHG emission reduction (tCO_2e)
01/01/2009 - 01/01/2010	34,398	4,486	0	**29,912**
02/01/2010 - 01/01/2011	34,398	4,486	0	**29,912**
02/01/2011 - 01/01/2012	34,398	4,486	0	**29,912**
02/12/2009 - 01/01/2013	34,398	4,486	0	**29,912**
02/01/2013 - 01/01/2014	34,398	4,486	0	**29,912**
02/01/2014 - 01/01/2015	34,398	4,486	0	**29,912**
02/01/2015 - 01/01/2016	34,398	4,486	0	**29,912**
Total (tCO_2e)	**240,786**	**31,405**	**0**	**209,381**

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 / year
Description:	Amount of sludge generated from the wastewater treatment.
Source of data to be used:	Direct measurement by weight. Data would be available at the wastewater treatment laboratory.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	5,990 Estimated value by applying the following equation when considering the future slaughtering figures of 2.500 head of cattle per day an increase of 163% from the recent slaughtering of 950 cattle per day: 32 **daily estimated value** (m³) * 0.6 **density (tonnes/m³)** = 19 tonnes / day * 312 days = 5,990 tonnes This will occur by August 2008 and thus clearly before the starting date of the crediting period.
Description of measurement methods and procedures to be applied:	The yearly amount of sludge produced (S_y) shall be directly measured by weighing the trucks when they arrive (empty) and when they leave (carrying the sludge). The difference between both weights will result in the amount of sludge produced.
QA/QC procedures to be applied:	The scale where the truck will be weighed follows standard calibration procedures and presents low inaccuracy.
Any comment:	The emissions regarding the generated sludge will not be considered once it will be donated to local farmers for composting purposes and soil application; therefore an aerobic practice.

Data / Parameter:	T
Data unit:	°C
Description:	Ambient average temperature at the project site.
Source of data to be used:	Regional weather statistics
Value of data applied for the purpose of calculating expected emission reductions in section B.5	above 15ºC.
Description of measurement methods and procedures to be applied:	Monthly average is used in the calculations
QA/QC procedures to be applied:	Official data from Vilhena monitoring station SEDAM. Source: Agritempo (http://www.agritempo.gov.br)
Any comment:	Anaerobic lagoons are ponds deeper than 2 meters, without aeration, ambient temperature above 15°C, at least during part of the year, on a monthly average basis, and with a volumetric loading rate of Chemical Oxygen Demand above 0.1 kg $COD.m^{-3}.day^{-1}$.

Data / Parameter:	Σ ($COD_{y,m}$)
Data unit:	Tonnes/m³
Description:	Chemical oxygen demand of effluent entering the lagoons in the year "y", for the months with ambient average temperature above 15 °C.
Source of data to be used:	Analysis by external laboratory
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0.005 This value was estimated conservatively while taking under consideration the slaughter of 2,500 heads of cattle per day with an increase of 163% from the recent slaughtering of 950 cattle per day. This will occur by August 2008 and thus clearly before the starting date of the crediting period.
Description of measurement methods and procedures to be applied:	The wastewater analysis that determines the COD will take place in an external laboratory and will be done monthly.
QA/QC procedures to be applied:	The external laboratory will measure the COD according to *Standard Methods for Examination of Water & Wastewater*, 21st edition. The measurement error will be identified and will follow the standard above.
Any comment:	This value of COD was measured in the entrance of the effluent in the first anaerobic lagoon. While considering the aerobic system the COD will be measured in the equalization tank where both lines will be mixed together. From the information above it can be concluded that the laboratory is accredited.

Data / Parameter:	**$Q_{ww,y,m}$**
Data unit:	m^3 / year
Description:	Volume of Wastewater treated during the months m, during the year "y"
Source of data to be used:	Direct measurements from Project Owner.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	1,950,000.00 The value was estimated according to the future amount of 2,500 head of cattle that will be slaughtered from the beginning of the project activity. An increase of 163% from the recent slaughtering of 950 cattle per day. This will occur by August 2008 and thus clearly before the starting date of the crediting period.
Description of measurement methods and procedures to be applied:	The volume of the wastewater entering the Flotation system which is based on air diffusion will be measured per hour using an analogical meter. Monthly averages will be available.
QA/QC procedures to be applied:	The analogical meter will be used as flow meter and as quality assurance all of the collected data will be archived at JBS S.A.'s facilities. If there is any problem with the meter a conservative approach based on the volume of wastewater (in m^3 / hour) will be implemented while dismissing moments where the analogical meter failed to register any data.
Any comment:	To monitoring, only the months with temperature equal or higher than 15ºC will be accounted to calculate emission reductions.

Data / Parameter:	**EC_y**
Data unit:	MWh / year
Description:	Electricity consumed by the project activity devices, in the year "y".
Source of data to be used:	Energy consumption information of equipments used from the purchase proposal from FAST dated 22/08/2007.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	660
Description of measurement methods and procedures to be applied:	Electricity that will be consumed by all devices installed in result of Project Activity implementation while operating for 26 days a month.
QA/QC procedures to be applied:	The installed capacity of the devices will be entirely accounted when calculating this parameter.
Any comment:	The energy consumption will not be measured since it would not be financially feasible to install an energy meter since the equipments consumption of electricity is not significant and also to insure conservativeness to the calculations, the equipments maximum capacity was used.

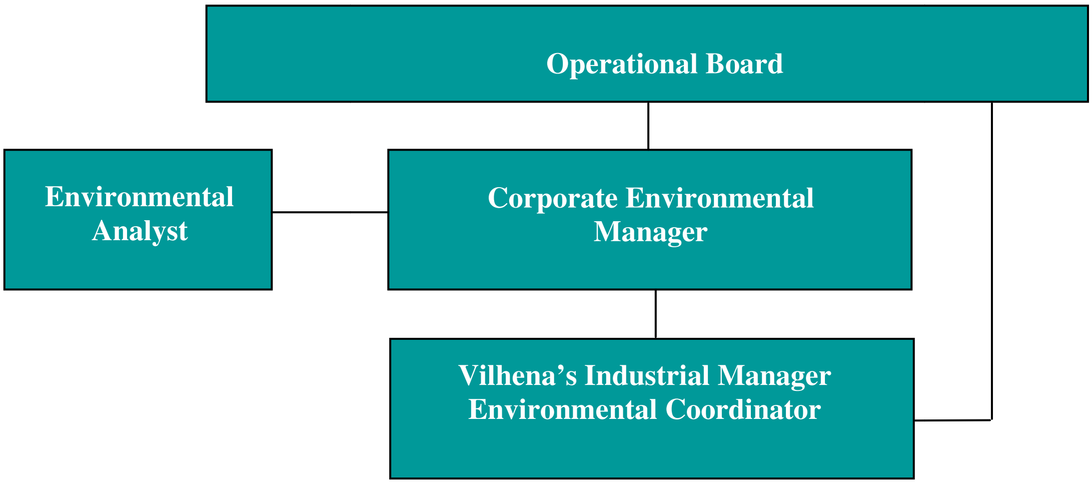
Data / Parameter:	**End-use of the final sludge**
Data unit:	N/A
Description:	The final disposal method of the sludge generated in the aerobic treatment
Source of data to be used:	Destination contracts and internal controls.
Value of data	Composting and used for soil application.
Description of measurement methods and procedures to be applied:	The sludge will be treated aerobically through composting and used for soil application.
QA/QC procedures to be applied:	Composting company contracted will emit monthly a declaration of sludge delivered by JBS.
Any comment:	--

B.7.2 Description of the monitoring plan:

This section details the steps taken to monitor on a regular basis the GHG emissions reductions from the JBS S/A – Slaughterhouse Wastewater Aerobic Treatment – Vilhena Unit. The Monitoring Plan for this project was developed in order to ensure that from the beginning, the project would be well organized by collecting and archiving all reliable data.

1. Monitoring organization

Prior to the start of the crediting period, the organization of the monitoring team will be established. Clear roles and responsibilities will be assigned to all staff involved in the CDM project and a single CDM Manager will be nominated. The CDM Manager will have the overall responsibility for the monitoring system on this project. The following organogram indicates the operational and management system where Giuliano Conde (environmental coordinator) will be responsible for the monitoring of the parameters.



All other CDM monitoring staff will have clearly defined roles and responsibilities. The CDM Manager which is the Industrial Manager (Giuliano Conde) will manage the process of training new staff, ensuring trained staff performs the monitoring duties and that where trained monitoring staff is absent; the integrity of the monitoring system is maintained by other trained staff. Giuliano Conde as the CDM Manager is also responsible for the entire CDM monitoring system. The Corporate Environmental Manager (Angela Garcia) will be responsible for gathering all the data from all the units and the Environmental Analyst will analyze the information in order to foresee the outcome of each unit regarding the efficiency of the effluent treatment process related to the productivity of each unit. However all the flowcharts and data will be stored in Vilhena.

A formal set of monitoring procedures will be established prior to the start of the project. These procedures will detail the organization, control and steps required for certain key monitoring system features, including:

- CDM staff training
- CDM data and record keeping arrangements
- Equipment Failure
- Data collection

- CDM data quality control and quality assurance
- Equipment calibration

See Annex 4 for a description and the scope of these procedures. The CDM Manager will be responsible for ensuring that the procedures are followed on site and for continuously improving the procedures to ensure a reliable monitoring system is established. All staff involved in the CDM project will receive some relevant training from CDM consulters. Records of trained CDM staff will be retained by the Project Developer. The CDM Manager will ensure that only trained staff is involved in the operation of the monitoring system.

2. Monitoring equipment and installation

The following parameters will be monitored:

- **Amount of sludge generated from the wastewater treatment.**

The yearly amount of sludge produced (S_y) shall be directly measured by weighing the trucks when they arrive (empty) and when they leave (carrying the sludge). The difference between both weights will result in the amount of sludge produced.

- **Ambient average temperature at the project site.**

The average temperature will be based on analysis performed by the local monitoring unit of Vilhena – SEDAM.

- **Chemical oxygen demand of effluent entering the lagoons.**

The wastewater analysis that determines the COD will take place in an external laboratory and will be done monthly.

- **Volume of Wastewater treated during the month m.**

The volume of the wastewater entering the Flotation system which is based on air diffusion will be measured per hour using an analogical meter.

- **Electricity consumed by the project activity devices per year.**

The energy consumption will not be measured since it would not be financially feasible to install an energy meter since the equipments consumption of electricity is not significant and also to insure conservativeness to the calculations, the equipments maximum capacity was used.

- **End-use of the final sludge.**

The sludge will be treated aerobically through composting and used for soil application.

QA/QC

In order to guarantee quality control and quality assurance, the following procedures will be realized for each monitored parameter:

- The water analysis that determines the **COD** will be sent to an accredited laboratory which follows a set of specific procedures based on nationally recognized standards. The result of the analysis will be stored in flowcharts in the office of the unit of Vilhena.

- The **average ambient temperature** will be monitored by a weather station in Vilhena (SEDAM) and the monthly values will be stored in the office of the industry.

- The **amount of generated sludge** will be monitored by direct measurements with a standardized scale which presents low inaccuracy and the values will be stored in flowcharts.

- An analogical meter will be used to monitor the **volume of wastewater treated** per hour. All the data will be archived in the office in the industrial unit.

- As stated before the **energy consumption** will not be directly measured therefore the installed capacity of the devices will be considered when calculating this parameter.

- The **end-use of the final sludge** will be aerobically treated through composting methods and then used in soil application. A monthly declaration of the composting hired company will be emitted in order to prove that the sludge was delivered by JBS S.A.

All data will be archived and stored in flowcharts.

3. Equipment Failure

Analogical meter:

If this equipment may fail since it is an analogical meter and the measurements are per hour the time in which the data was not collected will not be taken under consideration when calculating the flow rate throughout the year.

4. Data Collection

All the monitored data will be archived in flowcharts that are easily traceable by any member of the personnel.

5. Data and records management

At the end of each month the monitoring data needs to be filed electronically. The electronic files need to have CD back-up or print-out. The project owner must keep COD analysis records.

All written documentation such as maps, plant prints and water analysis should be stored and should be available to the verifier so that the reliability of the information may be checked. In order to make it easy for the verifier to retrieve the documentation and information in relation to the project emission reduction verification, the project owner should provide a document register. The document management system will be developed to ensure adequate document control for CDM purposes.

The dedicated CDM Manager of the project participant (Giuliano Conde) is responsible for checking the data (according to a formal procedure) and the CDM Manager will be responsible for managing the collection, storage and archive of all data and records. A procedure will be developed to manage the CDM record keeping arrangements. All the data shall be kept until two years after the end of credit period.

6. Equipment Calibration

The equipment will be calibrated annually at least. In the future the calibrations will take place in a shorter period of time.[10]

[10] Further information regarding the calibration methods involved will be detailed in the beginning of the project activity once not every equipment used in the monitoring scheme of the project activity have been purchased or are being applied.

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

18 / 02 / 2008

Mr Carlos Henrique Delpupo;
Miss Andrea Marilia Loyola and
Miss Sheila Guebara de Souza

INSTITUTO TOTUM
Av. Paulista, 37
10th floor – Bela Vista
01311-902- São Paulo - SP
Tel: +55 (11) 3372-9572
E-mail: cdelpupo@institutototum.com.br
URL: http://www.institutototum.com.br

Instituto Totum is a project participant.

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:

04/09/2007

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

10 years[11]

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:

The crediting period will start on 01/01/2009, or on the date of registration of the CDM project activity, whichever is later

C.2.1.2. Length of the first crediting period:

7 years

C.2.2. Fixed crediting period:

Not applicable

C.2.2.1. Starting date:

Not applicable

C.2.2.2. Length:

Not applicable

[11] This is the expected lifetime of the flotation system supplied by FAST. Since FAST is considered to be a new company in the market, 10 years was taken as a reference since the first equipment started operating 10 years ago.

SECTION D. Environmental impacts

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

Project activity has the full documentation that it is in compliance with all environmental laws and regulations of the Host Country. Vilhena's project activity presents the operational license N° 0002271/NUCOF/SEDAM, good through July 26th, 2008.

The Project Activity does not frame itself within the Article 2nd of the *CONAMA* Resolution nº1 23.01.86, which is responsible for the development of the Study of Environmental Impacts (SEI) and on which the Environmental Licensing depends.

Aspects of potential environmental and safety implications are discussed as follows:

Land Use
No change in land use is expected, as the project activity occurs within the constructed area of the plant.

Air Pollution
The implementation of this project activity will reduce the emissions of green house gases by substituting the wastewater treatment which is anaerobic for a more efficient aerobic effluent treatment system therefore minimizing air pollution and odour problems.

Water Pollution
The project activity does not interfere with water reservoirs, underground water or waterways. The effluent generated will be treated in order to fulfill the parameters established by local environmental agency therefore not polluting the body of water in which it will be discharged.

The project activity foresees that the rumin will be removed without the use of water therefore reducing significantly the amount of water consumed by this process.

Noise Pollution and Vibration
The project activity does not generate noise impacts or vibration to area residents.

Soil Quality
The quality of the soil will not be altered due to the implementation of this project activity.

Flora/Fauna
There are no foreseeable effects on flora or fauna due to the project activity.

The project does not have any transboundary impacts.

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:

The project activity is an environmental project in order to improve actual wastewater treatment system. All documentations required are available at JBS S/A facility in Vilhena and may be presented when requested.

The environmental impacts related to this project activity were not considered significant.

SECTION E. Stakeholders' comments

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

Brazilian DNA requests in addition to the UNFCCC global stakeholders' process, that the project participants invite comments from the specific agents mentioned above. The letters were sent in Febuary 2008 (copies of the letters and post office confirmation of receipt communication are available upon request).

The letters have been sent to the following institutions:

Stakeholder	Date Received	Type of Delivery
Municipal City Hall of Vilhena, Rondônia state;	29/02/2008	Delivered in person
Municipal Assembly of Vilhena, Rondônia state;	05/03/2008	Delivered in person
Municipal Secretary of Industry, Commercial, Agriculture and Environment (Semicam / Vilhena)	29/02/2008	Delivered in person
Secretary of State for Environment development (SEDAM– RO);	26/02/2008	Delivered in person
Brazilian Forum of NGOs and Social Movements for Environment and Development http://www.fboms.org.br	03/03/2008	Certified Courier
Office of the State Attorney-General of Rondônia / Public Ministry	25/02/2008	Delivered in person

The PDD of the Project in reference was made publicly available for comments during the validation phase on the web-site of UNFCCC CDM web-site (http://cdm.unfccc.int/), so that every person has access to the document from the official source.

E.2. Summary of the comments received:

Stakeholder	Date Answer	Summary of the comments
Municipal City Hall of Vilhena, Rondônia state;	13/03/2008	The stakeholders welcomed the initiative taken by JBS S/A regarding the technological innovation in the slaughterhouse effluent treatment process.
Municipal Secretary of Industry, Commercial, Agriculture and Environment (Semicam / Vilhena)	13/03/2008	The stakeholders welcomed the initiative taken by JBS S/A regarding the technological innovation in the slaughterhouse effluent treatment process.
Brazilian Forum of NGOs and Social Movements for Environment and Development	10/04/2008	The stakeholders welcomed and support the initiative taken by JBS S/A regarding the technological innovation in the slaughterhouse effluent treatment process.

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

There were no negative comments related to the purposed project activity. Thus no action was necessary.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Instituto Totum Ltda
Street/P.O.Box:	Av. Paulista, 37
Building:	10th floor
City:	São Paulo
State/Region:	SP
Postfix/ZIP:	01311-902
Country:	Brazil
Telephone:	+55 11 3372-9572
FAX:	-
E-Mail:	secretaria@institutototum.com.br
URL:	www.institutototum.com.br
Represented by:	Carlos Henrique Delpupo
Title:	Director
Salutation:	Mr.
Last Name:	Delpupo
Middle Name:	Henrique
First Name:	Carlos
Department:	Directory
Mobile:	+55 11 9494-6201
Direct FAX:	-
Direct tel:	-
Personal E-Mail:	cdelpupo@institutototum.com.br

Organization:	JBS S/A
Street/P.O.Box:	Avenida Marginal Direita do Tietê, 500
Building:	-
City:	São Paulo
State/Region:	SP
Postfix/ZIP:	05118-100
Country:	Brazil
Telephone:	+55 11 3144 4000
FAX:	+ 55 11 3144 4399
E-Mail:	-
URL:	www.jbs.com.br
Represented by:	Angela Garcia
Title:	Environmental Manager
Salutation:	Ms.
Last Name:	Garcia
Middle Name:	-
First Name:	Angela
Department:	Corporative Environmental
Mobile:	+55 11 8415 3304
Direct FAX:	+55 11 3144 4399
Direct tel:	+55 11 3144 4391
Personal E-Mail:	angelagarcia@jbs.com.br

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funding was and will be used in the project activity.

Annex 3

BASELINE INFORMATION

Not applicable

Annex 4

MONITORING INFORMATION

CDM Monitoring System Procedures

This CDM monitoring System Procedure includes the contents as following:

(1) CDM staff training
(2) CDM data and record keeping arrangements
(3) Equipment Failure
(4) Data collection CDM data quality control and quality assurance
(5) CDM data quality control and quality assurance
(6) Equipment Calibration

The contents in each section are described as following:

(1) CDM staff training

Within the QC (quality control) aspect Giuliano Conde will be held responsible for training the staff and providing the proper support and orientation while handling the flotation system and the chemical products added to the effluent.

(2) CDM data and record keeping arrangements

As far as QA (quality assurance) goes this section provides details of the sites data and record keeping arrangements. The arrangements ensure that complete and accurate records are retained by the CDM Manager within the quality control system. Data and records will be stored and archived according to this procedure. All data and records should be managed following this procedure. All staff is responsible for ensuring that any data or records are dealt with according to this procedure.

Giuliano Conde who is responsible for the monitoring of the parameters will also keep flowcharts of all the monitored data.

(3) Equipment Failure

Analogical meter:

If this equipment may fail since it is an analogical meter and the measurements are per hour the time in which the data was not collected will not be taken under consideration when calculating the flow rate throughout the year.

(4) Data Collection

The procedures involved in obtaining data such as COD will be described as follows:
- the sample of the wastewater will be collected manually.
- the sampling point will be in the equalization tank where both lines will be mixed together.

(5) CDM data quality control and quality assurance

Data and records will be checked prior to being stored and archived. Data from the project will be checked to identify possible errors or omissions. All records will be checked for completeness.

All staffs are responsible for ensuring the collection and archiving of complete and accurate data and records.

(6) Equipment calibration

The equipment will be calibrated annually at least. In the future the calibrations will take place in a shorter period of time.[12]

[12] Further information regarding the calibration methods involved will be detailed in the beginning of the project activity once not every equipment used in the monitoring scheme of the project activity have been purchased or are being applied.

Annex 5

INFORMATION OF THE CALCULATIONS OF THE EMISSION FACTOR

Summary of the calculations regarding the emission factor:

Prepared by AgCert, EcoAdvance, Ecoinvest, Econergy, Ecosecurities and MGM

Source: Operador Nacional do Sistema Elétrico, Centro Nacional de Operação do Sistema, Acompanhamento Diário da Operação do SIN (daily reports from Jan. 1, 2006 to Dec. 31, 2006)

Emission factors for the Brazilian South-Southeast-Midwest interconnected grid

Baseline	EF_{OM} [tCO_2/MWh]		$_y$		Generation [MWh]
2006	0.8071		0.4185		315,192,117
2005	0.9653		0.5275		315,511,628
2004	0.9886		0.4937		301,422,617
	$EF_{OM, simple-adjusted}$ [tCO_2/MWh]		$EF_{BM,2006}$		Default EF_y [tCO_2/MWh]
	0.4749		0.0903		**0.2826**
	Alternative weights		Default weights		
	w_{OM} =	0.75	w_{OM} =	0.5	Alternative EF_y [tCO_2/MWh]
	w_{BM} =	0.25	w_{BM} =	0.5	0.379

$EF_{OM,average}$ [tCO_2/MWh]		Imports (MWh) net intl	Imports (MWh) net national
2006	0.0585	0	3,865,158
2005	0.0546	0	0
2004	0.0596	0	0

Annex 6

FINANCIAL ANALYSIS DATA

- **Investment Analysis of the Readjustment of the Open Lagoon System**

Cash Flow	Unit	Source	Value	NPV 7yr	NPV 10yr
Civil Engineering	R$	client	1,341,961.90	-	-
O&M	R$	client	62,890.68	-	-
Civil Engineering NPV	R$	Calculated	1,341,961.90	**-1,341,961.90**	**-1,341,961.90**
O&M NPV	R$	Calculated	-	**-293,974.71**	**-366,527.01**
Total NPV	R$	Calculated	-	**-1,635,936.61**	**-1,708,488.91**
Total NPV	**$**	Calculated	-	**-965,211.29**	**-1,008,017.53**

- **Investment Analysis of the Full Implantation of the Physical-Chemical Flotation System**

Cash Flow	Unit	Source	Value	NPV 7yr	NPV 10yr
Civil Engineering	R$	Client	1,074,461.00	-	-
Equipment	R$	Contract	1,189,822.20	-	-
O&M	R$	Client	125,485.93	-	-
Civil Engineering and Equipment NPV	R$	Calculated	**2,264,283.20**	**-2,264,283.20**	**-2,264,283.20**
O&M NPV	R$	Calculated	-	**-586,568.48**	**-731,332.25**
Total NPV	R$	Calculated	-	**-2,850,851.68**	**-2,995,615.45**
Total NPV	**$**	Calculated	-	**-1,682,017.63**	**-1,767,429.02**

Annex 7

BIBLIOGRAPHIC REFERENCES

Reference 1. Wastewater Management – The Process. Goulburn Valley Water. Content found in the website <http://www.gvwater.vic.gov.au> Page 3.

Reference 2. Extensive Wastewater Treatment Processes Adapted to Small and Medium Sized Communities. Luxembourg: Office of publications of the European Community. Edition 2001 – 40 pp. Pages 4 through 6.

Reference 3. Agritempo: AgroMeteorological Monitoring System. Content found in the website <http://www.agritempo.gov.br>

Reference 4. *Banco Central do Brasil.* Content found in the website < http://www5.bcb.gov.br/pec/conversao/Resultado.asp?idpai=convmoeda > in 09/05/2008.

Reference 5. *Guia Técnico Ambiental de Abates (Bovino e Suíno) – Série P + L.* *Governo do Estado de São Paulo ; Secretaria do Meio Ambiente; FIESP – Federação das Indústrias do Estado de São Paulo* and *CETESB – Companhia de Tecnologia de Saneamento Ambiental*. Edition 2006 – 98 pp. Pages 57 and 58 of the *Guia Técnico Ambiental de Abates (Bovino e Suíno) – Série P + L.* Content found in the website <http://apps.fiesp.com.br/sbsnetv2/big/ambiente/pdf/abate.pdf>

Reference 6. *Banco Central do Brasil.* Content found in the website <http://www.bcb.gov.br/?COPOMJUROS >. Accessed in 05/09/2007.