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

CONTENTS

SECTION A. General description of small-scale project activity

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

Amazon Carbon Swine Waste Management System Project 03.
Version: 6
Date: 14/11/2008

A revision history of the PDD follows:

Version Number	Date	Description and reason of revision
01	12/03/2008	PDD sent for Global Stakeholder Consultation Process (GSP)
02	16/06/2008	Additional documents and clarifications were added, as requested by the DOE
03	04/04/2008	Clarifications of the engine's efficiency on methane destruction, engine efficiency on combusting biogas and the source of retention time were added as requested by the DOE
04	29/08/2008	Details on the evidence regarding numbers heads and CDM consideration were added, as requested by the DOE
05	02/10/2008	Minor corrections were made regarding historic livestock data and flare efficiency
06	14/11/2008	Minor alteration on the Project Participants. No farm was excluded from the project activity. Farm owners were excluded as Project Participants only for simplification purposes

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

Amazon Carbon is starting a sustainability program along with ten (10) swine confinement farms in Brazil, aiming at improving animal manure management systems, reducing greenhouse gases (GHG) emissions and improving the living conditions of the population on the project sites. The proposed project is associated with Sectoral Scope 15 (Agriculture) and includes technologies/measures related to the installation of a methane recovery and combustion system to an existing source of methane emissions.

Purpose: The purpose of this project is to reduce GHG emissions associated to swine waste management and to contribute to sustainable development.

Explanation of GHG emission reductions: The project proposes to replace the existing Animal Waste Management Systems (AWMS) by a lower-GHG emitting AWMS. Currently, swine waste is flushed from the barns and treated in anaerobic lagoon management systems that results in high GHG emissions (additional information on the current AWMS of each farm is available in section A.4.1.4).

The project will replace the baseline scenario (the current AWMS, as described above) by anaerobic digesters that capture and combusts methane in a controlled and economically sustainable

manner with energy generation. According to the ex-ante estimations (described in sections B.4 and B.6.1, below), this shift of animal waste management systems will result in a GHG emission reduction of 151,220 tons of CO_2e during the crediting period. Certified Emission Reductions are claimed exclusively for the emission reductions associated to methane capture and combustion not for electricity generation. No other GHG are included in the baseline scenario. CO_2 emissions from fossil and electricity consumption are included in the project boundary, though are neglected as significant increase in consumption of fossil fuel or electricity are not expected. The project boundary also includes methane emissions from anaerobic digesters and methane emissions from inefficient flaring.

In the project case, all animal waste will be flushed from the barns to the anaerobic digesters. The anaerobic digesters captures a considerable amount of volatile solids (as carbon dioxide and methane) produced by anaerobic bacteria. The anaerobic digestion reduces and stabilizes the organic material, retrieve the substrate for fertilizer and produces biogas (that contains methane).

The biogas will be captured and burned in motors to generate electric energy or in enclosed flares, The equipments installed by the project activity are described in section A.4.2.

The resulting effluent will then flow into the existing storage lagoons where it is collected to irrigate either the farmer's crops or neighbouring areas, if necessary. The GHG emissions should, after this process, show considerable reduction as a result of the implementation of the system. Sludge application and irrigation shall be carried out on neighbouring fields, offsite, where methane emissions may be regarded as insignificant, since anaerobic conditions shall be avoided.

Contribution to sustainable development: Swine waste is considered a serious environmental concern in the project region. The project proposes major improvements in swine waste handling. In the view of the project participant, this will result not only in GHG emission reduction, but also in other environmental and social benefits, such as:

- **Contribution to local environmental sustainability:**

  - Reduction in the risk of underground water contamination due to correct management of swine manure. The proposed AWMS is built in a manner to avoid effluent leakages or uncontrolled disposal. Effluents are managed in completely sealed pipeline and lagoons. Guidance on sludge disposal will be provided to avoid uncontrolled disposal of sludge.

  - Reduction in the odours arising from open anaerobic lagoons.

  - Reduction in the pathogenic vectors associated to animal manure. The proposed AWMS is equipped with sealed PVC cover layers to capture the resulting biogas. The cover layer also avoids odour emissions and eliminates the presence of pathogenic vectors in the AWMS surroundings.

- Improvement of swine manure quality as fertilizer. The proposed AWMS results in a more efficient treatment in animal manure. The organic fraction of manure will be significantly reduced to due improved anaerobic digestion, when compared to baseline AWMS. The improvement in manure treatment reduces it's pollutant potential and improves it's quality as soil fertilizer.

-The utilization of motors for energy generation using the resulting biogas will create a source of renewable electric energy for the farms, that does not exist in the baseline.

- **Contribution to working conditions and employment creation**

  - Increase of job opportunities during and post project activity due to the continuous need for equipment monitoring and workforce improvement. The proposed AWMS includes several equipments/technologies that do not exist in the baseline AWMS. These equipments demand regular monitoring, operation and maintenance, creating the potential for job opportunities.

  - Improvement on working conditions to farms personnel, due to odour and pathogenic vectors reduction; The presence of odours and pathogenic vectors is unpleasant and might constitute health hazards to farms personnel and to the local community. The proposed AWMS will significantly reduced or eliminate these issues.

  - Employees' professional skill development (training) to operate the installed AWMS; Training on farms personnel will be necessary to operate the proposed AWMS, since it is equipped with advanced technology that does not exist in baseline AWMS.

- **Contribution to income distribution**

- Improvement on the quality of manure to be used as fertilizer by neighbouring farmers. Neighbouring farmers consider animal manure to be an important income. The use of animal manure as fertilizer reduces or eliminates the need to acquire industrial fertilizers for these farmers. With the proposed AWMS, the quality of such manure will be significantly improved. The amount of manure distributed to local farmers might also increase, due to better handling of animal waste.

Contribution to capacitating and technological development

- Technological development of the region through the implementation of innovative equipment; The proposed AWMS is far more advanced than the baseline AWMS. The new AWMS is equipped with devices to capture and combust methane in a controlled manner, thus reducing local greenhouse gas emissions. Besides, the new AWMS reduces environmental hazards and pollutant potential due to manure handling. The new AWMS complies with local and national environmental law.

The proposed AWMS can also be applied to similar activities in the region, since it is produced or distributed by Brazilian companies. No international technical assistance is necessary for the operation and maintenance of the proposed AWMS.

- **Contribution for regional integration and articulation with other sectors**

  - Regional development might be attained by the replication of this project by other swine farms in the region, later on. The proposed AWMS also generates a new source of renewable energy, biogas. Farmers are likely to invest in the generation of thermal or electric energy for end use in the future, which is not the case in the baseline scenario. Investments on energy generation will introduce swine farmers to a new market and further improve their sustainability.

All benefits above are in line with the farmer's goals to improve the quality of they operation and to act in a positive manner in the community. According to the project participant, the project is an opportunity to adopt sustainable practices and provide guidelines for future swine confinement farms.

A.3. Project participants:

Name of Party involved* (indicate the host Country)	Private and/or public entity (ies) participating in project	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
Brazil (Host)	Amazon Carbon S/S 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 of requesting registration, the approval by the Party(ies) involved is required.		

Further information regarding the parties involved, please refer to Annex I.

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.:

State of Mato Grosso do Sul.

A.4.1.3. City/Town/Community etc:

The project activity will take place at the following cities:

State	City	Participating Farm
Mato Grosso do Sul	Ivinhema	Antonio Durval Góis farm
	Ivinhema	Sítio Nossa Senhora Aparecida
	Glória de Dourados	Sítio São Geraldo
	Ivinhema	Sítio Esperança
	Itaporã	Chácara Paraíso
	Fátima do Sul	Osmar Rodrigues Caíres farm
	Jateí	Dulcemar José Grando farm

	Glória de Dourados	Emerson Fernandes farm
	Glória de Dourados	Antonio José Figueiredo Filho farm
	Itaporã	Rancho Cosmo

Table A1. Cities involved in the project activity..

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

The precise location of farms is identified by means of global positioning system as seen on Table A2, that follows.

ID	Farm Name	Property	Address	Town	Contact	Phone	Global Positioning System*	
							S	W
1	Antonio Durval Góis farm	Antonio Durval Góis	Lote 18,quadra 09 - Gleba Vitória	Ivinhema	Mr. Antonio Durval Góis	(67) 9956-1064	22º20'38.21''	53º48'36.25''
2	Sítio Nossa Senhora Aparecida	Fernando de Castro	Gleba Ubiratan – lote 16/quadra 17	Ivinhema	Fernando de Castro	(67) 9978-7491	21º21'50.87''	53º52'39.52''
3	Sítio São Geraldo	Geraldo Ferro da Silva	3º Linha Nascente Km 13	Glória de Dourados	Geraldo Ferro da Silva	(67) 9939-2623	21º29'18.26''	54º07'52.70''
4	Sítio Esperança	Márcio Toshimitsu Muraoka	Sítio Esperança Gleba Azul (lote 13 quadra 8)	Ivinhema	Márcio Toshimitsu Muraoka	(67) 9978-7844	22º14'09.65''	53º52'08.29''
5	Chácara Paraíso	Luiz Henrique Jordão do Amaral	Rodovia Itaporã-Maracajú Km 15 + 3 Km à direita	Itaporã	Luiz Henrique Jordão do Amaral	(67) 3451-1351	21º55'38.20	54º47'39.80
6	Osmar Rodrigues Caíres farm	Osmar Rodrigues Caíres	Quarta Linha Nascente Km 2,5	Fátima do Sul	Mr. Osmar Rodrigues Caíres	(67) 9965-9648	22º 22'42.17	54º20'33.38
7	Dulcemar José Grando farm	Dulcemar José Grando	Linha caraguatá km 02 lote 17 quadra 18	Jateí	Mr. Dulcemar José Grando	(67) 9971-5041	22º 32'36.02	54º16'01.42
8	Emerson Fernandes farm	Emerson Fernandes	Lote 47, quadra 34 – Linha Barreirão	Glória de Dourados	Mr. Emerson Fernandes	(67) 3466-1719	22º 27'34.91	54º17'37.40
9	Antonio José Figueiredo Filho farm	Mr. Antonio José Figueiredo Filho	3° Linha Km 02	Glória de Dourados	Mr. Antonio José Figueiredo Filho	(67) 9612-4135	22º 25'36.64	54º14'59.85
10	Rancho Cosmo	Mr. César Janzeski	Lote 47 - Quadra 34 - Linha Barreirão	Itaporã	Mr. César janzeski	(67) 3451-9002	21º 54'13.75	54º42'2.21

Table A2: Farms location and contact information. *All GPS coordinates were taken in the farms main entrance.

A brief description of the farms follows:

1. **Antonio Durval Góis:** This is a Piglet Producing and Nursery Unit farm owned by Mr. Antonio Durval Góis. It is located in Ivinhema/MS. From December 2006 to November 2007 in the Piglet Producing and Nursery Unit there was approximately a population of 4 827 animals on site. No population increase is expected during the crediting period. Animal waste is sent from 4 containment areas to a sequential system of 3 anaerobic lagoons and one storage lagoon by flushing and scrapping. The first lagoon measure 15x60x3.5 meters respectively (width, length and depth), the second lagoon 23x63x3 meters and the third lagoon 16x42x3.5 meters. Effluent is disposed of through irrigation on neighboring fields. Waste is removed from the forth lagoon. Irrigation is currently done by electric pumps. No additional pumping will be necessary due to the project activity. Installation of the equipments is expected to take place according to the schedule demonstrated in Table A3.

2. **Sítio Nossa Senhora Aparecida:** This is a Piglet Producing and Nursery Unit farm owned by Mr. Fernando de Castro. It is located in Ivinhema/MS. From December 2006 to November 2007 in the Piglet Producing and Nursery Unit there was approximately a population of 6 147 animals on site. No population increase is expected during the crediting period. Animal waste is sent from 04 containment areas to a sequential system of 4 anaerobic lagoons by flushing and scrapping. The first and second lagoon measure 17x25x3.5 meters respectively (width, length and depth), the third lagoon 23x63x3 meters and the forth lagoon 25x50x3.5 meters. Effluent is disposed of through irrigation on neighboring fields. Waste is removed from the forth lagoon. Irrigation is currently done by electric pumps. No additional pumping will be necessary due to the project activity. Installation of the equipments is expected to take place according to the schedule demonstrated in Table A3.

3. **Sítio São Geraldo**: This is a Finishing Unit farm owned by Mr. Geraldo Ferro da Silva. It is located in Glória de Dourados/MS. From December 2006 to November 2007, there were approximately 1 712 animals on site. No population increase is expected during the crediting period. Animal waste is sent from 02 containment areas to a sequential system of 04 anaerobic lagoons by flushing and scrapping. The first lagoon measure 14x35x3.5 meters respectively (width, length and depth), the second lagoon 13x32x3.5 meters, the third lagoon 19x56x1.3 meters and the forth lagoon 15x43x1 meters. Effluent is disposed of through irrigation on neighboring fields. Waste is removed from the forth lagoon. Irrigation is currently done by electric pumps. No additional pumping will be necessary due to the project activity. Installation of the equipments is expected to take place according to the schedule demonstrated in Table A3.

4. **Sítio Esperança:** This is a Piglet Producing and Nursery Unit farm owned by Mr. Márcio Toshimitsu Muraoka. It is located in Ivinhema/MS. From December 2006 to November 2007 in the Piglet Producing and Nursery Unit there was approximately a population of 6 224 animals on site. No population increase is expected during the crediting period. Animal waste is sent from 04 containment areas to a sequential system of 4 anaerobic lagoons and 1 storage lagoon by flushing and scrapping. The first and second lagoon measure 17x25x3.5 meters respectively (width, length and depth), the third lagoon 23x63x3 meters, the forth lagoon 16x46x3.5 meters and the fifth lagoon (storage lagoon) 33.5x82.5x0.65. Effluent is disposed of through irrigation on neighboring fields. Waste is removed from the fifth lagoon. Irrigation is currently done by electric pumps. No additional pumping will be necessary due to the project activity. Installation of the equipments is expected to take place according to the schedule demonstrated in Table A3.

5. **Chácara Paraíso**: This is a Finishing Unit farm owned by Mr. Luiz Henrique Jordão do Amaral. It is located in Itaporã/MS. From December 2006 to November 2007, there were approximately 2 675 animals on site. No population increase is expected during the crediting period. Animal waste is sent from 03 containment areas to a sequential system of 02 anaerobic lagoons by flushing and scrapping. The first lagoon measure 15x70x2.0 meters respectively (width, length and depth) and the second lagoon 20x70x2.0. Effluent is disposed of through irrigation on neighboring fields. Waste is removed from the second lagoon. Irrigation is currently done by electric pumps. No additional pumping will be necessary due to the project activity. Installation of the equipments is expected to take place according to the schedule demonstrated in Table A3.

6. **Osmar Rodrigues Caíres**: This is a Finishing Unit farm owned by Mr. Osmar Rodrigues Caíres. It is located in Fátima do Sul/MS. From December 2006 to November 2007, there were approximately 2 791 animals on site. No population increase is expected during the crediting period. Animal waste is sent from 02 containment areas to a sequential system of 03 anaerobic lagoons and one storage lagoon by flushing and scrapping. The first lagoon measure 12x36x3.5 meters respectively (width, length and depth), the second lagoon 25x68x3.0 meters, the third lagoon 17x42x3.5 meters and the forth lagoon (storage lagoon) 30x86x0.65 meters. Effluent is disposed of through irrigation on neighboring fields. Waste is removed from the fourth lagoon. Irrigation is currently done by electric pumps. No additional pumping will be necessary due to the project activity. Installation of the equipments is expected to take place according to the schedule demonstrated in Table A3.

7. **Dulcemar José Grando**: This is a Finishing Unit farm owned by Mr. Dulcemar José Grando. It is located in Jateí/MS. From December 2006 to November 2007, there were approximately 4 198 animals on site. No population increase is expected during the crediting period. Animal waste is sent from 04 containment areas to a sequential system of 04 anaerobic lagoons by flushing and scrapping. The first lagoon measure 12x40x3.5 meters respectively (width, length and depth), the second lagoon 29x80x3.0 meters, the third lagoon 19x49x3.5 meters and the forth lagoon 20x60x1.3 meters. Effluent is disposed of through irrigation on neighboring fields. Waste is removed from the forth lagoon. Irrigation is currently done by electric pumps. No additional pumping will be necessary due to the project activity. Installation of the equipments is expected to take place according to the schedule demonstrated in Table A3.

8. **Emerson Fernandes**: This is a Finishing Unit farm owned by Mr. Emerson Fernandes. It is located in Glória de Dourados/MS. From December 2006 to November 2007, there were approximately 3 063 animals on site. No population increase is expected during the crediting period. Animal waste is sent from 04 containment areas to a sequential system of 4 anaerobic lagoons by flushing and scrapping. The first and second lagoon measure 12x20x3.5 meters respectively (width, length and depth), the third and forth lagoon 16x20x3.0. Effluent is disposed of through irrigation on neighboring fields. Waste is removed from the forth lagoon. Irrigation is currently done by electric pumps. No additional pumping will be necessary due to the project activity. Installation of the equipments is expected to take place according to the schedule demonstrated in Table A3.

9. **Antônio José Figueiredo Filho**: This is a Finishing Unit farm owned by Mr. Antônio José Figueiredo Filho. It is located in Glória de Dourados/MS. From December 2006 to November 2007, there were approximately 4 360 animals on site. No population increase is expected during the crediting period. Animal waste is sent from 04 containment areas to a sequential system of 02 anaerobic lagoons by flushing and scrapping. The first lagoon measure 28x81x3.5 meters respectively (width, length and depth) and the second lagoon 27x32x3.5 meters. Effluent is disposed of through irrigation on neighboring fields. Waste is removed from the second lagoon. Irrigation is currently done by electric pumps. No additional pumping will be necessary due to the project activity. Installation of the equipments is expected to take place according to the schedule demonstrated in Table A3.

10. **César Janzensky**: This is a Finishing Unit farm owned by Mr. César Janzensky. It is located in Glória de Dourados/MS. From December 2006 to November 2007, there were approximately 4 268 animals on site. No population increase is expected during the crediting period. Animal waste is sent from 05

containment areas to a sequential system of 04 anaerobic lagoons by flushing and scrapping. The first lagoon measure 14.80x41.08x3 meters respectively (width, length and depth), the second lagoon 14.80x36x3.5 meters, the third lagoon 27x75.20x1.3 and the forth lagoon 17.10x52.40x1.0. Effluent is disposed of through irrigation on neighboring fields. Waste is removed from the third lagoon. Irrigation is currently done by electric pumps. No additional pumping will be necessary due to the project activity. Installation of the equipments is expected to take place according to the schedule demonstrated in Table A3.

Fig. A1: Map showing the location of Project farms.

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

The proposed project activity fits in type III: Other project activities, category III.D/Ver. 13 Methane recovery in agricultural and agro industrial activities. The project is associated to Sectoral Scope 15 (agriculture) This category is applicable to project activities that result in GHG emission reductions under or equal to 60 000 metric tons of CO_2 equivalent (tCO_2e). The proposed project activity will capture and combust methane gas resulting from the anaerobic decomposition of swine manure and generate electric energy from the resulting gas from farms located in Brazil. No other GHG are included in the baseline scenario. CO_2 emissions from fossil and electricity consumption are included in the project boundary, though are neglected as significant increase in consumption of fossil fuel or electricity are not

expected. The project boundary also includes methane emissions from anaerobic digesters and methane emissions from inefficient flaring. No emission reductions are claimed for the generation of electricity.

The equipment used by the project activity will be provided by the Brazilian Company BIOTER. BIOTER was established in 1997 and has been working with anaerobic digesters since 2004. BIOTER is specialized in energy generation from biogas The technology shall be easily transferred to and assimilated by the project participant and the farms involved, since there are no problems regarding language or proximity. Farms's personnel training and good practice guidance by the technology provider will ensure that technology transfer will be done successfully. All technology to operate the AWMS is produced in Brazil. Technology transfer from Annex I will only be necessary for the monitoring equipment, such as the gas analyzer and the flow meters. However, these equipments are provided by Brazilian companies that also provide training and maintenance, if necessary.

The AWMS installed by the project includes the adaptation of existing anaerobic lagoons in order to create anaerobic digesters (equipped with methane capture and combustion). The system will be built as one or more anaerobic digesters, ensuring a minimum Hydraulic Retention Time (HRT) of 30 days, to guarantee a significant reduction in organic matter and volatile solids through anaerobic digestion. This new AWMS will replace the baseline AWMS (existing anaerobic lagoon based AWMS) , described in Sections A.2 and A.4.1.4, above. The AWMS proposed includes technical components to ensure methane production, capture and combustion by a motor to generate electric energy. A brief description of such components follows:

Manure loading system:

Animal waste is sent from the barns to the anaerobic digester through two sealed pipes made of Polymer Polyvinyl Chloride (PVC). Manure is loaded from the barns to the anaerobic digesters.

Mixing system

The mixing system will reflux the available effluent through a electric pump and a 85mm PVC pipeline. Effluent will be periodically refluxed inside the anaerobic digester to avoid solid agglomeration in the bottom of the anaerobic digester, improving the system's efficiency to decompose organic matter. Each AWMS will be equipped with one electric pump to operate this system. The electric pump is equipped with a 7.5 HP engine and an estimated consumption of 2 KWh.

Bottom geomembrane

The bottom geomembrane is made of HDPE. This geomembrane is 0,5 mm thick.

Cover layer:

The anaerobic digester will have a 1.25mm thick HDPE layer to ensure biogas capture and storage. This layer will be sealed and welded to the bottom geomembrane. Both layers will be 1m bellow the ground, to ensure fixation.

Upon leaving the anaerobic digester, the treated effluent will flow into the existing storage lagoons, through PVC pipelines. In the storage lagoons, the treated effluent will be collected and used to irrigate cropping areas.

The captured biogas will be conducted to a motor and generate electric energy to the barn, after passing through a flow meter. In the fraction of time the motor is not operational, biogas will be conducted through another sealed PVC pipeline and flow meter to an enclosed flare system

Sludge removal system

The AWMS will have two 200mm PVC pipelines to remove sludge from the bottom of the anaerboc digesters. Slduge removal will be performed by applying the electric pump to such pipeline.

Motor to generate energy:

Motor GM. 1.8, 4 cylinders for biogas use, cooled by water with cogeneration system of by thermal power of 15 kW, 1800 RPM, single grain coupling the asynchronous with power of 15 kW.h of electric energy, three-phase electric generator, without brushs, 4 polos, tension 220/380/440 Volts, 60 Hz, mounted on base in steel and supported on cushion anti vibration, Triernet model TT15.

The energy generators are equipped with a Control Panel designed to control and protect the equipment. This panel provides constant monitoring of the tension and frequency of the gridline, is able to start the generator on demand and shuts the equipment off in case the gridline become unstable.

The motors will be installed during the crediting period, but most likely in a later moment. Initially, all biogas will be burned in enclosed flares.

Enclosed combustion System (flares)

A total of ten stainless steel enclosed flaring equipments will be installed by the project activity. The flaring system is automated to ensure that all produced biogas is flared (after passing through the flow meter). Pressure control devices within the gas handling system maintain ideal biogas flow to the combustion system.

The enclosed fares are built in thermo resistant material, such as stainless steel. Temperature meters are included to determine the combustion temperature. Ventilation devices regulate air flow to allow the complete combustion of methane. Solar energy devices provide a constant and independent energy source to the combustion system.

The system is designed to reach a minimum temperature of 500ºC in the flaring process (a second ignition system is automatically activated if the exhaust gas temperature is below the programmed temperature).

Data-logger:

Through the DATA-LOGGER, data on biogas flow, biogas temperature, biogas pressure, flaring temperature, etc will be recorded and stored. The DATA-LOGGER will record data on a 512 Kb memory, allowing the project participant to determine emission reductions on an hourly basis in every farm. The DATA-LOGGER will be interfaced to a PC terminal via Universal Serial Bus (USB) connection and appropriate software. The components parts are verified functional on a quarterly basis, in accordance with manufacturer and other technical specifications.

Flow meter:

Two flow meter will be installed at each farm; one to measure the flow in to the enclosed flare and another one to measure the flow in to a motor to energy generated. Biogas flow will be measured by ROOTS® G65 SSM – ICPWS flow meters.

ROOTS® special service meters (SSM) are continuous duty meters for measurement of gases where entrained liquids may be present and where the gas being measured may have a corrosive effect on some of the materials employed in meters of standard construction. Typical applications would be in a production pipeline with sour, wet gases or in a sewage treatment plant to measure gases produced by a sludge digester.

SSM Construction

All carbon steel parts have been eliminated from the gas stream in a Special Service Meter. The bearings are made of stainless steel as are the timing gears, spring clips, and internal cap screws. The bearing retainers, clamps and magnet wheel housings are made of anodized aluminum to provide greater resistance to corrosion.

The impellers are made from aluminum extrusions and hard-coated to impart wear and corrosion resistance. The cylinder and head plates on the Series B meters (sizes 8C175 through the 56M175) are

manufactured from aluminum and hard-coat anodized. The anodizing also makes the meter highly resistant to abrasion from particles which may be in the gas stream. More details can be found in Annex 4.

Gas analyzer

All biogas produced in the digester cells will be analyzed by a Dual wavelength Infra-red Refrigerant Gas sensor. This sensor has a measurement range of 0-100% and an accuracy range of +/- 2.5%. This gas sensor will be periodically connected to the gas pipeline in a specific valve and perform gas analysis. More details can be found in Annex 4.

Biogas temperature analyzer

Biogas temperature will be determined by sensors in the combustion system. The Every Control FK 200P is a digital controller ON-OFF, simplified, developed for refrigeration sector to execute the management of compressor and thawing due the compressor stop.
By means of the standardization of the instrument, protected by password, it is possible to regulate the temperature. This instrument it is pre-configured to accepted the NTC sensor.

Biogas Pressure analyzer

The biogas pressure analyser coordinates all combustion system. Once the ideal biogas pressure is present, the ignition system is activated and monitoring information is recorded in the Data-logger (regarding biogas flow, temperature and temperature of the flaring process).Biogas pressure will be determined by sensors in the combustion system. The biogas pressure will be measured by LD301 Smart pressure transmitter.

The AWMS installed by the project activity is far more advanced then the existing AWMS. BIOTER will perform training and guidance for all participating farms personnel prior to the crediting period. Training will involve normal operation, emergency operation, maintenance, and request for warranty service. Amazon Carbon will perform training for all participating farms personnel regarding monitoring and emergency operations as well.

Physical description of the proposed AWMS:

In **Granja Antonio Durval Góis**, the AWMS will consist of one digester cell, measuring 15.0 x 60.0 x 3.5 meters (width, length and depth). The digester cell will be built adapting the existing anaerobic lagoons. The digester cell will have a volume of 3 150 m^3. The resulting effluent will flow to the existing

storage lagoons. One motor to generate electric energy will be used to combust the produced biogas in a controlled manner.

In **Sítio Nossa Senhora Aparecida**, the AWMS will consist of one digester cell, measuring 17.0 x 25.0 x 3.5 meters (width, length and depth). The digester cell will be built adapting the existing anaerobic lagoons. The digester cell will have a volume of 1 487 m^3. The resulting effluent will flow to the existing storage lagoons. One motor to generate electric energy will be used to combust the produced biogas in a controlled manner.

In **Sítio São Geraldo**, the AWMS will consist of one digester cell, measuring 14.0 x 35.0 x 3.5 meters (width, length and depth). The digester cell will be built adapting the existing anaerobic lagoons. The digester cell will have a volume of 1 715 m^3. The resulting effluent will flow to the existing storage lagoons. One motor to generate electric energy will be used to combust the produced biogas in a controlled manner.

In **Sítio Esperança**, the AWMS will consist of two digester cells, measuring 17.0 x 25.0 x 3.5 meters (width, length and depth) each. The digester cells will be built adapting the existing anaerobic lagoons. The digester cells will have a volume of 2 975 m^3. The resulting effluent will flow to the existing storage lagoons. One motor to generate electric energy will be used to combust the produced biogas in a controlled manner.

In **Chacára Paraíso**, the AWMS will consist of one digester cell, measuring 12 x 36.0 x 3.5 meters (width, length and depth). The digester cell will be a new lagoon built at the farm. The digester cell will have a volume of 1 512 m^3. The resulting effluent will flow to the existing storage lagoons. One motor to generate electric energy will be used to combust the produced biogas in a controlled manner.

In **Granja Osmar Rodrigues Caíres**, the AWMS will consist of one digester cell, measuring 12.0 x 36.0 x 3.5 meters (width, length and depth). The digester cell will be built adapting the existing anaerobic lagoons. The digester cell will have a volume of 1 512 m^3. The resulting effluent will flow to the existing storage lagoons. One motor to generate electric energy will be used to combust the produced biogas in a controlled manner.

In **Granja Dulcemar José Grando**, the AWMS will consist of one digester cell, measuring 12.0 x 40.0 x 3.5 meters (width, length and depth). The digester cell will be built adapting the existing anaerobic lagoons. The digester cell will have a volume of 1 680 m^3. The resulting effluent will flow to the existing storage lagoons. One motor to generate electric energy will be used to combust the produced biogas in a controlled manner.

In **Granja Emerson Fernandes**, the AWMS will consist of one digester cell, measuring 17,0 x 25,0 x 3,5 meters (width, length and depth) and the deactivation of the existents third and forth lagoon. The new digester cell will be a new lagoon built at the farm. The digester cell will have a volume of 1 487 m^3. The resulting effluent will flow to the existing storage lagoons. One motor to generate electric energy will be used to combust the produce biogas in a controlled manner.

In **Granja Antônio José Figueiredo Filho**, the AWMS will consist of one digester cell, measuring 12.0 x 50.0 x 3.5 meters (width, length and depth). The new digester cell will be a new lagoon built at the farm. The digester cell will have a volume of 2 100 m^3. The resulting effluent will flow to the existing storage lagoons. One motor to generate electric energy will be used to combust the produced biogas in a controlled manner.

In **Rancho Cosmo**, the AWMS will consist of two digester cell, measuring 14.80 x 41.08 x 3.0 meters (width, length and depth) and 14.80 x 36 x 3.5. The digesters cells will be built adapting the existing anaerobic lagoons. The first digester cell will have a volume of 1 823 m^3, the second digester cell will have a volume of 1 864 m^3. The resulting effluent will flow to the existing storage lagoons. Two motors to generate electric energy will be used to combust the produced biogas in a controlled manner, one for each digester cell.

The implementation schedule of equipment installation is demonstrated in table A3.

Item	Description	jan/08			May/08			June/08			July/08			Aug/08			Sep/08			Oct/08			nov/08			Dec/08			jan/09			2009 remaining months		
CDM CONSIDERATION	Contract signing	ALL FARMS																																
BIODIGESTER CONSTRUCTION	Lagoons cleaning				FARM 1	FARM 2	FARM 3	FARM 4	FARM 5	FARM 6	FARM 7	FARM 8	FARM 9	FARM 10																				
	Mixing system							FARM 1	FARM 2	FARM 3	FARM 4	FARM 5	FARM 6	FARM 7	FARM 8	FARM 9	FARM 10																	
	Biodigester cover																FARM 1	FARM 2	FARM 3	FARM 4	FARM 5	FARM 6	FARM 7	FARM 8	FARM 9	FARM 10								
Flaring and monitoring equipment																				FARM 1	FARM 2	FARM 3	FARM 4	FARM 5	FARM 6	FARM 7	FARM 8	FARM 9	FARM 10					
EXPECTED START OF OPERATION																					FARM 1	FARM 2	FARM 3	FARM 4	FARM 5	FARM 6	FARM 7	FARM 8	FARM 9	FARM 10				
Installation of TRIGAS equipment (model TT15)																															ALL FARMS (to be confirmed)			

Farm 1	Dulcemar José Grando
Farm 2	Osmar Rodrigues Caires
Farm 3	Emerson Fernandes
Farm 4	Geraldo Ferro
Farm 5	Fernando de Castro
Farm 6	Márcio Toshimitsu Muraoka
Farm 7	Antônio Durval Góis
Farm 8	Luiz Henrique Jordão do Amaral
Farm 9	César Janzeski
Farm 10	Antonio Figueiraedo Filho

Table A3: Implementation schedule of equipment installation.

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

Years	Annual estimated emission reductions in tCO_2e
2009	13.838*
2010	15,122
2011	15,122
2012	15,122
2013	15,122
2014	15,122
2015	15,122
2016	15,122
2017	15,122
2018	15,122
2019	1.284**
Total estimated reductions (tCo_2e)	151,220
Crediting period (years)	**10**
Annual average of estimated reductions over the crediting period (CO_2e)	15,122

Tab. A.4: Project activity estimated GHG emission reduction values.

* For the first crediting year, the project will be operational for 334 days (from 01/02/2009 to 31/12/2009)

** For the last crediting year, the project will be operational for 31 days (from 01/01/2019 to 31/01/2019)

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

No public funds will be invested in the project.

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

The project activity includes only the above mentioned farms and the associated estimated emission reductions. Based on paragraph 2 of Appendix C of the Simplified Modalities and Procedures for Small Scale CDM project activities, this project is not deblundled. There are no other registered (or on application to register) small-scale CDM project activities with the same project participants, in the same project category and technology/measure whose project boundaries is within 1 km of another proposed small-scale project activity sites.

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 title of the approved baseline methodology is AMS-III.D "Methane Recovery in agricultural and agro industrial activities" version 13, and the reference is the United Nations Framework Convention on Climate Change (UNFCCC) website:

(http://cdm.unfccc.int/methodologies/SSCmethodologies/approved.html).

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

The small-scale project activity category is methane recovery from manure and wastes from agricultural or agro-industrial activities that would be decaying anaerobically in the absence of the project activity by

(a) Installing methane recovery and combustion system to an existing source of methane emissions, or

(b) Changing the management practice of a biogenic waste or raw material in order to achieve the controlled anaerobic digestion equipped with methane recovery and combustion system.

The project satisfies item 1(a) of the methodology III.D and items 2(a) and (b) that follows:

(a) The sludge must be handled aerobically. In case of soil application of the final sludge the proper conditions and procedures (not resulting in methane emissions) must be ensured.

(b) Technical measures shall be used (e.g. flared, combusted) to ensure that all biogas produced by the digester is used or flared.

The project consists in implementing a methane recovery and combustion system on an existing source of methane that would continue to decay anaerobically without the project. The project activity also satisfies the applicability conditions of item 2 of the adopted methodology, because all sludge will be used to irrigate cropping areas, avoiding the occurrence of anaerobic conditions. Enclosed flares and energy generators will be installed to ensure that all methane produced by the anaerobic digester is efficiently combusted or gainfully used. Technical measures will be adopted to ensure proper flare and generators operation and maintenance. Energy generators are built in a manner to ensure biogas combustion in an enclosed environment, and comply with the description of enclosed flares described in the Methodological tool to determine project emissions from flaring gases containing methane, version 1, that follows:

"Enclosed flare. Enclosed flares are defined as devices where the residual gas is burned in a cylindrical or rectilinear enclosure that includes a burning system and a damper where air for the combustion reaction is admitted."

Based on historical data from animal population and baseline studies, the estimated emission reduction of the project activity shall not exceed 60 Kt CO_2e in any year of the crediting period, as shown in Section A.4.3.

B.3. Description of the project boundary:

The project boundary is the physical and geographic sites where methane recovery occurs. Therefore, the application of treated waste to neighbouring fields occurs outside the project boundaries. The project boundary includes only the emissions (and related reductions) from the AWMS that captures and combusts methane installed by the project activity. This means that the anaerobic digester is the physical boundary of the methane recovery facility. Project boundary is shown in Figure B1 that follows:

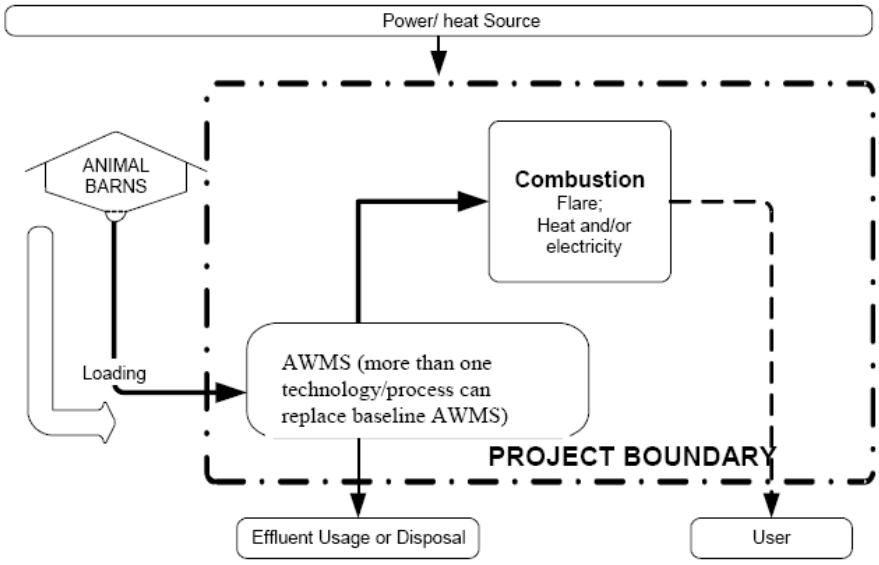

Figure B1. Project boundary

B.4. Description of baseline and its development:

The baseline emission is the amount of methane that would be released into the atmosphere during the crediting period in the absence of the project activity (ten years). The baseline emissions will be calculated as specified in paragraph 7 of AMS.III.D "The baseline scenario is the situation where, in the absence of the project activity, biomass and other organic matter are left to decay anaerobically within the project boundary and methane is emitted to the atmosphere. Baseline emissions (BEy) are calculated ex ante using the amount of the waste or raw material that would decay anaerobically in the absence of the project activity, with the most recent IPCC tier 2 approach".

Therefore, baseline emissions were determined according to the chapter 10 'Emissions from Livestock and Manure Management' under the volume 4 'Agriculture, Forestry and other Land use' of the 2006 IPCC Guidelines for National Greenhouse Gas Inventories and calculated based on swine's in each barn (see Annex 3).

Step 1 – Livestock population

Animal population was determined using historical records of participating farms. Livestock population was determined the average of animals confined during the period considered (December 2006 to November 2007). A brief description of the productive units adopted in the participating farms follows:

- **PPU (Piglet Producing Unit)**: This practice consists on gilts (weighting an average of 140 Kg), gestating sows (weighting an average of 160 kg), sows (weighting an average of 220 to 240 kg) that give birth 2.4 times a year on average, bearing an average 10.6 piglets per delivery and boars (weighting an average of 240kg). Piglet's are then breastfed for a 21-day period and after weaning are taken to the nursery. Piglets are transferred to the nursery weighting 6 Kg on average. Considering the 21-day periods, piglets weight around 3 Kg.
- **Nursery:** This unit consists only in swine coming from the PPU. Animals are fed for a 40-days period and sold at the age of 60 days. Animals are then transferred to the Finishing Units weighting 23 Kg on average. Considering the 40 days-period, animals in the nursery weight 14 - 15 Kg.
- **FU (Finishing Unit)**: This unit contains only weanlings from the nursery. Animals proceed through fattening up and growth until slaughter or transfer to the PPU. Slaughter is done when animals weight around 100 kg. Animals usually remain in the FU for a period of 120 days. Considering this period, animals in the FU unit weight 61 Kg.

  The livestock population for each farm is demonstrated in Table B1, bellow:

Animal category	Data	Granja Antonio Durval Góis	Sítio Nossa Senhora Aparecida	Sítio São Geraldo	Sítio Esperança
Piglet Producing Unit					
Gilts	Population	81	104	-	88
	Average Weight (Kg)	198*	198*	-	198*
Sows in gestation	Population	-	-	-	-
	Average Weight (Kg)	-	-	-	-
Sows	Population	761	985	-	1 005
	Average Weight (Kg)	198*	198*	-	198*
Boars	Population	7	5	-	5
	Average Weight (Kg)	198*	198*	-	198*
Piglets		1,220	1,677	-	1,712
	Average Weight (Kg)	3. 29	3.5	-	3.4
Nursery Unit				-	
Nursery	Population	2,756	3,376	-	3,413
	Average Weight (Kg)	15.14	15.41	-	147
Finishing Unit					
Finishers	Population	-	-	1,712	-
	Average Weight (Kg)	-	-	62.6	-
Total Livestock	**---**	**4,827.**	**6,147**	**1,712**	**6,224**

Table B1. Information on farm's livestock. Figures above represents the average of animals confined from December 2006 to November 2007 . Historic livestock data can be found in Annex 3.

***** Data on this animal category is not available. As a conservative action, IPCC default value for this parameter was chosen. See more details in Section B.6.1.

Animal category	Data	Chacara Paraíso	Granja Osmar Rodrigues Caíres	Granja Dulcemar José Grando	Granja Emerson Fernandes
Piglet Producing Unit					
Gilts	Population	-	-	-	-
	Average Weight (Kg)	-	-	-	-
Sows in gestation	Population	-	-	-	-
	Average Weight (Kg)	-	-	-	-
Sows	Population	-	-	-	-
	Average Weight (Kg)	-	-	-	-
Boars	Population	-	-	-	-
	Average Weight (Kg)	-	-	-	-
Piglets		-	-	-	-
	Average Weight (Kg)	-	-	-	-
Nursery Unit					
Nursery	Population	-	-	-	-
	Average Weight (Kg)	-	-	-	-
Finishing Unit					
Finishers	Population	2,675	2,791	4,198	3,063
	Average Weight (Kg)	60.1	60.5	62.6	61.7
Total Livestock	**---**	2,675	2,791	4,198	3,063

Table B1 (cont). Information on farm's livestock. Figures above represents the average of animals confined from December 2006 to November 2007 . Historic livestock data can be found in Annex 3..

Animal category	Data	Granja Antônio José Figueiredo Filho	Rancho Cosmo
Piglet Producing Unit			
Gilts	Population	-	
	Average Weight (Kg)	-	-
Sows in gestation	Population	-	-
	Average Weight (Kg)	-	-
Sows	Population	-	-
	Average Weight (Kg)	-	-
Boars	Population	-	-
	Average Weight (Kg)	-	-
Piglets	Population	-	-
	Average Weight (Kg)	-	-
Nursery Unit		-	
Nursery	Population	-	-
	Average Weight (Kg)	-	-
Finishing Unit			
Finishers	Population	4,360	4,268
	Average Weight (Kg)	61	61
Total Livestock	**---**	**4,360**	**4,268**

Table B1 (cont.). Information on farm's livestock. Figures above represents the average of animals confined from December 2006 to November 2007 . Historic livestock data can be found in Annex 3.

Step 2 – Methane Emission Factors

Emission factors were determined individually for every animal category shown on Table B1. The baseline AWMS is an open anaerobic lagoon, as described on item A.4.1.4

The emission factor for each animal group is determined by the following equation:

$$EF_{CH4,i} = (Vs_{site} * Nd * Bo * DCH_4 * MCF * MS\% * GWP\_CH_4)/1000$$

Where,

$EF_{CH4,i}$: Methane emission factor for the animal category i, expressed in tCO_2e/animal/year.

Vs_{site}: Adjusted volatile solids excretion per day, expressed in kg-dm/animal/day.

Nd Number of days animals are present in containment areas

Bo: Maximum methane production capacity, in m^3 of CH_4/kg-dm

DCH_4: Density of CH_4, in kg/m^3

MCF: Methane conversion factor for the anaerobic lagoon.

MS% Fraction of waste that is treated in the baseline AWMS.

Default values are used to determine manure characteristics (regarding VS and B_0), since local data is not available. Local data collection on manure characteristics is not a viable option, since the baseline AWMS does not include monitoring of such parameters. Default values for VS and for B_0 are taken from 2006 IPCC Guidelines for National Greenhouse Gas Inventories, since national values are not available. IPCC 2006 default values for VS are adjusted for a site-specific average animal weight. More details on this procedure are provided in Section B.6.1. VS are adjusted by applying the following formula:

Adjusted volatile solids excretion (Vs_{site}):

$$VS_{site,i} = (W_{site,i} / W_{default}) * VS_{default}$$ [1]

Where,

$VS_{site,i}$: Adjusted daily volatile solid matter excretion for the animal category i, on a dry matter basis, for a specific animal category on project site, in kg-dm/animal/day.

W_{site}: Average weight of local animal for category i, in kg.

$W_{default}$: Default value (2006 IPCC) of average weight per animal for a specific category, in kg.

[1] Adapted from AMS.III.D, version 14, equation 2. The number of days in the year "y" where the treatment plant was operational (nd_y) of the referenced equation is not taken into account at this moment because it integrates the calculation of $EF_{CH4,i}$ (as nd). Therefore, VSsite represents the daily volatile solid matter excretion rate..

$VS_{default}$: Default value (2006 IPCC) for daily volatile solid matter excretion, on a dry matter basis, for a specific animal category, in kg-dm/animal/day.

The amount of methane emitted in the baseline scenario is calculated by the equation:

$$CH_{4a} = EF_{CH4,i} * N_a$$

Where,

CH_{4a} Methane produced by the animal population of category i, expressed in tCO2e/year.

N_a Number of animals of the type i.

Step 3 – Total Baseline emissions

$$BE = \sum CH_{4a,i}$$

Where,

BE: Total baseline emissions, in tCO_2e/year.

$CH_{4a,i}$ Methane produced by the population of animal categories i.

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 additionality of the proposed project activity was defined as per guidance of the Attachment A to Appendix B of the Simplified modalities and procedures for small-scale clean development mechanism project activities.

The most probable baseline hypotheses have been selected for the proposed Project activity. In this case, the baseline scenario is determined as the scenario that represents "emissions from a technology which is economically attractive as far as the investment barriers are concerned". Therefore, this hypothesis determines the baseline scenario under a cost-benefit assessment point of view and assumes that high cost scenarios shall not be implemented. The various possible baseline scenarios, including different effluent management technologies, are described in detail in the Revised 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Reference Manual (Chapter 10, Table 10.18) and also in the GHG emissions inventory of the Ministry of Technology and Science

(http://www.mct.gov.br/index.php/content/ view /3881.html).

The baseline scenario for the participating farms has been defined per the following steps:

Step 1: Identifying the project activity alternatives

In the first step of the measurement and attempt to prove the additionality of the proposed project activity, the complete set of possible baseline scenarios and project activity, which are listed in the 2006 IPCC Guidelines for National Greenhouse Gas Inventories should be taken into account.
This includes the following swine manure treatment options:

- Disposal of untreated manure to environment
- Daily spread
- Liquid/slurry
- Solid storage
- Dry lot
- Anaerobic lagoon
- Pit storage below animal confinements
- Anaerobic digester
- Deep bedding
- Composting
- Aerobic treatment
- Burned for fuel

Step 2: Identification of plausible scenarios

2.a: Consistency with mandatory laws and regulations.

Laws and regulations concerning swine confinement farms are defined by the Environmental authority. In Mato Grosso do Sul, IMASUL (Instituto de Meio Ambiente do Mato Grosso do Sul) is responsible for such regulation. According According to the Resolution SEMADES N° 324/1998 , the only excluded scenario is the disposal of untreated manure to water streams or in Environmental Protected areas. The referenced document is available at IMASUL website, below:

http://www.imasul.ms.gov.br/LEGISLACAO/Licenciamento%20Ambiental/Docs/Res%20324-98%20-%20Suinocultura.doc

Bearing current practice in Brazil, a number of plausible scenarios have been identified from the list of possible options. The aspects that have been considered in order to identify the plausible baseline scenarios are: historic or pre-existing practices within the organization, technology available, possible and correct application of the technology in the context and assessment of national technological development.

These plausible scenarios are based on data described in the First Brazilian anthropogenic GHG emissions inventory of the Ministry of Science and Technology and EMBRAPA, available at:

(http://www.mct.gov.br/index.php/content/view/17341.html):

- Daily spread
- Composting
- Pit storage below animal confinements
- Anaerobic lagoon
- Anaerobic digester
- Aerobic digester
- Deep bedding

A justification for the inclusion/exclusion of the manure management systems that cannot be considered a plausible baseline scenario (including the proposed project activity) was determined according to the Technological Inventory of EMBRAPA for Swine Manure Management Systems, unless otherwise stated. The Technological Inventory is available at:

(http://www.cnpsa.embrapa.br/invtec/15.html)

Excluded scenarios:

The criteria used to determine the scenarios excluded are practical and economical regarding the type of technology. From these analyses, the excluded scenarios follow:

- Solid storage: Usually, the type of swine manure storage offers no protection against pathogenic vectors and, because it's a non-sealed area, releases odors that jeopardize the residents' quality of life.
- Daily spread: This system has been excluded due to the size of the livestock. Manure production is too great to allow daily spread on cropping areas. Besides, manure is handled in liquid form, as it is removed from the barns through a flushing system.
- Dry lot: This system has been excluded because it does not apply to confined animals.
- Liquid/slurry: This system was excluded because manure is removed by a flushing system that adds a considerable amount of water to the manure.
- Pit storage below animal confinements: This treatment system has been excluded due to the fact that biological manure digestion releases methane, which can intoxicate the herd when it's not properly eliminated through exhaustion systems.

- Deep bedding: According to the EMBRAPA researcher Mr. Paulo Armando de Oliveira, in his Article published in 2000 "Swine Production in Deep bedding systems: the Brazilian experience"[2], this type of treatment is inconsistent with the current productive systems adopted in Brazil, which require flushing to remove manure from the barns. Hence, this type of treatment has been excluded as a plausible scenario.
- Composting: Composting systems are not suitable for great volumes of confined swine manure. This occurs because there is too much water in the waste, which makes the drying process very hard. This treatment is more effective when dealing with the sludge resulting from bacterial decomposition processes.
- Aerobic treatment: This type of treatment is more commonly used when dealing with sludge or diluted waste. The solids in the manure are difficult to homogenize and oxygenate, which demands too much activity from the agitators. Another important consideration is the ammonium release potential from the system when it is not properly aerated. This equipment consumes high amounts of energy, which increases costs for the swine raiser.
- Burned for fuel: Animal waste is handled in a liquid form, since flushing systems are used to remove manure from the barns. Burning waste or organic matter is also not encouraged by IMASUL due to odor and smoke emissions.

Through this analysis, the plausible scenarios have been reduced to two potential manure treatment systems:

Plausible baseline scenario: Anaerobic lagoon.

Proposed project activity: Anaerobic Digester.

Included scenarios:

- Anaerobic Lagoon: This treatment system is easy to operate, which requires little workforce and maintenance investment. It is a viable alternative and has been considered a plausible baseline scenario. This is the current treatment system in all participating farms.
- Anaerobic digester: This system, retrieves methane, which is responsible for global warming, is capable of producing biogas and biofertilizer, and also reduces odors. It requires high

[2] Available at: http://www.cnpsa.embrapa.br/down.php?tipo=publicacoes&cod_publicacao=301

implementation costs and medium maintenance cost. This alternative is not very popular among Brazilian swine raisers and has been considered the project activity.

After the identification of the plausible scenarios, following the process of assessment of aditionality, an analysis shall be made to demonstrate the barriers that the proposed project activity selected above will face without the CDM project register.

Step 3: ***Barrier Analysis***

This Project activity is not adopted nationally due to the following barriers:

Investment Barriers: this manure management system is regarded as one of the most advanced practices worldwide. A few countries use this technology due to high costs involved when compared to other systems. The technology applied by the project demands an investment of R$40 to R$151[3] (U$ 23 to U$ 86.5 approximately) [4] per cubic meter of installed digester capacity. Less expensive AWMS are available (as anaerobic lagoons), but result in higher GHG emissions, as demonstrated in the Technological Inventory of EMBRAPA for Swine Manure Management Systems.

Technological Barriers: In order to justify the implementation of an anaerobic digester, a great deal of manure is needed, as well as proximity and concentration of barns, since the smaller the herd, the more expensive the implementation of the system regarding cost/benefit.

Anaerobic digesters are systems that need detailed planning to be installed. Operating also involves controlled manure handling practices, constant performance checking and maintenance. This is not usually the case for baseline scenarios, where farmers have little to no control of the existing AWMS.

According to EMBRAPA researchers Mr. Airton Kunz, Mr. Carlos Cláudio Perdomo and Mr. Paulo Armando de Oliveira, in the Article published in 2004 '*Biodigesters: Advances and Drawbacks* (Biodigestores: Avanços e Retrocessos)", the following barriers, amongst others, prevented anaerobic digesters to become common use for the treatment of swine manure:

- ✓ Lack of technical knowledge for the construction and operation of anaerobic digesters;
- ✓ High implementation and maintenance costs;
- ✓ High costs involved in using the resulting biofertilzer;

[3] Currency exchange rate of 15/01/2008 (U$1.00=R$1.745). Source: Banco Central do Brasil. Available at http://www5.bcb.gov.br/pec/conversao/Resultado.asp?idpai=convmoeda.

[4] These values were determined based on the actual cost for the installation of the AWMS in each farm, as provided by BIOMASSA. BIOMASSA is a consulting company, partner of BIOTER, responsible for designing AWMS installed by BIOTER To determine the investment per m^3 of installed capacity, the total cost of each AWMS was divided by the volume capacity described in Section A.4.2.

- ✓ Low efficiency in animal waste treatment, due to inadequate operation and maintenance procedures.

The referenced Article is available at:

(http://www.cnpsa.embrapa.br/index.php?ids=Sq4r54z6x&pg=1&ano=2004)

According to this article, most of these barriers are still prevailing. Despite the technological improvement in anaerobic digestion in the last 30 years, pig farmers still lack the knowledge and the assistance to successfully install and operate anaerobic digesters for the treatment of animal manure. In most cases, anaerobic digesters are built ignoring the basic principles of anaerobic digestion. This results in low efficient AWMS that are both technically and economically not viable.

EMBRAPA researchers conclude the article informing that unless proper technological transfer and technical assistance procedures are provided, anaerobic digesters might become more discredited in Brazil.

The above mentioned barriers have prevented anaerobic digesters to become the Business as Usual for manure treatment in Brazil. As demonstrated in the First Brazilian anthropogenic GHG emissions inventory of the Ministry of Science and Technology and EMBRAPA, the use of anaerobic digester is still limited for swine manure treatment.

Legal Restrictions: The Brazilian legislation related to swine confinement farms is focused on the protection of water sources and protected areas. A few water quality guidelines are determined. It is also forbidden to dispose untreated effluent into the environment, as demonstrated by IMASUL - Script of system project of environmental control for swine rising, amongst others. No specific effluent treatment or GHG emission control in swine farm operations are required.

Step 4: Common practice analysis:

The common practice analysis does not include farms that integrate registered CDM project activities. As from 19/06/2008, there are 34 registered CDM projects involving methane capture and combustion in swine confinement farms in Brazil[5]

According to the First Brazilian anthropogenic GHG emissions inventory of the Ministry of Science and Technology and EMBRAPA, the Brazilian swine manure systems can be divided into two distinct groups. The first group (occurring mainly in the states of São Paulo, Goiás and Mato Grosso) with large farms, over one thousand swine and usually treatment systems that consist of a series of stabilization

[5] Source: UNFCCC website (http://cdm.unfccc.int/Projects/index.html)

lagoons and, in some cases, partly digested waste spray. And the second group (occurring mainly in the west of the state of Santa Catarina, state of Paraná and northwest of the state of Rio Grande do Sul), with small farms, distributed as follows: small (up to 100 swine), medium (100 to 300 swine) and large (over 300 swine). The treatment system commonly used is the open tank (single anaerobic lagoon), which a retention time that varies from 20 to 90 days. After that period it's applied to the soil on site or in neighboring areas.

As described above, we are able to conclude that the usual technology applied to Brazilian swine confinement farms is based on anaerobic lagoons. Therefore the project activity, which consists on anaerobic digesters, is not similar to what can be commonly found in Brazil.

Step 5: Impact caused by the registration of the project as CDM:

As shown in the steps above, the only way to implement the proposed project activity is by overcoming the barriers mentioned and reducing the risks commonly associated to this type of project.

The potential of the CDM project, mainly the environmental and financial one, was extremely important in the decision-making process of the participating swine raisers. The implementation of such an innovative technology into the production system, which can bring great environmental improvements due to GHG emission reduction, would be impossible in the absence of the financial aid raised by the project activity.

Within the process of gathering the producers to implement the project activity it was possible to notice how resilient some of them were regarding the technology applied, which was caused mainly by the lack of information regarding economic and environmental cost/benefit. All measures related to the installation of the proposed AWMS (demonstrated in Table A3) were only taken after the CDM consideration. CDM consideration took place on 15/01/2008, when the first contract for the development of a CDM project was signed between Amazon Carbon and a participating farm. In the referenced date, a contract was signed between Amazon Carbon and Mr. Fernando de Castro, owner of Sitio Nossa Senhora Aparecida. The referenced date is also considered as the starting date of the project activity.

We must also consider the development and encouragement of new technologies or the application of well-known, widespread technologies to other productive activities, as they are adjusted for highly atmospheric polluting activities (such as swine confinement farms).

As demonstrated in this fifth step of the additionality analysis, it becomes evident that the impact caused by the registration of the CDM project was decisive to overcome the barriers to the implementation of the proposed project activity.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

Baseline emissions are calculated as described in Section B.4. Project emissions were determined according to the approved small-scale methodology AMS.III.D, version 13. The project emissions for the proposed project activity are defined as the amount of methane that would be emitted to the atmosphere during the crediting period due to the project activity, besides emissions associated to fossil fuel and energy consumption within project boundary. An anaerobic digester is considered the project activity and projects emissions consist of:

Ex ante estimation of Emissions from project activity ($PE_{ex\text{-}ante}$):

Four factors are considered emissions from the project activity: methane emissions from digester, methane emissions from inefficient flaring, CO_2 emissions from fossil fuel combustion and CO_2 emissions from electricity consumption. The following formulae are used to calculate these factors:

$$PE = PE_{digester} + PE_{flare} + PE_{FC} + PE_{EC}$$

Where,

PE	Project emissions, in tCO_2e.
$PE_{digester}$	Methane emissions from anaerobic digester, in tCO_2e.
PE_{flare}	Methane emissions from inefficiency in methane flaring in tCO_2e.
PE_{FC}	CO_2 emissions from fossil fuel combusted to operate the AWMS
PE_{EC}	CO_2 emissions from electricity consumption to operate the AWMS

Methane emissions from anaerobic digester ($PE_{digester}$)

Anaerobic digester emissions were also estimated according to the Tier 2 approach of the 2006 IPCC Guidelines for Greenhouse Gas Inventories, chapter 10 'Emissions from Livestock and Manure Management' under the volume 4 'Agriculture, Forestry and other Land use'. Emissions from this source were determined through the following steps:

Step 1 – Livestock population

Livestock population was defined as described in section B.4. Livestock population will remain constant during the project activity.

Step 2 – Methane Emission Factors

Emission factors were determined individually for every animal category shown on Table B1.

The emission factor for each animal group is determined by the following equation:

$$EF_{CH4,i} = (Vs_{site} * Nd * Bo * DCH_4 * MCF * MS\% * GWP\_CH_4)/1000$$

Where,

$EF_{CH4,i}$: Methane emission factor for the animal category i, expressed in tCO_2e/animal/year.

Vs_{site}: Adjusted volatile solids excretion per day, expressed in kg-dm/animal/day.

Nd Number of days animals are present in containment areas

Bo: Maximum methane production capacity, in m^3 of CH_4/kg-dm

DCH_4: Density of CH_4, in kg/m^3

MCF: Methane conversion factor for the anaerobic digester.

MS% Fraction of waste that is treated in the project AWMS.

Adjusted volatile solids excretion (Vs_{site}):

$$VS_{site,i} = (W_{site,i} / W_{default}) * VS_{default}$$

Where,

$VS_{site,i}$: Adjusted daily volatile solid matter excretion for the animal category i, on a dry matter basis, for a specific animal category on project site, in kg-dm/animal/day.

W_{site}: Average weight of local animal for category i, in kg.

$W_{default}$: Default value of average weight per animal for a specific category, in kg.

$VS_{default}$: Default value (2006 IPCC) for daily volatile solid matter excretion, on a dry matter basis, for a specific animal category, in kg-dm/animal/day.

The amount of methane emitted by an animal population is calculated by the equation:

$$CH_{4a} = EF_{CH4,i} * N_a$$

Where,

CH_{4a} Methane emissions by the animal population of category i, expressed in tCO2e/year.

N_a Average number of animals of the type i.

Step 3 – Total methane emissions from anaerobic digester

$$PECH_4 = \sum CH_{4a,i}$$

Where,

$PECH_4$: Methane emissions from anaerobic digester.

$CH_{4a,i}$ Methane emissions by the population of animal categories , expressed in tCO2e/year.

Emissions from inefficiency in methane flaring (PE_{flare}):

Methane emissions from flaring occur due to the incomplete flaring of the methane contained in the residual gas that will be sent to the flares during the crediting period. Emissions from this source are estimated as the amount of methane emitted in the baseline scenario, corrected for the efficiency of the proposed AWMS on methane destruction, as follows:

$$PE_{Flare} = \text{Baseline } CH_{4a,i} * (1\text{-}FE)$$

Where,

PE_{flare} Project emissions from inefficiency in methane flaring, in tCO_2e.

Baseline $CH_{4a,i}$ Amount of methane emitted in the baseline, calculated as described in Section B.4, in tCO_2e.

FE Flare efficiency on methane destruction

A default value of 90% is used for Flare Efficiency. This value is also used to determine the motors efficiency on methane destruction. This is in accordance with paragraph 12 of AMS.III.D, version 13, that follows:

"AMS.III.D, version 13

Paragraph 12

…

Project activities where a portion of the biogas is destroyed through flaring and the other portion is used for energy may consider to apply the flare efficiency to the portion of the biogas used for energy, if separate measurements are not performed".

Procedures and parameters monitored to determine flare efficiency default values during the crediting period are described in Section B.7.

CO_2 emissions from fossil fuel combusted to operate the AWMS

Project emissions from this source are considered negligible, because the AWMS installed as the project activity will not result in increase in fossil fuel consumption.

CO_2 emissions from electricity consumption to operate the AWMS

Project emissions from this source are considered negligible, because the AWMS installed as the project activity will not result in significant increase in energy consumption. The combined electricity consumption of the electric pumps for each farm is approximately 0.8 MWh per year. However our goal at

this project is generated electrical energy from the biogas and the CO_2 emissions from electricity will be negative.

Leakage emissions (LE):

Leakage emissions are not considered, as defined as defined in paragraph 9 of approved small-scale methodology AMS.III.D, version 13.

Emission Reductions (ER)

In order to obtain the project activity emission reductions, project activity emissions and leakage emissions must be subtracted from the baseline emissions, as described below:

Estimated project activity emission reductions ($ER_{PA\_estimated}$):

$$ER_{PA\_estimated} = BE - PE - LE$$

Where,

$ER_{PA\_estimated}$ is expressed in tCO_2e.

BE: Total baseline emissions in tCO_2e.

PE: Total emissions from project activity.

LE Total leakage emissions.

Calculated project activity emission reductions ($ER_{PA\_calculated}$):

The actual emission reduction achieved by the project during the crediting period will be calculated using the amount of methane recovered and destroyed by the project activity, calculated as:

$$ER_{PA\_calculated} = MD_y - PE_y - Leakage$$

Where:

PEy actual project emissions in the year y

MDy methane captured and destroyed by the project activity in the year "y" (tCO2 e), that will be measured using the conditions of the flaring process:

$$MD_y = BG_{burnt,y} * w_{CH4,y} * D_{CH4,y} * FE * GWP_{CH4}$$

Where:

$BG_{burnt,y}$ biogas flared or used as fuel in the year "y" (m^3).

$w_{CH4,y}$ methane content in biogas in the year "y" (mass fraction).

$D_{CH4,y}$ density of methane at the temperature and pressure of the biogas in the year "y"

	(tonnes/m3).
FE	flare efficiency in the year "y" (fraction)
GWPCH4	Methane global warming potential (21)

Explanation of methodological choices

Default values are used to represent volatile solid excretion (Vs), methane production from treated manure (Bo) and Methane Conversion Factors (MCF). Default values have been chosen to quantify the emissions, since the existing AWMS did not include direct monitoring of such values. Determining these parameters on site is not an economically viable option. Default values for Vs are used to determine Adjusted VS values, as described above. Default values are taken from 2006 IPCC Guidelines for Greenhouse Gas Inventories, chapter 10 'Emissions from Livestock and Manure Management' under the volume 4 'Agriculture, Forestry and other Land use', unless otherwise stated. Default values for Western Europe genetics were chosen, since these are the genetics used in the participating farms.

Default values for VS were adjusted for site-specific average animal weight to provide more realistic values for this parameter. This is in accordance with the following information provided in IPCC 2006:

"Even when the level of detail presented in the Tier 2 method is not possible in some countries, country-specific data elements such as animal mass, VS excretion, and others can be used to improve emission estimates."[6]

In Annex 10A.2 of Chapter 10 of IPCC 2006, default values for VS from swine are only provided for two animal categories: market swine and breeding swine. Projects participant considers this approach to be incomplete, considering that swine are classified in up to seven categories in the participating farms (gilts, sows in gestation, sows, boars, piglets, nursery and finishers).

Project participant considers that there are significant differences in animal average weight among the chosen animal categories and those described in Tables 10A-7 and 10A-8 of Chapter 10 of IPCC 2006. This is especially applicable for piglets (weighting around 3 to 4 Kg), nursery (weighting around 13 to 15 kg) and finishers (that weight from 56 to 72 Kg).

Project participant considers as a more conservative approach to correct VS for each animal category adopted in the participating farms, instead of using only two animal categories. Choosing only two categories would imply in considering piglets, nursery and finishers as market swine, with the same value for VS, which is unrealistic due to their average weight.

[6] Extracted from page 10.42 of Chapter 10 of IPCC 2006.

Carbon dioxide emissions from methane combustion (burned in the flare) are biogenic. This assumption is based on the fact that the organic matter consumed by the animals has a renewable origin (and therefore is not considered fossil). CO_2 emissions from anaerobic digestion do not represent any difference in the emission volumes between each scenario since there is no possible additional transformation once that compound is burned. Methane emissions from biogas flaring were determined as described above.

The characteristics of the livestock regarding number and weight of individuals were collected on site. Therefore, the degree of uncertainty of these variables is minimal.

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

Data / Parameter:	**Na**
Data unit:	N/A
Description:	Average number of animals of type i
Source of data used:	Farms monitoring spreadsheets
Value applied:	Values applied are described in Table B.1.
Justification of the choice of data or description of measurement methods and procedures actually applied:	The procedures for determining this parameter are described in Section B.6.1.
Any comment:	

Data / Parameter:	**$VS_{default}$**
Data unit:	Kg-dm/animal/day
Description:	Daily volatile solids excretion rate
Source of data used:	2006 IPCC, Annex 10A.2, Table 10A-7 (market swine) and 10A-8 (breeding swine)
Value applied:	0.3 (market swine) 0.46 (breeding swine)
Justification of the choice of data or description of measurement methods and procedures actually applied:	Default values are applied because local data is not available. Local data collection is not a viable option for excretion rate.
Any comment:	

Data / Parameter:	**VS_{site}**
Data unit:	Kg-dm/animal/day
Description:	Daily volatile solids excretion rate, corrected for local animal weight
Source of data used:	2006 IPCC, Annex 10A.2, Table 10A-7 (market swine) and 10A-8 (breeding swine)
Value applied:	Values applied are described in Tables B2 to B11.

Justification of the choice of data or description of measurement methods and procedures actually applied:	A correction of VS default value was made considering local animal weight. Default values were used for Gilts, Sows and Boars where local data was not available.
Any comment:	

Data / Parameter:	**$W_{default}$**
Data unit:	Kg/animal
Description:	Default animal weight per animal category
Source of data used:	2006 IPCC, Annex 10A.2, Table 10A-7and 10A-8
Value applied:	198 for breeding swine and 50 for market swine
Justification of the choice of data or description of measurement methods and procedures actually applied:	
Any comment:	These values are only used to determine VSsite, as shown in Sections B.4 and B.6.1

Data / Parameter:	**Wsite**
Data unit:	Kg/animal
Description:	Average animal weight per animal category
Source of data used:	Farms manager and monitoring spreadsheets
Value applied:	Values applied are described in Tables B2 to B11.
Justification of the choice of data or description of measurement methods and procedures actually applied:	The procedures for determining this parameter are described in Section B.6.1.

Data / Parameter:	**nd_y**
Data unit:	Days/year
Description:	Number of days animals are present in containment areas in the year y
Source of data used:	Farms managers and monitoring spreadsheets
Value applied:	334 for 2009, 31 for 2019 and 365 for the remaining years
Justification of the choice of data or description of measurement methods and procedures actually applied:	
Any comment:	

Data / Parameter:	**Bo**
Data unit:	m^3/Kg of VS
Description:	Maximum methane producing capacity for manure produced by animal type
Source of data used:	2006 IPCC, Annex 10A.2, Table 10A-7 (market swine) and 10A-8 (breeding swine)

Value applied:	0.45 (Western Europe)
Justification of the choice of data or description of measurement methods and procedures actually applied:	Default values are applied because local data is not available. Local data collection is not a viable option for methane producing capacity.
Any comment:	

Data / Parameter:	**MCF**
Data unit:	Fraction or percentage
Description:	Methane Conversion Factor for baseline and project AWMS
Source of data used:	2006 IPCC Table 10.17
Value applied:	78 for baseline AWMS and 10 for project AWMS
Justification of the choice of data or description of measurement methods and procedures actually applied:	Default values are applied because local data is not available. Local data collection is not a viable option for methane conversion factor. The project AWMS (anaerobic digester) is a sealed system that does not result in methane emissions. A 10% conservative factor was adopted to account for uncertainties.
Any comment:	Baseline Methane Conversion Factors were determined according to the average annual temperature for the different project sites. Temperatures were obtained from INMET (Instituto Nacional de Meteorologia) database, available at http://www.inmet.gov.br/html/clima.php#. Temperature applied was 22ºC for the Central Region of Brazil.

Data / Parameter:	**MS% baseline**
Data unit:	Fraction or percentage
Description:	Fraction of waste destined to the baseline AWMS
Source of data used:	Farms manager
Value applied:	100%
Justification of the choice of data or description of measurement methods and procedures actually applied:	All manure is destined to the baseline AWMS (anaerobic lagoons) in the farms.
Any comment:	

Data / Parameter:	**MS% project activity**
Data unit:	Fraction or percentage
Description:	Fraction of waste destined to the project AWMS
Source of data used:	BIOMASSA
Value applied:	100%
Justification of the choice of data or description of measurement methods and procedures actually applied:	All manure will be destined to the project AWMS (anaerobic digesters) in the farms.
Any comment:	

B.6.3 Ex-ante calculation of emission reductions:

Baseline emissions were determined as described in section B.4. Project emissions and emissions reductions were determine through equations shown in section B.6.1. A summary of emission reductions for each farm are shown in Tables B.2 to B.11:

Goiz											
Baseline emissions											
Animal category	Na	Wdefault	Wsite	Vssite	Bo	DCH4	MS%	MCF	GWPCH4	EFi	Annual CH4 emissions (in tCO2e)
Gilts	81	198	198	0,460	0,45	0,67000	100	0,78	21	0,829	67
Sows in gestation	-	-	-	-	-	-	-	-	-	0	0
Sows	761,96	198	198	0,460	0,45	0,67000	100	0,78	21	0,829	632
Boars	7	198	198	0,460	0,45	0,67000	100	0,78	21	0,829	6
Piglets	1.220	50	2,75	0,020	0,45	0,67000	100	0,78	21	0,036	43
Nursery	2.757	50	14,4	0,091	0,45	0,67000	100	0,78	21	0,164	451
Finishers	-	-	-	-	-	-	-	-	-	-	-
									Baseline emissions		**1.200**
Project emissions											
Animal category	Na	Wdefault	Wsite	Vssite	Bo	DCH4	MS%	MCF	GWPCH4	EFi	Annual CH4 emissions (in tCO2e)
Gilts	81	198	198	0,460	0,45	0,67000	100	0,10	21	0,106	9
Sows in gestation	-	-	-	-	-	-	-	-	-	0,000	0
Sows	761,96	198	198	0,460	0,45	0,67000	100	0,10	21	0,106	81
Boars	7	198	198	0,460	0,45	0,67000	100	0,10	21	0,106	1
Piglets	1.220	50	2,75	0,020	0,45	0,67000	100	0,10	21	0,005	6
Nursery	2.757	50	14,4	0,091	0,45	0,67000	100	0,10	21	0,021	58
Finishers	-	-	-	-	-	-	-	-	-	-	-
									PEdigester		**154**
									PEflare		**120**
									Project emissions		**274**

Table B2. Baseline and project emissions for Antônio Durval Góis

Nossa Senhora Aparecida											
Baseline emissions											
Animal category	Na	Wdefault	Wsite	Vssite	Bo	DCH4	MS%	MCF	GWPCH4	EFi	Annual CH4 emissions (in tCO2e)
Gilts	104	198	198	0,460	0,45	0,67000	100	0,78	21	0,829	86
Sows in gestation	-	-	-	-	-	-	-	-	-	-	0
Sows	985,9	198	198	0,460	0,45	0,67000	100	0,78	21	0,829	817
Boars	5	198	198	0,460	0,45	0,67000	100	0,78	21	0,829	4
Piglets	1.677	50	3,50	0,021	0,45	0,67000	100	0,78	21	0,038	64
Nursery	3.376	50	15,4	0,092	0,45	0,67000	100	0,78	21	0,167	563
Finishers	-	-	-	-	-	-	-	-	-	-	-
										Baseline emissions	**1.534**
Project emissions											
Animal category	Na	Wdefault	Wsite	Vssite	Bo	DCH4	MS%	MCF	GWPCH4	EFi	Annual CH4 emissions (in tCO2e)
Gilts	104	198	198	0,460	0,45	0,67000	100	0,10	21	0,106	11
Sows in gestation	-	-	-	-	-	-	-	-	-	-	0,000
Sows	985,9	198	198	0,460	0,45	0,67000	100	0,10	21	0,106	105
Boars	5	198	198	0,460	0,45	0,67000	100	0,10	21	0,106	1
Piglets	1.677	50	3,50	0,021	0,45	0,67000	100	0,10	21	0,005	8
Nursery	3.376	50	15,4	0,092	0,45	0,67000	100	0,10	21	0,021	72
Finishers	-	-	-	-	-	-	-	-	-	-	-
									PEdigester		**197**
									PEflare		**153**
									Project emissions		**350**

Table B3. Baseline and project emissions for Sítio Nossa Senhora Aparecida.

Sítio São Geraldo											
Baseline emissions											
Animal category	Na	Wdefault	Wsite	Vssite	Bo	DCH4	MS%	MCF	GWPCH4	EFi	Annual CH4 emissions (in tCO2e)
Gilts	-	-	-	-	-	-	-	-	-	-	-
Sows in gestation	-	-	-	-	-	-	-	-	-	-	-
Sows	-	-	-	-	-	-	-	-	-	-	-
Boars	-	-	-	-	-	-	-	-	-	-	-
Piglets	-	-	-	-	-	-	-	-	-	-	-
Nursery	-	-	-	-	-	-	-	-	-	-	-
Finishers	1.712	198	62,6	0,376	0,45	0,67000	100	78,00	21	0,677	1.160
									Baseline emissions		**1.160**
Project emissions											
Animal category	Na	Wdefault	Wsite	Vssite	Bo	DCH4	MS%	MCF	GWPCH4	EFi	Annual CH4 emissions (in tCO2e)
Gilts	-	-	-	-	-	-	-	-	-	-	-
Sows in gestation	-	-	-	-	-	-	-	-	-	-	-
Sows	-	-	-	-	-	-	-	-	-	-	-
Boars	-	-	-	-	-	-	-	-	-	-	-
Piglets	-	-	-	-	-	-	-	-	-	-	-
Nursery	-	-	-	-	-	-	-	-	-	-	-
Finishers	1.712	198	62,6	0,376	0,45	0,67000	100	0,10	21	0,087	149
									PEdigester		**149**
									PEflare		**116**
									Project emissions		**265**

Table B4. Baseline and project emissions for Sítio São Geraldo.

Sítio Esperança											
Baseline emissions											
Animal category	Na	Wdefault	Wsite	Vssite	Bo	DCH4	MS%	MCF	GWPCH4	EFi	Annual CH4 emissions (in tCO2e)
Gilts	88	198	198	0,460	0,45	0,67000	100	0,78	21	0,829	73
Sows in gestation	-	-	-	-	-	-	-	-	-	-	0
Sows	1.005,55	198	198	0,460	0,45	0,67000	100	0,78	21	0,829	834
Boars	5	198	198	0,460	0,45	0,67000	100	0,78	21	0,829	4
Piglets	1.712	50	3,36	0,020	0,45	0,67000	100	0,78	21	0,036	62
Nursery	3.376	50	14,7	0,088	0,45	0,67000	100	0,78	21	0,159	544
Finishers	-	-	-	-	-	-	-	-	-	-	0
									Baseline emissions		**1.517**
Project emissions											
Animal category	Na	Wdefault	Wsite	Vssite	Bo	DCH4	MS%	MCF	GWPCH4	EFi	Annual CH4 emissions (in tCO2e)
Gilts	88	198	198	0,460	0,45	0,67000	100	0,10	21	0,106	9
Sows in gestation	-	-	-	-	-	-	-	-	-	-	0,000
Sows	1.005,55	198	198	0,460	0,45	0,67000	100	0,10	21	0,106	107
Boars	5	198	198	0,460	0,45	0,67000	100	0,10	21	0,106	1
Piglets	1.712	50	3,36	0,020	0,45	0,67000	100	0,10	21	0,005	8
Nursery	3.376	50	14,7	0,088	0,45	0,67000	100	0,10	21	0,020	70
Finishers	-	-	-	-	-	-	-	-	-	-	0
									PEdigester		**194**
									PEflare		**152**
									Project emissions		**346**

Table B5. Baseline and project emissions for Sítio Esperança.

Chácara Paraíso											
Baseline emissions											
Animal category	Na	Wdefault	Wsite	Vssite	Bo	DCH4	MS%	MCF	GWPCH4	EFi	Annual CH4 emissions (in tCO2e)
Gilts	-	-	-	-	-	-	-	-	-	-	-
Sows in gestation	-	-	-	-	-	-	-	-	-	-	-
Sows	-	-	-	-	-	-	-	-	-	-	-
Boars	-	-	-	-	-	-	-	-	-	-	-
Piglets	-	-	-	-	-	-	-	-	-	-	-
Nursery	-	-	-	-	-	-	-	-	-	-	-
Finishers	2.675	198	60,2	0,361	0,45	0,67000	100	78,00	21	0,651	1.741
									Baseline emissions		**1.741**
Project emissions											
Animal category	Na	Wdefault	Wsite	Vssite	Bo	DCH4	MS%	MCF	GWPCH4	EFi	Annual CH4 emissions (in tCO2e)
Gilts	-	-	-	-	-	-	-	-	-	-	-
Sows in gestation	-	-	-	-	-	-	-	-	-	-	-
Sows	-	-	-	-	-	-	-	-	-	-	-
Boars	-	-	-	-	-	-	-	-	-	-	-
Piglets	-	-	-	-	-	-	-	-	-	-	-
Nursery	-	-	-	-	-	-	-	-	-	-	-
Finishers	2.675	198	60,2	0,361	0,45	0,67000	100	0,10	21	0,083	223
									PEdigester		**223**
									PEflare		**174**
									Project emissions		**397**

Table B6. Baseline and project emissions for Chácara Paraíso.

Osmar Rodrigues Caires											
Baseline emissions											
Animal category	Na	Wdefault	Wsite	Vssite	Bo	DCH4	MS%	MCF	GWPCH4	EFi	Annual CH4 emissions (in tCO2e)
Gilts	-	-	-	-	-	-	-	-	-	-	0
Sows in gestation	-	-	-	-	-	-	-	-	-	-	0
Sows	-	-	-	-	-	-	-	-	-	-	0
Boars	-	-	-	-	-	-	-	-	-	-	0
Piglets	-	-	-	-	-	-	-	-	-	-	0
Nursery	-	-	-	-	-	-	-	-	-	-	0
Finishers	2.792	198	60,5	0,362	0,45	0,67000	100	78,00	21	0,654	1.827
									Baseline emissions		**1.827**
Project emissions											
Animal category	Na	Wdefault	Wsite	Vssite	Bo	DCH4	MS%	MCF	GWPCH4	EFi	Annual CH4 emissions (in tCO2e)
Gilts	-	-	-	-	-	-	-	-	-	-	0
Sows in gestation	-	-	-	-	-	-	-	-	-	-	0
Sows	-	-	-	-	-	-	-	-	-	-	0
Boars	-	-	-	-	-	-	-	-	-	-	0
Piglets	-	-	-	-	-	-	-	-	-	-	0
Nursery	-	-	-	-	-	-	-	-	-	-	0
Finishers	2.792	198	60,5	0,362	0,45	0,67000	100	0,10	21	0,084	234
									PEdigester		**234**
									PEflare		**183**
									Project emissions		**417**

Table B7. Baseline and project emissions for Osmar Rodrigues Caíres.

Dulcemar José Grando											
Baseline emissions											
Animal category	Na	Wdefault	Wsite	Vssite	Bo	DCH4	MS%	MCF	GWPCH4	EFi	Annual CH4 emissions (in tCO2e)
Gilts	-	-	-	-	-	-	-	-	-	-	-
Sows in gestation	-	-	-	-	-	-	-	-	-	-	-
Sows	-	-	-	-	-	-	-	-	-	-	-
Boars	-	-	-	-	-	-	-	-	-	-	-
Piglets	-	-	-	-	-	-	-	-	-	-	-
Nursery	-	-	-	-	-	-	-	-	-	-	-
Finishers	4.199	198	62,6	0,375	0,45	0,67000	100	78,00	21	0,677	2.841
									Baseline emissions		**2.841**
Project emissions											
Animal category	Na	Wdefault	Wsite	Vssite	Bo	DCH4	MS%	MCF	GWPCH4	EFi	Annual CH4 emissions (in tCO2e)
Gilts	-	-	-	-	-	-	-	-	-	-	-
Sows in gestation	-	-	-	-	-	-	-	-	-	-	-
Sows	-	-	-	-	-	-	-	-	-	-	-
Boars	-	-	-	-	-	-	-	-	-	-	-
Piglets	-	-	-	-	-	-	-	-	-	-	-
Nursery	-	-	-	-	-	-	-	-	-	-	-
Finishers	4.199	198	62,6	0,375	0,45	0,67000	100	0,10	21	0,087	364
									PEdigester		**364**
									PEflare		**284**
									Project emissions		**648**

Table B8. Baseline and project emissions for Dulcemar José Grando.

Emerson Fernandes											
Baseline emissions											
Animal category	Na	Wdefault	Wsite	Vssite	Bo	DCH4	MS%	MCF	GWPCH4	EFi	Annual CH4 emissions (in tCO2e)
Gilts	-	-	-	-	-	-	-	-	-	-	-
Sows in gestation	-	-	-	-	-	-	-	-	-	-	-
Sows	-	-	-	-	-	-	-	-	-	-	-
Boars	-	-	-	-	-	-	-	-	-	-	-
Piglets	-	-	-	-	-	-	-	-	-	-	-
Nursery	-	-	-	-	-	-	-	-	-	-	-
Finishers	3.064	198	61,7	0,370	0,45	0,67000	100	78,00	21	0,667	2.043
										Baseline emissions	**2.043**
Project emissions											
Animal category	Na	Wdefault	Wsite	Vssite	Bo	DCH4	MS%	MCF	GWPCH4	EFi	Annual CH4 emissions (in tCO2e)
Gilts	-	-	-	-	-	-	-	-	-	-	-
Sows in gestation	-	-	-	-	-	-	-	-	-	-	-
Sows	-	-	-	-	-	-	-	-	-	-	-
Boars	-	-	-	-	-	-	-	-	-	-	-
Piglets	-	-	-	-	-	-	-	-	-	-	-
Nursery	-	-	-	-	-	-	-	-	-	-	-
Finishers	3.064	198	61,7	0,370	0,45	0,67000	100	0,10	21	0,086	262
									PEdigester		**262**
									PEflare		**204**
									Project emissions		**466**

Table B9. Baseline and project emissions for Emerson Fernandes.

Antônio José Figueiredo Filho											
Baseline emissions											
Animal category	Na	Wdefault	Wsite	Vssite	Bo	DCH4	MS%	MCF	GWPCH4	EFi	Annual CH4 emissions (in tCO2e)
Gilts	-	-	-	-	-	-	-	-	-	-	-
Sows in gestation	-	-	-	-	-	-	-	-	-	-	-
Sows	-	-	-	-	-	-	-	-	-	-	-
Boars	-	-	-	-	-	-	-	-	-	-	-
Piglets	-	-	-	-	-	-	-	-	-	-	-
Nursery	-	-	-	-	-	-	-	-	-	-	-
Finishers	4.361	198	61,0	0,366	0,45	0,67000	100	78,00	21	0,660	2.879
									Baseline emissions		**2.879**
Project emissions											
Animal category	Na	Wdefault	Wsite	Vssite	Bo	DCH4	MS%	MCF	GWPCH4	EFi	Annual CH4 emissions (in tCO2e)
Gilts	-	-	-	-	-	-	-	-	-	-	-
Sows in gestation	-	-	-	-	-	-	-	-	-	-	-
Sows	-	-	-	-	-	-	-	-	-	-	-
Boars	-	-	-	-	-	-	-	-	-	-	-
Piglets	-	-	-	-	-	-	-	-	-	-	-
Nursery	-	-	-	-	-	-	-	-	-	-	-
Finishers	4.361	198	61,0	0,366	0,45	0,67000	100	0,10	21	0,085	369
									PEdigester		**369**
									PEflare		**288**
									Project emissions		**657**

Table B10. Baseline and project emissions for Antônio José Figueiredo Filho.

Rancho Cosmo											
Baseline emissions											
Animal category	Na	Wdefault	Wsite	Vssite	Bo	DCH4	MS%	MCF	GWPCH4	EFi	Annual CH4 emissions (in tCO2e)
Gilts	-	-	-	-	-	-	-	-	-	-	-
Sows in gestation	-	-	-	-	-	-	-	-	-	-	-
Sows	-	-	-	-	-	-	-	-	-	-	-
Boars	-	-	-	-	-	-	-	-	-	-	-
Piglets	-	-	-	-	-	-	-	-	-	-	-
Nursery	-	-	-	-	-	-	-	-	-	-	-
Finishers	4.268	198	61,8	0,371	0,45	0,67000	100	78,00	21	0,668	2.852
									Baseline emissions		**2.852**
Project emissions											
Animal category	Na	Wdefault	Wsite	Vssite	Bo	DCH4	MS%	MCF	GWPCH4	EFi	Annual CH4 emissions (in tCO2e)
Gilts	-	-	-	-	-	-	-	-	-	-	-
Sows in gestation	-	-	-	-	-	-	-	-	-	-	-
Sows	-	-	-	-	-	-	-	-	-	-	-
Boars	-	-	-	-	-	-	-	-	-	-	-
Piglets	-	-	-	-	-	-	-	-	-	-	-
Nursery	-	-	-	-	-	-	-	-	-	-	-
Finishers	4.268	198	61,8	0,371	0,45	0,67000	100	0,10	21	0,086	366
									PEdigester		**366**
									PEflare		**285**
									Project emissions		**651**

Table B11. Baseline and project emissions for Granja Cosmo.

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

Year	Estimation of project activity emissions (tonnes of CO_2 e)	Estimation of baseline emissions (tonnes of CO_2 e)	Estimation of leakage (tonnes of CO_2 e)	Estimation of overall emission reductions (tonnes of CO_2 e)
2009	4.091	17,929	Neglected	13,838
2010	4,471	19,593	Neglected	15,122
2011	4,471	19,593	Neglected	15,122
2012	4,471	19,593	Neglected	15,122
2013	4,471	19,593	Neglected	15,122
2014	4,471	19,593	Neglected	15,122
2015	4,471	19,593	Neglected	15,122
2016	4,471	19,593	Neglected	15,122
2017	4,471	19,593	Neglected	15,122
2018	4,471	19,593	Neglected	15,122
2019	380	1,664	Neglected	1,284
Total (tCO_2e)	**44,710**	**195,930**	**Neglected**	**151,220**

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

B.7.1 Data and parameters monitored:

Data / Parameter:	**Sludge removal**
Data unit:	Numeric frequency
Description:	Sludge removal count
Source of data to be used:	Amazon Carbon Data collection and Monitoring spreadsheets
Value of data applied for the purpose of calculating expected emission reductions in section B.5	N/A
Description of measurement methods and procedures to be applied:	Measured each time sludge removal is performed. Proper disposition of sludge shall be accomplished to avoid anaerobic conditions that can lead to methane emissions.
QA/QC procedures to be applied:	Amazon Carbon will provide good practice guidance and training for farms personnel. This parameter will be electronically recorded in spreadsheets. Back up copies shall be made weekly.
Any comment:	Data will be available for the duration of the crediting period plus 2 years.

Data / Parameter:	**BGburnt on Flare**
Data unit:	m^3
Description:	**Biogas Burnt**
Source of data to be used:	Amazon Carbon Data collection and Monitoring spreadsheets
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Not applicable
Description of measurement methods and procedures to be applied:	Biogas flow will be continuously measured by Roots Special Service Meters, with an accuracy of +/- 0.55% and electronically recorded by a DATA-LOGGER system.
QA/QC procedures to be applied:	Biogas flow meter will be subject to constant checking and maintenance. Data will be recorded automatically by the DATA-LOGGER and will be made available online for Amazon Carbon through PC terminals.
Any comment:	Data will be available for the duration of the crediting period plus 2 years. Monitored data on this parameter will be used to determine and Methane flared, as described bellow.

Data / Parameter:	**BGburnt on Motor**
Data unit:	m^3
Description:	**Biogas used as fuel**
Source of data to be used:	Amazon Carbon Data collection and Monitoring spreadsheets
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Not applicable
Description of measurement methods and procedures to be applied:	Biogas flow will be continuously measured by Roots Special Service Meters, with an accuracy of +/- 0.55% and electronically recorded by a DATA-LOGGER system,
QA/QC procedures to be applied:	Biogas flow meter will be subject to constant checking and maintenance. Data will be recorded automatically by the DATA-LOGGER and will be made available online for Amazon Carbon through PC terminals.
Any comment:	Data will be available for the duration of the crediting period plus 2 years. Monitored data on this parameter will be used to determine and Methane flared, as described bellow.

Data / Parameter:	**CCH_4**
Data unit:	Fraction or percentage
Description:	Methane concentration in residual gas (biogas)
Source of data to be used:	Amazon Carbon Data collection and Monitoring spreadsheets

Value of data applied for the purpose of calculating expected emission reductions in section B.5	Not aplicable
Description of measurement methods and procedures to be applied:	Measured and recorded on a monthly basis by dual wavelength Infra-red refrigerant gas sensors. This sensor has a accuracy of +-2.5%. Analysis will be stored in PC terminals, organized in spread sheets. A 95% confidence level will be ensured through maintenance and calibration of gas sensors.
QA/QC procedures to be applied:	Biogas analyser will be subject to constant checking and maintenance. Data will be recorded automatically and will be available online for Amazon Carbon
Any comment:	Data will be available for the duration of the crediting period plus 2 years.

Data / Parameter:	**Methane flared on Flare**
Data unit:	Kg
Description:	Methane flared or used as fuel
Source of data to be used:	Amazon Carbon Data collection and Monitoring spreadsheets
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Not applicable
Description of measurement methods and procedures to be applied:	The amount of methane flared will be determined as the mass flow rate of methane multiplied by the system efficiency on methane destruction in both systems flare and motor and measured separated.
QA/QC procedures to be applied:	All sensors and meters will be subject to maintenance and calibration. Data to determine the methane flared will be digitally recorded and stored by the DATA-LOGGER.
Any comment:	Data will be available for the duration of the crediting period plus 2 years.

Data / Parameter:	**Methane flared on Motor**
Data unit:	Kg
Description:	Methane flared or used as fuel
Source of data to be used:	Amazon Carbon Data collection and Monitoring spreadsheets
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Not applicable
Description of measurement methods and procedures to be applied:	The amount of methane flared will be determined as the mass flow rate of methane multiplied by the system efficiency on methane destruction in both systems flare and motor and measured separated.
QA/QC procedures to be applied:	All sensors and meters will be subject to maintenance and calibration. Data to determine the methane flared will be digitally recorded and stored by the

	DATA-LOGGER.
Any comment:	Data will be available for the duration of the crediting period plus 2 years.

Data / Parameter:	**RGT**
Data unit:	ºC
Description:	Residual Gas temperature
Source of data to be used:	Amazon Carbon Data collection and Monitoring spreadsheets
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Not applicable. Residual Gas temperature will be monitored to determine the density of methane combusted during the project activity. This data will be automatically recorded by Every Control FK200P sensor.
Description of measurement methods and procedures to be applied:	Measured by Every Control FK200P sensor, with an accuracy of +/- 0.1ºC and recorded automatically by the DATA-LOGGER.
QA/QC procedures to be applied:	FK200P sensors are built and calibrated according to national and international standards. Recalibration, testing and maintenance will be performed during the crediting period. More details are available in Annex 4
Any comment:	Data will be available for the duration of the crediting period plus 2 years.

Data / Parameter:	**RGP**
Data unit:	Bar
Description:	Residual Gas Pressure
Source of data to be used:	Amazon Carbon Data collection and Monitoring spreadsheets
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Not applicable. Residual Gas pressure will be monitored to determine the density of methane combusted during the project activity.
Description of measurement methods and procedures to be applied:	Measured by LD301 Smart Pressure Transmitter Series with a precision of +/- 0.075% and recorded automatically by the DATA-LOGGER.
QA/QC procedures to be applied:	LD301Smart Pressure Transmitter Series will be subject to constant checking and maintenance. Data will be recorded automatically will be available online for Amazon Carbon
Any comment:	Data will be available for the duration of the crediting period plus 2 years.

Data / Parameter:	**Methane density**
Data unit:	Kg/m^3
Description:	Density of flared methane
Source of data to be used:	Amazon Carbon Data collection and Monitoring spreadsheets
Value of data applied for the purpose of	0.67 (extracted from approved small scale methodology AMS.III.D, version 14 and adjusted for the chosen Data unit).

calculating expected emission reductions in section B.5	
Description of measurement methods and procedures to be applied:	Methane density will be determined through measurement of temperature and pressure of the residual gas.
QA/QC procedures to be applied:	Temperature and pressure sensors will be subject to constant maintenance and calibration
Any comment:	Data will be available for the duration of the crediting period plus 2 years.

Data / Parameter:	**ExGT on Flare**
Data unit:	ºC
Description:	Temperature of the exhaust gas
Source of data to be used:	Amazon Carbon Data collection and Monitoring spreadsheets
Value of data applied for the purpose of calculating expected emission reductions in section B.5	>500ºC
Description of measurement methods and procedures to be applied:	Measured and recorded automatically by Every control Termopar and digital temperature controllers within the combustion systems. This parameter is measured to determine the fraction of time the flare is operational and to determine flare efficiency.
QA/QC procedures to be applied:	Temperature sensors are made to operate in a temperature range of 0 to 1280ºC. This type of sensor provides 99.9% accuracy. Data will be recorded automatically by the DATA-LOGGER with 100% precision and will be available online for Amazon Carbon.
Any comment:	The temperature of the exhaust gas will be measured to determine flare efficiency. A default value of 90% will be adopted for the fraction of time the temperature is above 500ºC. Continuous check of compliance with the manufacturer´s specifications of the flare device (temperature, biogas flow rate) will be done. If in any specific hour any of the parameters is out of the range of specifications, 50 % of default value shall be used for this specific hour. In the cases where the temperature of the exhaust gas is lower than 500ºC the flaring efficiency will be considered 0%. Data will be available for the duration of the crediting period plus 2 years. Flare temperature is measured to determine methane combustion efficiency.

Data / Parameter:	**ExGT on Motor**
Data unit:	ºC
Description:	Temperature of the exhaust gas
Source of data to be used:	Amazon Carbon Data collection and Monitoring spreadsheets
Value of data applied for the purpose of	>500ºC

calculating expected emission reductions in section B.5	
Description of measurement methods and procedures to be applied:	Measured and recorded automatically by Every control Termopar and digital temperature controllers within the combustion systems. This parameter is measured to determine the fraction of time the motor is operational and to determine motor efficiency.
QA/QC procedures to be applied:	Temperature sensors are made to operate in a temperature range of 0 to 1280ºC. This type of sensor provides 99.9% accuracy. Data will be recorded automatically by the DATA-LOGGER with 100% precision and will be available online for Amazon Carbon.
Any comment:	The temperature of the exhaust gas will be measured to determine motor efficiency. A default value of 90% will be adopted for the fraction of time the temperature is above 500ºC. Continuous check of compliance with the manufacturer´s specifications of the motor device (temperature, biogas flow rate) will be done. If in any specific hour any of the parameters is out of the range of specifications, 50 % of default value shall be used for this specific hour. In the cases where the temperature of the exhaust gas is lower than 500ºC the flaring efficiency will be considered 0%. Data will be available for the duration of the crediting period plus 2 years. This parameter is measured to determine methane combustion efficiency.

Data / Parameter:	**GWP CH4**
Data unit:	tCO_2/tCH_4
Description:	Methane Global Warming Potential, valid for the relevant commitment period
Source of data to be used:	2006 IPCC
Value of data applied for the purpose of calculating expected emission reductions in section B.5	21
Description of measurement methods and procedures to be applied:	$GWPCH_4$ will be obtained from the most recent IPCC Guidelines for National Greenhouse Gas Inventories
QA/QC procedures to be applied:	
Any comment:	

B.7.2 Description of the monitoring plan:

Amazon Carbon and all participating farms will perform monitoring of methane capture and combustion during the crediting period. Farms personnel will operate the installed AWMS in all farms. Amazon Carbon will provide training on data collection and storage, as well as emergency reporting procedures.

Amazon Carbon will also execute on-site inspections on each individual farm for each verification period, to confirm that the monitoring plan is being executed properly.

The variables monitored are described in Section B.7.1 above. Emission reductions and project emissions will be determined according to the monitored amount of methane captured and destroyed. Data used for the ex ante estimation of baseline and project emissions (described in Section B.6.2) do not need to be monitored.

The actual project emissions will be calculated according to the monitored amount of methane captured and destroyed by the project activity. The amount of methane sent to the flare will be determined by monitoring the amount of biogas flared and the methane content in the biogas, monitored as described bellow. Hence,

$$PE_{digester,y} = BG_{burnt} * C_{CH4} * MCF * GWPCH4$$

Methane emissions from inefficiency in methane flaring are incorporated in the calculation of Methane captured and destroyed by the project activity in the year "y" (MDy), as described in Section B.6.1. Through this equation, inefficiencies in the flaring process are accounted since the total amount of biogas flared is multiplied by a flaring efficiency factor of 90%.

Sludge removal will be performed by farms personnel. Guidance for sludge removal and application was developed by BIOTER and will be made available in the projects sites during the crediting period (see Annex 4). Data on sludge removal will be recorded every time sludge removal is performed in electronic spreadsheets. The final destination of sludge will also be monitored to ensure that anaerobic conditions are avoided.

In every farm, all monitoring equipment (flow meter, gas analyser, biogas pressure and temperature analyser, exhaust gas temperature analyser) will be connected to a DATA-LOGGER. Data stored in the DATA LOGGER will be periodically transferred to PC terminal, allowing the electronic collection and recording of monitoring data.

The (DATA-LOGGER) is a digital computer used for data collection and storage. Unlike general-purpose computers, the DATA-LOGGER is designed for multiple inputs. The DATA-LOGGER will register monitoring information regarding biogas capture and combustion. 100% precision is ensured due to the automation of the process.

Through the PC terminal Amazon Carbon will have real time access to monitoring variables via internet connection. Data will also be stored in data discs, providing redundancy in data storage. All data will be stored and made available for the crediting period plus two years.

The PC terminal will store all data necessary to determine the amount of methane fuelled and flared in a given crediting year. These terminals will also store any additional data that is necessary to calculate emission reductions.

After being collected in the digester cell, biogas will be conducted by sealed pipeline. The pipeline is later divided in two separate pipelines, conducting the biogas either to the energy generators or to the enclosed flare. Data related to methane recovery and combustion, such as the parameters BGburnt, methane flared and ExGT will be monitored individually for the fraction of gas sent to the energy generators and to the fraction of gas sent to the flares. As standard procedure, all biogas produced will be sent to the energy generators. The enclosed flares will be installed to ensure methane destruction for the fraction of time the energy generators are under maintenance.

The amount of biogas produced and sent to the flare and energy generators will be continuously measured by ROOTS Special Service Flow meters. Details on the flow meter are provided in Annex 4. The amount of methane actually destroyed will be obtained by monitoring the methane content in the biogas, the pressure and temperature of the biogas previous to the flaring process.

The methane content in the biogas will be analysed by a Dual wavelength Infra-red Refrigerant Gas sensor. This sensor has a measurement range of 0-100% and an accuracy range of +/-2.5%. This gas sensor will be periodically connected to the gas pipeline in a specific valve and perform gas analysis. This valve is located where the pipeline contains all produced biogas, before the division between energy generator and flare pipelines. Thus, the methane concentration in the biogas burnt in the flares and in the energy generators will be considered the same. The project participant consider this approach to be realistic, since significant changes in methane concentration are not expected to occur at this stage of the treatment plant. Additional information on the gas analyzer is available in Annex 4.

Biogas pressure will be determined by LD301 Smart pressure transmitter. Biogas temperature will be measured by Every Control FK200P sensors. These parameters will be measured separately in the energy generators and in the flares. Biogas pressure and temperature will be monitored to determine methane density during the project activity.

The same procedures to determine the flare efficiency default values will be adopted for the energy generators and for the enclosed flares. The efficiency of the flaring process will not be directly measured. Default values will be adopted, and the temperature of the exhaust gas will be monitored.

Flare efficiency will be considered 90% in the fraction of time the exhaust gas temperature is higher than 500ºC. Continuous check of compliance with the manufacturer´s specifications of the flare device (temperature, biogas flow rate) will be done. If in any specific hour any of the parameters is out of

the range of specifications, 50 % of default value shall be used for this specific hour.In the cases where the temperature of the exhaust gas is lower than 500ºC the flaring efficiency will be considered 0%.

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

Date of completion of the application of the methodology to this project activity: 04/07/2008.

Name of the person/entity responsible for the application of the baseline and monitoring methodology to this project activity:

Amazon Carbon S/S Ltda (project participant)**.**

Jorge Sebastião Bernardo-Silva (Project developer)

Conselhero Mafra 758 sala 703

Florianópolis - SC, Brazil

CEP 88010-102

Phone: + 55 (48) 3024.7257

E-mail: jorge@amazoncarbon.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:

The starting date of the project activity is 15/01/2008. The starting date was considered as the date when the first contract was signed between Amazon Carbon and a participating farm. In such date, a contract was signed between Amazon Carbon and Mr. Fernando de Castro, owner of Sítio Nossa Senhora Aparecida,

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

25 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:

The start of the crediting period is 01/02/2009 or on the date of the registration of the project activity, whichever is later.

C.2.2.2. Length:

The duration of the project activity is 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 Brazilian environmental legislation forces swine breeders to go through a process of environmental licensing where environmental impacts are assessed. All participating farms are in accordance with the environmental authority. Licenses have already been issued or are in process. Local environmental authorities shall be informed of the installation of anaerobic digesters, but no Environmental Impact Study is necessary.

The AWMS proposed by the project will result in various environmental benefits, as described in section A.4.3 of this report. The project, besides promoting GHG emission reduction, will also contribute to sustainable development. The anaerobic digester reduces the organic matter in the effluent when compared to anaerobic lagoons. Besides, the odour arising from the volatile molecules, which result from the anaerobic digestion, is considerably diminished since the gases produced are contained by a sealed cover and then flared. No transboundaries impacts are expected to result from the project activity.

The pro-active stand of Amazon Carbon and all participating farms to implement anaerobic digesters on swine farms is a great challenge that must be regarded as an initiative that will encourage

other swine breeders to improve the existing AWMS, aiming to reduce the overall environmental impacts caused by this activity.

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:

No action required. Environmental impacts of the project activity are considered positive since they contribute to local, regional and global sustainable development.

SECTION E. Stakeholders' comments

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

The invitation to the project stakeholders was made as per the "September 11th, 2003 Resolution No. 1 (Approved by Administrative Law Nr 863, of November 27th, 2003 and published in the "Diário Oficial da República Federativa do Brasil" on December 2nd, 2003.)". Invitations were sent by postal service, on 22/10/2007.The following stakeholders were invited:

Entity	City
PREFEITURA MUNICIPAL DE GLÓRIA DE DOURADOS	GLÓRIA DE DOURADOS
SECRETARIA MUNICIPAL DE MEIO AMBIENTE DE GLÓRIA DE DOURADOS	GLÓRIA DE DOURADOS
CAMARA MUNICPAL DE GLÓRIA DE DOURADOS	GLÓRIA DE DOURADOS
PROMOTORIA DE JUSTIÇADE GLÓRIA DE DOURADOS	GLÓRIA DE DOURADOS
SECRETARIA ESTADUAL DE MEIO AMBIENTE	CAMPO GRANDE
FÓRUM BRASILEIRO DE ONGS E MOVIMENTOS SOCIAIS PARA O MEIO AMBIENTE E DESENVOLVIMENTO	BRASÍLIA
PREFEITURA MUNICIPAL DE IVINHEMA	IVINHEMA
SECRETARIA DE MEIO AMBIENTE DE IVINHEMA	IVINHEMA
CÂMARA MUNICIPAL DE IVINHEMA	IVINHEMA
PROMOTORIA DE JUSTIÇA DE IVENHEMA	IVINHEMA
AGÊNCIA DE DESENVOLVIMENTO AGRÁRIO E EXTENSÃO RURAL	GLÓRIA DE DOURADOS
AVIGLORIA	GLÓRIA DE DOURADOS
SECRETARIA DE AGRICULTURA	IVINHEMA
PREFEITURA MUNICIPAL DE JATÉI	JATEÍ
CÂMARA MUNICIPAL DE JATÉI	JATEÍ
SECRETARIA MUNICPAL DE MEIO AMBIENTE	JATEI
ASSOCIAÇÃO DOS AMIGOS DE JATEÍ	JATEI
SINDICATO RURAL DE JATEÍ	JATEI
PREFEITURA MUNICIPAL DE FÁTIMA DO SUL	FÁTIMA DO SUL
CÂMARA MUNICIPAL DE FÁTIMA DO SUL	FÁTIMA DO SUL
PROMOTORIA DE JUSTIÇA	FÁTIMA DO SUL

SECRETARIA MUNICIPAL DO MEIO AMBIENTE	FÁTIMA DO SUL
ASSOCIAÇÃO DE MORADORES DO JARDIM BRASILÂNDIA	FÁTIMA DO SUL
ASSOCIAÇÃO DE MORADORES DO JARDIM TATIANE E KATIRA	FÁTIMA DO SUL
ASSOCIAÇÃO DE MORADORES DO JARDIM O PIONEIRO	FÁTIMA DO SUL
PREFEITURA MUNICIPAL DE ITAPORÁ	ITAPORÃ
CÂMARA MUNICIPAL DE ITAPORÁ	ITAPORÃ
PROMOTORIA DE JUSTIÇA	ITAPORÃ
SECRETARIA MINICIPAL DA AGRICULTURA	ITAPORÃ
COOPERAVI	IVINHEMA
SINDICATO RURAL DE IVINHEMA	IVINHEMA
CMDR	IVINHEMA
FUMATUR – FUNDAÇÃO MUNICIPAL DE MEIO AMBIENTE	IVINHEMA
SINDICATO DOS TRABALHADORES RURAIS	IVINHEMA

A lecture was held in 20/02/2008, at Glória de Dourados/MS to expose the project to stake holders. The lecture was presented by the Project Developer of Amazon Carbon and by the Production Manager of all participating farms. The PDD was made publicly available on Amazon Carbon website for comments.

E.2. Summary of the comments received:

Comments by stakeholders and local community were received orally during and after the presentation. No written commentaries were received, all questions were clarified orally and negative comments were not registered.

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

No action required.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Amazon Carbon S/S Ltda
Street/P.O.Box:	Conselheiro Mafra 758 sala 703
City:	Florianópolis
Postfix/ZIP:	88010-102
Country:	Brazil
Represented by:	Mr. Augusto Leipnitz
FAX:	+ 55 48 3024.7152
Direct tel:	+ 55 48 9164.2971
Personal E-Mail:	augusto@amazoncarbon.com.br

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funds will be invested in the project.

Annex 3

BASELINE INFORMATION

ANTONIO DURVAL GOÍS

Piglet Producing and Nursery Unit farm

Antonio Durval Gois	Dez	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Average
Gilts	81	81	81	81	81	81	81	81	81	81	81	81	81
Sows	761.96	761.96	761.96	761.96	761.96	761.96	761.96	761.96	761.96	761.96	761.96	761.96	761.96
Sows in gestation	-	-	-	-	-	-	-	-	-	-	-	-	-
Piglets	1224	1174	1209	1196	1386	1095	1236	1463	1213	1020	1268	1158	1220.17
Nursery	2598	2889	2684	2666	2555	2815	2490	2547	2773	2954	3096	3016	2756.92
Boars	7	7	7	7	7	7	7	7	7	7	7	7	7
Finishers	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	4671.96	4912.96	4742.96	4711.96	4790.96	4759.96	4575.96	4859.96	4835.96	4823.96	5213.96	5023.96	4827.04

SÍTIO NOSSA SENHORA APARECIDA

Piglet Producing and Nursery Unit farm

Nossa Senhora Aparecida	Dez	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Average
Gilts	104	104	104	104	104	104	104	104	104	104	104	104	104
Sows	985.9	985.9	985.9	985.9	985.9	985.9	985.9	985.9	985.9	985.9	985.9	985.9	985.9
Sows in gestation	-	-	-	-	-	-	-	-	-	-	-	-	-
Piglets	1768	1543	1557	1486	1883	1492	1656	1994	1666	1993	1491	1601	1677.5
Nursery	3044	3715	3720	3635	3094	3588	2844	2968	3393	3025	3529	3946	3375.08
Boars	5	5	5	5	5	5	5	5	5	5	5	5	5
Finishers	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	5906.9	6352.9	6371.9	6215.9	6071.9	6174.9	5594.9	6056.9	6153.9	6112.9	6114.9	6641.9	6147.48

SÍTIO SÃO GERALDO

Finishing Unit farm

São Geraldo	Dez	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Average
Gilts	-	-	-	-	-	-	-	-	-	-	-	-	-
Sows	-	-	-	-	-	-	-	-	-	-	-	-	-
Sows in gestation	-	-	-	-	-	-	-	-	-	-	-	-	-
Piglets	-	-	-	-	-	-	-	-	-	-	-	-	-
Nursery	-	-	-	-	-	-	-	-	-	-	-	-	-
Boars	-	-	-	-	-	-	-	-	-	-	-	-	-
Finishers	0	0	2167	2167	2167	2167	2167	1942	1942	1942	1942	1942	1712,08
Total	0	0	2167	2167	2167	2167	2167	1942	1942	1942	1942	1942	1712,08

SÍTIO ESPERANÇA

Piglet Producing and Nursery Unit farm

Sítio Esperança	Dez	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Average
Gilts	88	88	88	88	88	88	88	88	88	88	88	88	88
Sows	1005.55	1005.55	1005.55	1005.55	1005.55	1005.55	1005.55	1005.55	1005.55	1005.55	1005.55	1005.55	1005.55
Sows in gestation	-	-	-	-	-	-	-	-	-	-	-	-	-
Piglets	1766	1611	1745	1476	1604	1856	1776	1656	1474	2061	1780	1744	1712.42
Nursery	3075	3476	3095	3287	3403	3360	3277	3751	3710	2959	3850	3716	3413.25
Boars	5	5	5	5	5	5	5	5	5	5	5	5	5
Finishers	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	5939.55	6185.55	5938.55	5861.55	6105.55	6314.55	6151.55	6505.55	6282.55	6118.55	6728.55	6558.55	6224.22

CHÁCARA PARAÍSO

Finishing Unit farm

Chácara Paraíso	Dez	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Average
Gilts	-	-	-	-	-	-	-	-	-	-	-	-	-
Sows	-	-	-	-	-	-	-	-	-	-	-	-	-
Sows in gestation	-	-	-	-	-	-	-	-	-	-	-	-	-
Piglets	-	-	-	-	-	-	-	-	-	-	-	-	-
Nursery	-	-	-	-	-	-	-	-	-	-	-	-	-
Boars	-	-	-	-	-	-	-	-	-	-	-	-	-
Finishers	3180	3180	0	3240	3240	3240	3240	3240	0	3180	3180	3180	2675
Total	3180	3180	0	3240	3240	3240	3240	3240	0	3180	3180	3180	2675

OSMAR CAÍRES

Finishing Unit farm

Caíres	Dez	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Average
Gilts	-	-	-	-	-	-	-	-	-	-	-	-	-
Sows	-	-	-	-	-	-	-	-	-	-	-	-	-
Sows in gestation	-	-	-	-	-	-	-	-	-	-	-	-	-
Piglets	-	-	-	-	-	-	-	-	-	-	-	-	-
Nursery	-	-	-	-	-	-	-	-	-	-	-	-	-
Boars	-	-	-	-	-	-	-	-	-	-	-	-	-
Finishers	3435	3435	3435	3435	3265	3265	3265	3265	3265	0	0	3435	2791,67
Total	3435	3435	3435	3435	3265	3265	3265	3265	3265	0	0	3435	2791,67

DULCEMAR JOSÉ GRANDO

Finishing Unit farm

Grando	Dez	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Average
Gilts	-	-	-	-	-	-	-	-	-	-	-	-	-
Sows	-	-	-	-	-	-	-	-	-	-	-	-	-
Sows in gestation	-	-	-	-	-	-	-	-	-	-	-	-	-
Piglets	-	-	-	-	-	-	-	-	-	-	-	-	-
Nursery	-	-	-	-	-	-	-	-	-	-	-	-	-
Boars	-	-	-	-	-	-	-	-	-	-	-	-	-
Finishers	4927	4927	4927	4927	4927	0	5150	5150	5150	5150	5150	0	4198,75
Total	4927	4927	4927	4927	4927	0	5150	5150	5150	5150	5150	0	4198,75

EMERSON FERNANDES

Finishing Unit farm

Emerson Fernandes	Dez	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Average
Gilts	-	-	-	-	-	-	-	-	-	-	-	-	-
Sows	-	-	-	-	-	-	-	-	-	-	-	-	-
Sows in gestation	-	-	-	-	-	-	-	-	-	-	-	-	-
Piglets	-	-	-	-	-	-	-	-	-	-	-	-	-
Nursery	-	-	-	-	-	-	-	-	-	-	-	-	-
Boars	-	-	-	-	-	-	-	-	-	-	-	-	-
Finishers	3694	3694	3694	3694	0	3659	3659	3659	3659	3659	0	3694	3063,75
Total	3694	3694	3694	3694	0	3659	3659	3659	3659	3659	0	3694	3063,75

ANTÔNIO JOSÉ FIGUEIREDO FILHO

Finishing Unit farm

Figueiredo Filho	Dez	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Average
Gilts	-	-	-	-	-	-	-	-	-	-	-	-	-
Sows	-	-	-	-	-	-	-	-	-	-	-	-	-
Sows in gestation	-	-	-	-	-	-	-	-	-	-	-	-	-
Piglets	-	-	-	-	-	-	-	-	-	-	-	-	-
Nursery	-	-	-	-	-	-	-	-	-	-	-	-	-
Boars	-	-	-	-	-	-	-	-	-	-	-	-	-
Finishers (1)	3501	3501	3501	3501	3501	0	0	3290	3290	3290	3290	3290	2829,58
Finishers (2)	1884	1884	1884	1884	1884	0	0	1791	1791	1791	1791	1791	1531,25
Total	5385	5385	5385	5385	5385	0	0	5081	5081	5081	5081	5081	4360,83

RANCHO COSMO

Finishing Unit farm

Rancho Cosmo	Dez	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Average
Gilts	-	-	-	-	-	-	-	-	-	-	-	-	-
Sows	-	-	-	-	-	-	-	-	-	-	-	-	-
Sows in gestation	-	-	-	-	-	-	-	-	-	-	-	-	-
Piglets	-	-	-	-	-	-	-	-	-	-	-	-	-
Nursery	-	-	-	-	-	-	-	-	-	-	-	-	-
Boars	-	-	-	-	-	-	-	-	-	-	-	-	-
Finishers (1)	0	0	3142	3142	3142	3142	3142	2991	2991	2991	2991	2991	2555,42
Finishers (2)	0	0	2126	2126	2126	2126	2126	1985	1985	1985	1985	1985	1712,92
Total	0	0	5268	5268	5268	5268	5268	4976	4976	4976	4976	4976	4268,33

GRANJA ANTONIO DURVAL GOÍS LIVESTOCK AND LOCAL WEIGHT

Granja Durval 2
AGRINESS S2 - 2.29-B
21/05/2008 15:35

S2 - Geral

FILTRO: Período: 01/12/2006 - 30/11/2007 >>> Lançamentos realizados no período

Plantel

	Leitoas	Matrizes	Machos	Leitões
Estoques (ativos)	81 Gilts	740	7 Boars	4590
Estoques (descartados)	6	115	0	-
Compras	420	0	5	0
Reposiçoes internas	0	-	0	-
Descartes	35	367	0	-
Vendas	35	366	2	20257
Mortes	0	23	0	1791

Consumo total de ração	1.365.490,12	% Reposição de fêmeas/ano	55,12
Peso total dos animais vendidos	512.021,84	% Mortalidade de fêmeas/ano	3,02
Conversão alimentar do rebanho	2,67	% Descarte de fêmeas/ano	52,76

Reprodução

Coberturas	Quant.	%	Repetições de Cio	Quant.	%	Intervalos	Dias
Total	2047		Total	41	2,00	Desmame - Cobertura	7,43 [1]
I.A.	2044	99,85	I.A.	41	2,01	Desmame - Prenhez	8,72 [2]
Monta natural	3	0,15	Monta natural	0	0,00	Entrada - 1a Cobertura	77,11
% Múltiplas montas		99,95					
Coberturas até 7 dias	1236	78,13 [3]					
Primíparas cobertas	387	18,91					
Idade de 1a cobertura	233,75						
Ração consumida	469.812,00						

Legenda
1) Intervalo entre o desmame e a primeira cobertura pós-desmame, mesmo que essa cobertura tenha resultado em repetiçao de cio ou aborto
2) Intervalo entre o desmame e a cobertura em que efetivamente a matriz entrou em gestaçao
3) O percentual é calculado considerando apenas a primeira cobertura da matriz após o desmame. Coberturas de repetiçao de cio nao sao consideradas

Maternidade

Estoque médio de matrizes ativas: 761,96 Average population of active sows

Partos

	Quant.	%	
Previstos	2053 [1]		
Realizados	1901		
Taxa de parição		92,60	95,62 (ajustada)
Ciclo médio	4,96		
Média de duração (horas)	02:43		
Período de gestação	113,78		
Intervalo entre partos	143,48		
Partos/Fêmea/Ano	2,49 [2]		
Abortos	45	2,20	
Partos prematuros	6	0,32	

Desmames

	Quant.	%
Total de desmames	2160	
Desmames de mãe de leite	238	11,02
Raçao consum. fêmeas (kg)	223.441,00	
Consumo fêmea/dia (kg)	4,60	
Ração consum. leitões (kg)		
Ciclo médio	5,05	

Nascidos

	Quant.	Média (Average)	%
Vivos	22602	11,89	93,28
Natimortos	691	0,36	2,85
Mumificados	834	0,44	3,44
Mortos ao nascer	104	0,05	0,43
Total	24231	12,75	100,00
Vivos/Fêmea/Ano	29,66 [3]		
Peso (kg)	31.987,05	1,42	

Weight at birth

Desmamados

	Quant.	Média	%
Leitões a desmamar	22839		
Total de desmamados	21191	11,03	92,78
Idade média		21,03	
Mortes relac. aos desmames	1649	0,76	7,22
Mortes no período	1628		
Desmamados/Fêmea/Ano	27,81 [4]		
Peso (kg)	109.621,01	5,17	
Peso dos nascidos (kg)		1,42	
GPD (kg)		0,178	
Peso aos 21 dias (kg)		5,17	

Weight at 21 days (kg)

Agriness - Gerenciamento para Agroempresas Page 1 of 2

Legenda
1) O número de partos previstos é baseado nas coberturas realizadas 114 dias atrás
2) O índice de partos/femea/ano é calculado considerando os partos realizados no período e a média de matrizes ativas do período
3) O índice de vivos/femea/ano é calculado considerando os nascidos vivos no período e a média de matrizes ativas do período
4) O índice de desmamados/femea/ano é calculado considerando os leitoes desmamados no período e a média de matrizes ativas do período, nao tendo relaçao com o índice de partos/femea/ano mostrado nesse relatório (que é baseado nos partos do período).

Creche

Entradas		Saídas		Resultados da Fase	
Saldo inicial	2596	Saldo Final	3217	Dias na fase	49,23
Quantidade	21191	Quantidade	20407	Mortalidade (%)	0,77 [2]
Idade média (dias)	21,03	Idade média (dias)	70,26	Peso aos 61 dias (kg)	19,16
Peso médio (kg)	5,17	Peso médio (kg)	25,11	G.P.D. médio	0,405 [3]
Peso total (kg)	109.621,01	Peso total (kg)	512.471,84	Ração consumida	631.655,00
Weight at 21 days (kg)		Exit weight (kg)		Conversão alimentar	1,552 [4]
Tipos de Entrada		**Tipos de Saída**		Leitões/fêmea/ano	26,78
Desmame	21191	Venda	20257	Vendidos/fêmea/ano	26,59
Compra	0	Morte	163		
		Reposição	0		
		Desclassificação	150		

Legenda
1) As mortes nao entram no total de saídas porque nao interferem nos índices de idade média, peso médio e peso total de saída.
2) O percentual de mortalidade da fase é calculado dividindo o número de mortes do período pelo total de entradas do período.
3) O GPD médio é calculado considerando o ganho de peso médio do animal na fase (peso médio de saída - peso médio de entrada) dividido pelo número de dias na fase.
4) Conversao alimentar = Raçao consumida / ((Peso médio de saída - Peso médio de entrada) * Total de animais que saíram)
   O sistema calcula a conversao considerando os lançamentos de raçao, entradas e saídas do período.
   Por esse motivo, é recomendável que esse índice seja analisado em um período longo de tempo e nao de apenas uma semana ou um mes.
   Se a sua conversao der alta, verifique se todas as saídas dos animais já foram lançadas no sistema.
   Se a conversao der muito baixa, verifique se toda a raçao consumida já foi lançada no sistema.
5) O índice de leitões/femea/ano é calculado considerando os animais que saíram da fase no período (com exceçao das mortes) e a média de matrizes ativas do período

SÍTIO NOSSA SENHORA APARECIDA

Suinocultura N. Sra. Aparecida
AGRINESS S2 - 2.29-8
14/04/2008 15:52

S2 - Geral

FILTRO: Período: 01/12/2006 - 30/11/2007 >>> Lançamentos realizados no período (não considerando enfermaria)

Plantel

	Leitoas	Matrizes	Machos	Leitões
Estoques (ativos)	104	1027	5	5572
Estoques (descartados)	0	0	5	-
Compras	577	0	0	0
Reposiçoes internas	0	-	0	-
Descartes	51	447	0	-
Vendas	76	930	1	26667
Mortes	8	23	0	2533

Consumo total de ração	1.787.933,00	% Reposição de fêmeas/ano	58,53
Peso total dos animais vendidos	671.199,40	% Mortalidade de fêmeas/ano	3,14
Conversão alimentar do rebanho	2,66	% Descarte de fêmeas/ano	50,51

Reprodução

Coberturas

	Quant.	%
Total	2698	
I.A.	2681	99,37
Monta natural	17	0,63
% Múltiplas montas		99,81
Coberturas até 7 dias	1843	87,72
Primíparas cobertas	506	18,75
Idade de 1a cobertura	229,62	
Ração consumida	670.766,00	

Repetições de Cio

	Quant.	%
Total	51	1,89
I.A.	50	1,86
Monta natural	1	5,88

Intervalos

	Dias
Desmame - Cobertura	5,54
Desmame - Prenhez	6,55
Entrada - 1a Cobertura	75,36

Maternidade

Estoque médio de matrizes ativas: 985,90

Partos

	Quant.	%	
Previstos	2666		
Realizados	2494		
Taxa de parição		93,55	96,03 (ajustada)
Ciclo médio	4,35		
Média de duração (horas)	02:13		
Período de gestação	113,72		
Intervalo entre partos	141,26		
Partos/Fêmea/Ano	2,52		
Abortos	49	1,82	
Partos prematuros	52	2,09	

Desmames

	Quant.	%
Total de desmames	2517	
Desmames de mãe de leite	47	1,87
Raçao consum. fêmeas (kg)	305.644,00	
Consumo fêmea/dia (kg)	6,38	
Ração consum. leitões (kg)		
Ciclo médio	4,45	

Nascidos

	Quant.	Média	%
Vivos	29657	11,89	89,97
Natimortos	1149	0,46	3,49
Mumificados	1586	0,64	4,81
Mortos ao nascer	572	0,23	1,74
Total	32964	13,22	100,00
Vivos/Fêmea/Ano	30,08		
Peso (kg)	40.439,19	1,36	

Desmamados

	Quant.	Média	%
Leitões a desmamar	29501		
Total de desmamados	27373	11,08	92,79
Idade média		21,91	
Mortes relac. aos desmames	2128	0,85	7,21
Mortes no período	2204		
Desmamados/Fêmea/Ano	27,76		
Peso (kg)	154.601,53	5,65	
Peso dos nascidos (kg)		1,35	
GPD (kg)		0,196	
Peso aos 21 dias (kg)		5,65	

Creche

Entradas		Saídas		Resultados da Fase	
Saldo inicial	3514	Saldo Final	3903	Dias na fase	46,25
Quantidade	27385	Quantidade	26667	Mortalidade (%)	1,20
Idade média (dias)	21,91	Idade média (dias)	68,17	Peso aos 61 dias (kg)	20,56
Peso médio (kg)	5,65	Peso médio (kg)	25,17	G.P.D. médio	0,422
Peso total (kg)	154.668,13	Peso total (kg)	671.199,40	Ração consumida	810.223,00
				Conversão alimentar	1,556
Tipos de Entrada		**Tipos de Saída**		Leitões/fêmea/ano	27,05
Desmame	27385	Venda	26667	Vendidos/fêmea/ano	27,05
Compra	0	Morte	329		
		Reposição	0		
		Desclassificação	0		

SÍTIO SÃO GERALDO LIVESTOCK AND LOCAL WEIGHT

S E A R A - DEMONSTRATIVO DO ACERTO DE CONTAS 12/07/2007

COD. DO PARCEIRO 30228014506 ORIGEM : 0121 - MCR-CRECHES

NOME DO PARCEIRO GERALDO FERRO DA SILVA -CONTR.

ENDERECO 3a LINHA KM 13 NASCENTE

NOME DO TECNICO FABRICIO JOS KONDO DE AZEVEDO

DATA DE REFERENCIA 12/07/2007 LOTE 20/06/2007 SEXO MISTO

TABELA 006 - CRECHES

DESEMPENHO TECNICO	CABECA	PESO (KG)
CAPACIDADE ALOJ.....	2.170	
LEITOES LOTADOS.....	2.225	59.981
PESO MEDIO DOS LEITOES.....		26,957
SUINOS RECEBIDOS.....	2.167	220.983
SUINOS MORTOS LOC.CRIACAO...	58	2.706
RACAO CONSUMIDA.....		663.876
PESO MEDIO		101,976
IDADE MEDIA.....		128
DIAS EM TERMINACAO.....		145
CONVERSAO ALIMENTAR REAL....		3,651
CONVERSAO ALIMENTAR CORRIGIDA		3,604
% MORTALIDADE LOC.CRIACAO...		2,606
GPD.....		0,659

PAGO
20 JUL. 2007
FINANCEIRO

S E A R A - DEMONSTRATIVO DO ACERTO DE CONTAS 14/12/2007

COD. DO PARCEIRO 30228014506 ORIGEM : 0101 - PARC UPL

NOME DO PARCEIRO GERALDO FERRO DA SILVA -CONTR.

ENDERECO 3a LINHA KM 13 NASCENTE

NOME DO TECNICO GERCELIO DE OLIVEIRA CHAVES

DATA DE REFERENCIA 14/12/2007 LOTE 30/11/2007 SEXO MISTO

TABELA 004 - UPL DDOS

DESEMPENHO TECNICO	CABECA	PESO (KG)
CAPACIDADE ALOJ.....	2.170	
LEITOES LOTADOS.....	2.020	50.643
PESO MEDIO DOS LEITOES.....		25,070
SUINOS RECEBIDOS.....	1.942	187.349
SUINOS MORTOS LOC.CRIACAO...	78	625
RACAO CONSUMIDA.....		534.342
PESO MEDIO		96,472
IDADE MEDIA.....		118
DIAS EM TERMINACAO.....		132
CONVERSAO ALIMENTAR REAL....		3,463
CONVERSAO ALIMENTAR CORRIGIDA		3,455
% MORTALIDADE LOC.CRIACAO...		3,861
GPD.....		0,679

20 DEZ. 2007

SÍTIO ESPERANÇA LIVESTOCK AND LOCAL WEIGHT

M. MURAOKA II- Gleba Azul
AGRINESS S2 - 2.29-B
15/04/2008 14:25

S2 - Geral

FILTRO: Período: 01/12/2006 - 30/11/2007 >>> Lançamentos realizados no período (não considerando enfermaria)

Plantel

	Marrãs	Matrizes	Machos	Leitões
Estoques (ativos)	88	997	5	5898
Estoques (descartados)	0	0	0	-
Compras	528	0	3	0
Reposiçoes internas	0	-	0	-
Descartes	36	452	0	-
Vendas	36	462	2	27879
Mortes	1	22	0	3270

Consumo total de ração	1.842.162,00	% Reposição de fêmeas/ano	52,51
Peso total dos animais vendidos	671.911,19	% Mortalidade de fêmeas/ano	2,29
Conversão alimentar do rebanho	2,74	% Descarte de fêmeas/ano	48,53

Reprodução

Coberturas

	Quant.	%
Total	2698	
I.A.	2651	98,26
Monta natural	47	1,74
% Múltiplas montas		99,22
Coberturas até 7 dias	1828	86,31
Primíparas cobertas	493	18,27
Idade de 1a cobertura	231,32	
Ração consumida	658.906,00	

Repetições de Cio

	Quant.	%
Total	56	2,08
I.A.	56	2,11
Monta natural	0	0,00

Intervalos

	Dias
Desmame - Cobertura	5,76
Desmame - Prenhez	6,90
Entrada - 1a Cobertura	77,89

Maternidade

Estoque médio de matrizes ativas: 1.005,55

Partos

	Quant.	%	
Previstos	2709		
Realizados	2547		
Taxa de parição		94,02	95,68 (ajustada)
Ciclo médio	4,27		
Média de duração (horas)	02:35		
Período de gestação	113,77		
Intervalo entre partos	142,98		
Partos/Fêmea/Ano	2,53		
Abortos	39	1,45	
Partos prematuros	63	2,47	
Esp. toucinho matriz (mm)			

Desmames

	Quant.	%
Total de desmames	2543	
Desmames de mãe de leite	14	0,55
Raçao consum. fêmeas (kg)	325.554,00	
Consumo fêmea/dia (kg)	6,54	
Ração consum. leitões (kg)		
Ciclo médio	4,34	
Esp. toucinho matriz (mm)		

Nascidos

	Quant.	Média	%
Vivos	32054	12,59	91,21
Natimortos	1324	0,52	3,77
Mumificados	1316	0,52	3,74
Mortos ao nascer	451	0,18	1,28
Total	35145	13,80	100,00
Vivos/Fêmea/Ano	31,88		
Peso (kg)	43.538,35	1,36	

Desmamados

	Quant.	Média	%
Leitões a desmamar	31809		
Total de desmamados	29187	11,54	91,76
Idade média		21,70	
Mortes relac. aos desmames	2622	1,03	8,24
Mortes no período	2617		
Desmamados/Fêmea/Ano	29,03		
Peso (kg)	156.190,24	5,35	
Peso dos nascidos (kg)		1,35	
GPD (kg)		0,184	
Peso aos 21 dias (kg)		5,35	

Creche

Entradas		Saídas		Resultados da Fase	
Saldo inicial	3546	Saldo Final	4157	Dias na fase	44,96
Quantidade	29143	Quantidade	27879	Mortalidade (%)	2,24
Idade média (dias)	21,71	Idade média (dias)	66,67	Peso aos 61 dias (kg)	20,16
Peso médio (kg)	5,35	Peso médio (kg)	24,10	G.P.D. médio	0,417
Peso total (kg)	155.928,24	Peso total (kg)	671.911,19	Ração consumida	803.392,00
				Conversão alimentar	1,537
Tipos de Entrada		**Tipos de Saída**		Leitões/fêmea/ano	27,73
Desmame	29143	Venda	27879	Vendidos/fêmea/ano	27,73
Compra	0	Morte	653		
		Reposição	0		
		Desclassificação	0		

CHÁCARA PARAÍSO LIVESTOCK AND LOCAL WEIGHT

SEARA - DEMONSTRATIVO DO ACERTO DE CONTAS 06/02/2007

COD. DO PARCEIRO 30228015120 ORIGEM : 0121 - MCR-CRECHES

NOME DO PARCEIRO LUIZ HENRIQUE JORDAO DO AMARAL

ENDERECO CHACARA PARAISO

NOME DO TECNICO GERCELIO DE OLIVEIRA CHAVES

DATA DE REFERENCIA 01/02/2007 LOTE 30/01/2007 SEXO MISTO

TABELA 006 - CRECHES

DESEMPENHO TECNICO	CABECA	PESO (KG)
CAPACIDADE ALOJ.....	3.350	
LEITOES LOTADOS.....	3.300	97.159
PESO MEDIO DOS LEITOES.....		29,442
LEITOES MORTOS TRANSPORTE...	1	22
SUINOS RECEBIDOS.....	3.180	286.581
SUINOS MORTOS LOC.CRIACAO...	119	1.318
RACAO CONSUMIDA.....		825.764
PESO MEDIO		90,120
IDADE MEDIA.....		124
DIAS EM TERMINACAO.....		139
CONVERSAO ALIMENTAR REAL....		3,701
CONVERSAO ALIMENTAR CORRIGIDA		3,741
% MORTALIDADE LOC.CRIACAO...		3,606
GPD.....		0,572

PAGO 2 FEV 2007

SEARA - DEMONSTRATIVO DO ACERTO DE CONTAS 30/07/2007

COD. DO PARCEIRO 30228015120 ORIGEM : 0121 - MCR-CRECHES

NOME DO PARCEIRO LUIZ HENRIQUE JORDAO DO AMARAL

ENDERECO CHACARA PARAISO

NOME DO TECNICO GERCELIO DE OLIVEIRA CHAVES

DATA DE REFERENCIA 30/07/2007 LOTE 10/07/2007 SEXO MISTO

TABELA 006 - CRECHES

DESEMPENHO TECNICO	CABECA	PESO (KG)
CAPACIDADE ALOJ.....	3.350	
LEITOES LOTADOS.....	3.320	86.596
PESO MEDIO DOS LEITOES.....		26,083
SUINOS RECEBIDOS.....	3.240	307.999
SUINOS MORTOS LOC.CRIACAO...	80	789
RACAO CONSUMIDA.....		925.594
SOBRA DE RACAO DO LOTE.....		4.460
PESO MEDIO		95,061
IDADE MEDIA.....		128
DIAS EM TERMINACAO.....		141
CONVERSAO ALIMENTAR REAL....		3,681
CONVERSAO ALIMENTAR CORRIGIDA		3,681
% MORTALIDADE LOC.CRIACAO...		2,409
GPD.....		0,610

SEARA ALIMENTOS S/A PAGO 03 AGO. 2007 FINANCEIRO/DDOS/MS

OSMAR RODRIGUES CAÍRES FARM LIVESTOCK AND LOCAL WEIGHT

S E A R A - DEMONSTRATIVO DO ACERTO DE CONTAS 15/03/2007

COD. DO PARCEIRO 30228017017 ORIGEM : 0101 - PARC UPL

NOME DO PARCEIRO OSMAR RODRIGUES CAIRES II

ENDERECO LOT 62 QDR 46 PARTE

NOME DO TECNICO VITORINO FERREIRA DE ARAUJO PI

DATA DE REFERENCIA 15/03/2007 LOTE 15/03/2007 SEXO MISTO

TABELA 004 - UPL DDOS

DESEMPENHO TECNICO	CABECA	PESO (KG)
CAPACIDADE ALOJ.....	3.630	
LEITOSS LOTADOS.....	3.535	86.124
PESO MEDIO DOS LEITOES.....		24,363
LEITOES MORTOS TRANSPORTE...	1	26
SUINOS RECEBIDOS.....	3.435	319.889
SUINOS MORTOS LOC.CRIACAO...	99	7.388
RACAO CONSUMIDA.....		933.315
SOBRA DE RACAO DO LOTE.....		1.881
PESO MEDIO		93,126
IDADE MEDIA.....		135
DIAS EM TERMINACAO.....		133
CONVERSAO ALIMENTAR REAL....		3,540
CONVERSAO ALIMENTAR CORRIGIDA		3,556
% MORTALIDADE LOC.CRIACAO...		2,800
GPD.....		0,618

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22 MAR. 2007
FINANCEIRO INTEGRAÇÃO
Dourados-MS

S E A R A - DEMONSTRATIVO DO ACERTO DE CONTAS 13/09/2007

COD. DO PARCEIRO 30228017017 ORIGEM : 0104 - CRECHES

NOME DO PARCEIRO OSMAR RODRIGUES CAIRES II

ENDERECO LOT 62 QDR 46 PARTE

NOME DO TECNICO VITORINO FERREIRA DE ARAUJO PI

DATA DE REFERENCIA 13/09/2007 LOTE 30/08/2007 SEXO MISTO

TABELA 006 - CRECHES

DESEMPENHO TECNICO	CABECA	PESO (KG)
CAPACIDADE ALOJ.....	3.630	
LEITOES LOTADOS.....	3.370	91.343
PESO MEDIO DOS LEITOES.....		27,104
SUINOS RECEBIDOS.....	3.265	318.077
SUINOS MORTOS LOC.CRIACAO...	105	7.769
RACAO CONSUMIDA.....		949.566
PESO MEDIO		97,420
IDADE MEDIA.....		129
DIAS EM TERMINACAO.....		141
CONVERSAO ALIMENTAR REAL....		3,674
CONVERSAO ALIMENTAR CORRIGIDA		3,658
% MORTALIDADE LOC.CRIACAO...		3,115
GPD.....		0,618

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18 OUT. 2007
FINANCEIRO INTEGRAÇÃO

DULCEMAR JOSÉ GRANDO FARM LIVESTOCK AND LOCAL WEIGHT

S E A R A - DEMONSTRATIVO DO ACERTO DE CONTAS 29/12/2006

COD. DO PARCEIRO 30228016266 ORIGEM : 0101 - PARC UPL

NOME DO PARCEIRO DULCEMAR JOSè GRANDO

ENDERECO LINHA GARAGUATA, KM 02

NOME DO TECNICO VITORINO FERREIRA DE ARAUJO FI

DATA DE REFERENCIA 28/12/2006 LOTE 20/11/2006 SEXO MISTO

TABELA 004 - UPL DDOS

DESEMPENHO TECNICO	CABECA	PESO (KG)
CAPACIDADE ALOJ.....	5.660	
LEITOES LOTADOS.....	5.454	130.434
PESO MEDIO DOS LEITOES.....		23,915
SUINOS RECEBIDOS.....	5.293	551.446
SUINOS MORTOS LOC.CRIACAO...	161	8.770
RACAO CONSUMIDA.....		1.788.854
PESO MEDIO		104,184
IDADE MEDIA.....		144
DIAS EM TERMINACAO.....		171
CONVERSAO ALIMENTAR REAL....		3,836
CONVERSAO ALIMENTAR CORRIGIDA		3,765
% MORTALIDADE LOC.CRIACAO...		2,951
GPD.....		0,615

PAGO 08 JAN 2008

S E A R A - DEMONSTRATIVO DO ACERTO DE CONTAS 13/11/2007

COD. DO PARCEIRO 30228016266 ORIGEM : 0999 - MISTO

NOME DO PARCEIRO DULCEMAR JOS GRANDO

ENDERECO LINHA GARAGUATA, KM 02

NOME DO TECNICO VITORINO FERREIRA DE ARAUJO FI

DATA DE REFERENCIA 07/11/2007 LOTE 20/10/2007 SEXO MISTO

TABELA 006 - CRECHES

DESEMPENHO TECNICO	CABECA	PESO (KG)
CAPACIDADE ALOJ.....	5.780	
LEITOES LOTADOS.....	5.249	134.468
PESO MEDIO DOS LEITOES.....		25,617
SUINOS RECEBIDOS.....	5.150	497.106
SUINOS MORTOS LOC.CRIACAO...	99	4.596
RACAO CONSUMIDA.....		1.413.009
PESO MEDIO		96,525
IDADE MEDIA.....		124
DIAS EM TERMINACAO.....		143
CONVERSAO ALIMENTAR REAL....		3,452
CONVERSAO ALIMENTAR CORRIGIDA		3,444
% MORTALIDADE LOC.CRIACAO...		1,886
GPD.....		0,643

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EMERSON FERNANDES FARM LIVESTOCK AND LOCAL WEIGHT

S E A R A - DEMONSTRATIVO DO ACERTO DE CONTAS 29/03/2007

COD. DO PARCEIRO 30228016126 ORIGEM : 0121 - MCR-CRECHES

NOME DO PARCEIRO EMERSON FERNANDES

ENDERECO RANCHO VELHO

NOME DO TECNICO VITORINO FERREIRA DE ARAUJO FI

DATA DE REFERENCIA 29/03/2007 LOTE 05/04/2007 SEXO MISTO

TABELA 006 - CRECHES

DESEMPENHO TECNICO	CABECA	PESO (KG)
CAPACIDADE ALOJ.....	930	
LEITOES LOTADOS.....	3.799	114.401
PESO MEDIO DOS LEITOES.....		30,113
LEITOES MORTOS TRANSPORTE...	1	32
SUINOS RECEBIDOS.....	3.694	348.869
SUINOS MORTOS LOC.CRIACAO...	104	6.544
RACAO CONSUMIDA.....		1.001.838
PESO MEDIO		94,442
IDADE MEDIA.....		115
DIAS EM TERMINACAO.....		135
CONVERSAO ALIMENTAR REAL....		3,654
CONVERSAO ALIMENTAR CORRIGIDA		3,662
% MORTALIDADE LOC.CRIACAO...		2,737
GPD.....		0,650

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09 ABR. 2007
FINANCEIRO INTEGRAÇÃO
Dourados-MS

S E A R A - DEMONSTRATIVO DO ACERTO DE CONTAS 14/09/2007

COD. DO PARCEIRO 30228017556 ORIGEM : 0899 - MISTO

NOME DO PARCEIRO PAULO FERNANDES II

ENDERECO CA APAVA

NOME DO TECNICO VITORINO FERREIRA DE ARAUJO FI

DATA DE REFERENCIA 14/09/2007 LOTE 30/09/2007 SEXO MISTO

TABELA 006 - CRECHES

DESEMPENHO TECNICO	CABECA	PESO (KG)
CAPACIDADE ALOJ.....	4.028	
LEITOES LOTADOS.....	3.756	96,443
PESO MEDIO DOS LEITOES.....		25,677
SUINOS RECEBIDOS.....	3.659	352.804
SUINOS MORTOS LOC.CRIACAO...	97	7.583
RACAO CONSUMIDA.....		1.066.670
PESO MEDIO		96,424
IDADE MEDIA.....		131
DIAS EM TERMINACAO.....		142
CONVERSAO ALIMENTAR REAL....		3,680
CONVERSAO ALIMENTAR CORRIGIDA		3,672
% MORTALIDADE LOC.CRIACAO...		2,582
GPD.....		0,608

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24 SET. 2007
FINANCEIRO INTEGRAÇÃO
Dourados-MS

ANTÔNIO JOSÉ FIGUEIREDO FILHO FARM LIVESTOCK AND LOCAL WEIGHT

S E A R A - DEMONSTRATIVO DO ACERTO DE CONTAS 09/05/2007

COD. DO PARCEIRO 30228013429 ORIGEM : 0104 - CRECHES

NOME DO PARCEIRO ANTONIO J.FIGUEIREDO FILHO-CON

ENDERECO 3a LINHA POENTE KM 02 LD

NOME DO TECNICO FABRICIO JOS KONDO DE AZEVEDO

DATA DE REFERENCIA 09/05/2007 LOTE 20/04/2007 SEXO MISTO

TABELA 006 - CRECHES

DESEMPENHO TECNICO	CABECA	PESO (KG)
CAPACIDADE ALOJ.....	3.630	
LEITOES LOTADOS.....	3.621	97.226
PESO MEDIO DOS LEITOES.....		26,850
SUINOS RECEBIDOS.....	3.501	330.893
SUINOS MORTOS LOC.CRIACAO...	120	5.500
RACAO CONSUMIDA.....		959.012
PESO MEDIO		94,514
IDADE MEDIA.....		122
DIAS EM TERMINACAO.....		134
CONVERSAO ALIMENTAR REAL....		3,586
CONVERSAO ALIMENTAR CORRIGIDA		3,594
% MORTALIDADE LOC.CRIACAO...		3,314
GPD.....		0,631

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14 MAIO 2007
FINANCEIRO INTEGRAÇÃO
Dourados-MS

S E A R A - DEMONSTRATIVO DO ACERTO DE CONTAS 05/11/2007

COD. DO PARCEIRO 30228013429 ORIGEM : 0104 - CRECHES

NOME DO PARCEIRO ANTONIO J.FIGUEIREDO FILHO-CON

ENDERECO 3a LINHA POENTE KM 02 LD

NOME DO TECNICO FABRICIO JOS KONDO DE AZEVEDO

DATA DE REFERENCIA 01/11/2007 LOTE 30/11/2007 SEXO MISTO

TABELA 006 - CRECHES

DESEMPENHO TECNICO	CABECA	PESO (KG)
CAPACIDADE ALOJ.....	3.630	
LEITOES LOTADOS.....	3.404	90.259
PESO MEDIO DOS LEITOES.....		26,515
SUINOS RECEBIDOS.....	3.290	304.721
SUINOS MORTOS LOC.CRIACAO...	114	4.500
RACAO CONSUMIDA.....		874.690
PESO MEDIO		92,620
IDADE MEDIA.....		120
DIAS EM TERMINACAO.....		141
CONVERSAO ALIMENTAR REAL....		3,559
CONVERSAO ALIMENTAR CORRIGIDA		3,583
% MORTALIDADE LOC.CRIACAO...		3,349
GPD.....		0,627

swine capacity
received swines
delivery swines
dead swines

average weight of piglets

media 59,57 (kg)

average weight of delivery swines

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12 NOV. 2007
FINANCEIRO INTEGRAÇÃO
Dourados-MS

S E A R A - DEMONSTRATIVO DO ACERTO DE CONTAS 09/05/2007

COD. DO PARCEIRO 30228017173 ORIGEM : 0121 - MCR-CRECHES

NOME DO PARCEIRO LUCILENE RODRIGUES SOARES FIGU

ENDERECO 3" LINHA POENTE

NOME DO TECNICO FABRICIO JOS KONDO DE AZEVEDO

DATA DE REFERENCIA 09/05/2007 LOTE 20/04/2007 SEXO MISTO

TABELA 006 - CRECHES

DESEMPENHO TECNICO	CABECA	PESO (KG)
CAPACIDADE ALOJ.....	1.930	
LEITOES LOTADOS.....	1.934	54.128
PESO MEDIO DOS LEITOES.....		27,987
SUINOS RECEBIDOS.....	1.884	183.914
SUINOS MORTOS LOC.CRIACAO...	50	2.730
RACAO CONSUMIDA.....		524.298
PESO MEDIO		97,619
IDADE MEDIA.....		124
DIAS EM TERMINACAO.....		136
CONVERSAO ALIMENTAR REAL....		3,529
CONVERSAO ALIMENTAR CORRIGIDA		3,513
% MORTALIDADE LOC.CRIACAO...		2,585
GPD.....		0,640

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15 MAIO 2007
FINANCEIRO INTEGRAÇÃO
Dourados-MS

S E A R A - DEMONSTRATIVO DO ACERTO DE CONTAS 18/10/2007

COD. DO PARCEIRO 30228017173 ORIGEM : 0999 - MISTO

NOME DO PARCEIRO LUCILENE RODRIGUES SOARES FIGU

ENDERECO 3" LINHA POENTE

NOME DO TECNICO FABRICIO JOS KONDO DE AZEVEDO

DATA DE REFERENCIA 15/10/2007 LOTE 30/11/2007 SEXO MISTO

TABELA 006 - CRECHES

DESEMPENHO TECNICO	CABECA	PESO (KG)
CAPACIDADE ALOJ.....	1.930	
LEITOES LOTADOS.....	1.843	52.351
PESO MEDIO DOS LEITOES.....		28,405
SUINOS RECEBIDOS.....	1.791	168.117
SUINOS MORTOS LOC.CRIACAO...	52	2.380
RACAO CONSUMIDA.....		477.952
PESO MEDIO		93,868
IDADE MEDIA.....		119
DIAS EM TERMINACAO.....		126
CONVERSAO ALIMENTAR REAL....		3,569
CONVERSAO ALIMENTAR CORRIGIDA		3,585
% MORTALIDADE LOC.CRIACAO...		2,821
GPD.....		0,633

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24 OUT. 2007
FINANCEIRO INTEGRAÇÃO
Dourados-MS

RANCHO COSMO LIVESTOCK AND LOCAL WEIGHT

S E A R A - DEMONSTRATIVO DO ACERTO DE CONTAS 22/06/2007

COD. DO PARCEIRO 30228013321 ORIGEM : 0121 - MCR-CRECHES

NOME DO PARCEIRO CEZAR JANZESKI - CONTR. PARC.

ENDERECO SITIO RECANTO-STa TEREZINHA

NOME DO TECNICO GERCELIO DE OLIVEIRA CHAVES

DATA DE REFERENCIA 22/06/2007 LOTE 10/06/2007 SEXO MISTO

TABELA 006 - CRECHES

DESEMPENHO TECNICO	CABECA	PESO (KG)
CAPACIDADE ALOJ.....	3.248	
LEITOES LOTADOS.....	3.248	96.282
PESO MEDIO DOS LEITOES.....		29,643
LEITOES MORTOS TRANSPORTE...	1	31
SUINOS RECEBIDOS.....	3.142	305.608
SUINOS MORTOS LOC.CRIACAO...	105	527
RACAO CONSUMIDA.....		871.732
PESO MEDIO		97,265
IDADE MEDIA.....		122
DIAS EM TERMINACAO.....		138
CONVERSAO ALIMENTAR REAL....		3,591
CONVERSAO ALIMENTAR CORRIGIDA		3,575
% MORTALIDADE LOC.CRIACAO...		3,232
GPD.....		0,638

PAG 29 JUL. 2007 FINANCEIRO INTEG Dourados-MS

S E A R A - DEMONSTRATIVO DO ACERTO DE CONTAS 14/12/2007

COD. DO PARCEIRO 30228013321 ORIGEM : 0104 - CRECHES

NOME DO PARCEIRO CEZAR JANZESKI - CONTR. PARC.

ENDERECO SITIO RECANTO-STa TEREZINHA

NOME DO TECNICO FABIO RODRIGUES BARBOSA

DATA DE REFERENCIA 14/12/2007 LOTE 20/11/2007 SEXO MISTO

TABELA 006 - CRECHES

DESEMPENHO TECNICO	CABECA	PESO (KG)
CAPACIDADE ALOJ.....	3.248	
LEITOES LOTADOS.....	3.077	79.842
PESO MEDIO DOS LEITOES.....		25,948
SUINOS RECEBIDOS.....	2.991	278.429
SUINOS MORTOS LOC.CRIACAO...	86	810
RACAO CONSUMIDA.....		810.642
PESO MEDIO		93,089
IDADE MEDIA.....		125
DIAS EM TERMINACAO.....		138
CONVERSAO ALIMENTAR REAL....		3,582
CONVERSAO ALIMENTAR CORRIGIDA		3,598
% MORTALIDADE LOC.CRIACAO...		2,794
GPD.....		0,609

16 DEZ 2007

S E A R A - DEMONSTRATIVO DO ACERTO DE CONTAS 26/06/2007

COD. DO PARCEIRO 30228014166 ORIGEM : 0121 - MCR-CRECHES

NOME DO PARCEIRO PEDRO JANZESKI - CONTR. PARC.

ENDERECO SITIO COSMOS

NOME DO TECNICO GERCELIO DE OLIVEIRA CHAVES

DATA DE REFERENCIA 26/06/2007 LOTE 10/06/2007 SEXO MISTO

TABELA 006 - CRECHES

DESEMPENHO TECNICO	CABECA	PESO (KG)
CAPACIDADE ALOJ.....	2.200	
LEITOES LOTADOS.....	2.200	62.385
PESO MEDIO DOS LEITOES.....		28,356
LEITOES MORTOS TRANSPORTE...	1	27
SUINOS RECEBIDOS.....	2.126	208.863
SUINOS MORTOS LOC.CRIACAO...	73	1.345
RACAO CONSUMIDA.....		596.640
PESO MEDIO		98,242
IDADE MEDIA.....		124
DIAS EM TERMINACAO.....		133
CONVERSAO ALIMENTAR REAL....		3,549
CONVERSAO ALIMENTAR CORRIGIDA		3,525
% MORTALIDADE LOC.CRIACAO...		3,318
GPD.....		0,643

PAGO
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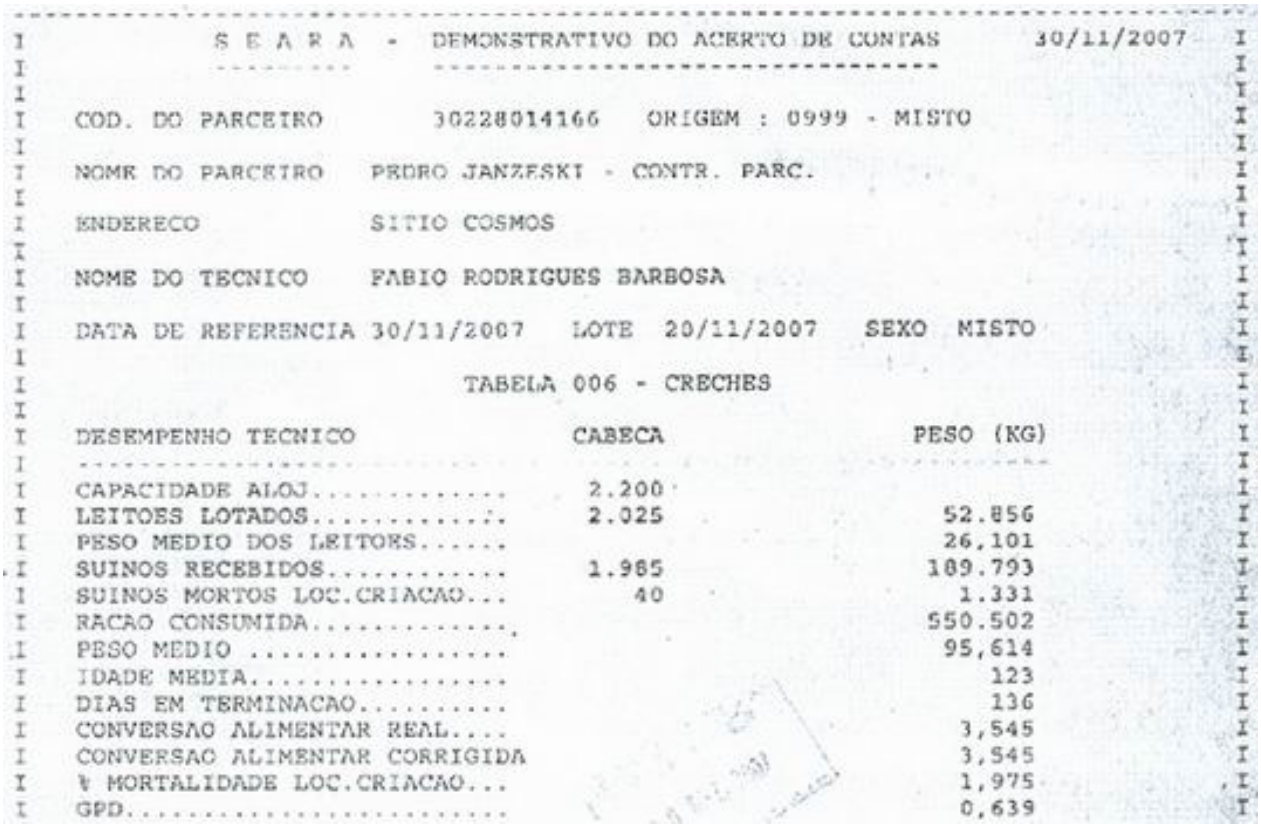
FINANCEIRO INTEGRAÇÃO
Dourados-MS



S E A R A - DEMONSTRATIVO DO ACERTO DE CONTAS 30/11/2007

COD. DO PARCEIRO 30228014166 ORIGEM : 0999 - MISTO

NOME DO PARCEIRO PEDRO JANZESKI - CONTR. PARC.

ENDERECO SITIO COSMOS

NOME DO TECNICO FABIO RODRIGUES BARBOSA

DATA DE REFERENCIA 30/11/2007 LOTE 20/11/2007 SEXO MISTO

TABELA 006 - CRECHES

DESEMPENHO TECNICO	CABECA	PESO (KG)
CAPACIDADE ALOJ.....	2.200	
LEITOES LOTADOS.....	2.025	52.856
PESO MEDIO DOS LEITOES.....		26,101
SUINOS RECEBIDOS.....	1.965	189.793
SUINOS MORTOS LOC.CRIACAO...	40	1.331
RACAO CONSUMIDA.....		550.502
PESO MEDIO		95,614
IDADE MEDIA.....		123
DIAS EM TERMINACAO.....		136
CONVERSAO ALIMENTAR REAL....		3,545
CONVERSAO ALIMENTAR CORRIGIDA		3,545
% MORTALIDADE LOC.CRIACAO...		1,975
GPD.....		0,639

Annex 4

MONITORING INFORMATION

This section provides further details on monitoring equipment, training, monitoring procedures, data recording and maintenance.

System Overview:

The Animal Waste Management System installed by the project is illustrated in figure 1. The system consists in four major components:

- Manure loading system
- Anaerobic digester cells
- Biogas transfer and flow meters
- Flaring system

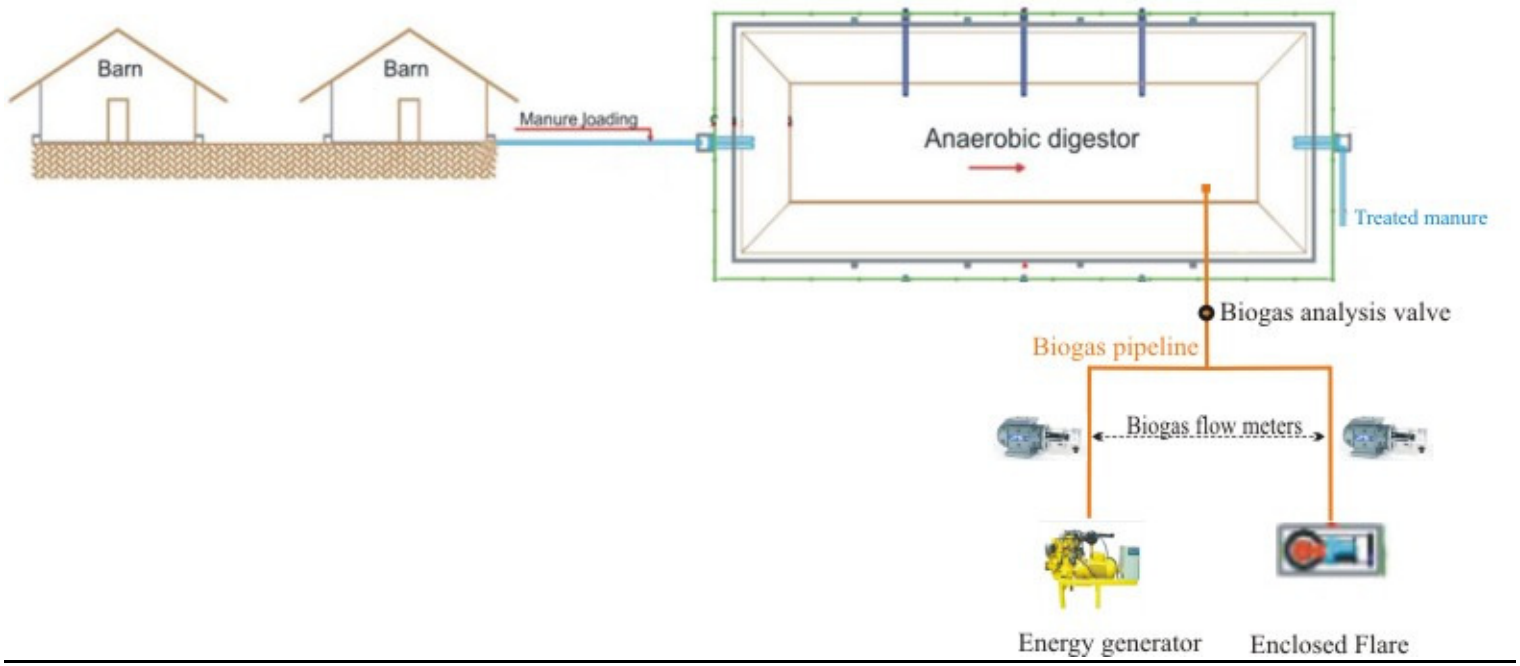


Figure 1. AWMS installed as the project acitivity.

System components Operation and maintenance:

Amazon Carbon and all participating farms will have online access to monitoring information via internet connection. All monitoring equipment will be connected to a DATA-LOGGER, which collects and stores information. DATA-LOGGERs information will be transferred to PC terminals for storage and distribution of data. Emergency and malfunction on any of the equipment installed by the project shall be reported by the participating farms immediately to Amazon Carbon. All participating farms will have trained personnel working on the farms on a daily basis. The equipment provider will assist in preventive and emergency maintenance during the crediting period.

A description of the system components follows:

1. Manure loading system

Training: Training on manure loading system will be provided by the technology manufacturer. Training shall include: system components, normal operation, emergency operations, maintenance and request for warranty service. Reporting procedures shall be made directly to Amazon Carbon.

Normal Operation: The manure loading system installed by the project activity is not much different than the existing system. Farms' managers are familiar with the system operation and maintenance. Under normal operations, manure is removed from the barns using water hoses and squeegees. This effluent is collected and flushed from the barns periodically. The effluent is sent to the manure tanks and then to the digester cells. To optimize manure treatment and biogas production, the excessive use of water shall be avoided.

Safety issues: All personnel working on the barns make use of appropriated gear and clothing. Sanitary and health issues are a serious concern. Care should be taken on handling animal manure and around the manure tanks, to avoid falling into them.

Regular inspections: Regular inspections shall be executed at least on a weekly basis, and will include the following procedures:

- ✓ Check for pipeline obstruction and leakages;
- ✓ Check for corrosion at exposed joints
- ✓ Check for clogging in the manure tanks

- ✓ Check the operational status of the pumping station, where applicable.

Alternative Operating procedures: In the event of malfunction of the manure loading system, all participating farms personnel shall immediately notify Amazon Carbon. The AWMS manufacturer will be notified to provide warranty or maintenance services, if required. Upon restoration of the system, Amazon Carbon shall be notified.

The proximity between the project sites and the manufacturer Head Office will allow fast emergency maintenance. Upon report by all participating farms, BIOTER maintenance team shall arrive on site in less than 48 hours. In the mean time, all participating farms and Amazon Carbon shall work together to identify an alternative method to route the effluent in order not to affect the farm nor result in additional GHG emissions.

2. Anaerobic digester:

The anaerobic digesters will be surrounded by a protection fence. Only authorized and trained personnel shall be in contact with the digesters.

Training: Training on the anaerobic digesters shall be provided to all participating farms personnel by the system manufacturer. Training shall include: construction and installation, system components, start-up procedures, normal operation, biogas and sludge handling, emergency operation, safety issues, maintenance and request for service. Reporting procedures shall be directly to Amazon Carbon.

Normal Operation:

Training on normal operation will include the basic operations of the system, biogas production, sludge production and disposal, start-up procedures, safety procedures, regular inspections, technical components and manure quality.

Safety issues: Safety advice shall include the following instructions:

- ✓ No open flame permitted within 15 meters of the digester
- ✓ Do not allow the access of untrained personnel in the digester surroundings
- ✓ Do not use sharp objects or tools around the digester cover

Regular inspections: Regular inspections shall be executed at least on a weekly basis, and will include the following procedures:

- ✓ Cover material – check for cracks, tears, points of distress and other irregularities around the perimeter of the digester cell.
- ✓ Check for excessive ballooning of cover or presence of odor
- ✓ Check seams for signs of gas leakages
- ✓ Check for manure leakages

Alternative operation procedures: In the event of malfunction of the anaerobic digesters, all participating farms personnel shall immediately notify Amazon Carbon. The AWMS manufacturer will be notified to provide warranty or maintenance services, if required. Upon restoration of the system, Amazon Carbon shall be notified. The proximity between the project sites and the manufacturer Head Office will allow fast emergency maintenance. Upon report by any participating farm, BIOTER maintenance team shall arrive on site in less than 48 hours. In the mean time, all participating farms and Amazon Carbon shall work together to identify an alternative method to route the effluent in order not to affect the farm nor result in additional GHG emissions.

3. Biogas transfer and flow meter devices:

Training: Training on the biogas transfer and flow meter devices shall be provided to all participating farms personnel by the system manufacturer (BIOTER). Training shall include: system components, normal operation, emergency operation, safety issues, maintenance and request for service. Reporting procedures shall made be directly to Amazon Carbon.

Normal operation: The biogas produced by the anaerobic digesters will be contained by a sealed geomembrane and sent to the combustion system through PVC pipeline. The combustion system, will be regulated by pressure controlling devices to ensure ideal biogas pressure. ROOTS B3 G65 – SSM ICPWS Flow meters will be connected to the PVC pipeline and continuously measure biogas flow to the combustion system. The flow meters are integrated to the DATA-LOGGER, which will record biogas flow. The DATA-LOGGER will be periodically connected to a PC terminal that will store monitoring data and transmit it via internet connection to Amazon Carbon personnel.

Safety issues: Measures will be taken to avoid biogas leakage and pipeline damages. Care shall be taken when performing maintenance on the flow meters and when digging near the pipelines.

Preventive maintenance: Maintenance procedures shall be conducted according the manufacturer's recommendations. Preventive maintenance shall be executed on a quarterly basis.

Regular inspections: Regular inspections shall be executed at least on a weekly basis, and will include the following procedures:

- ✓ Check for leaks in exposed pipelines
- ✓ Check for operational status of flow meters
- ✓ Check for DATA-LOGGER operational status.

Alternative operating procedures: In the event of malfunction of the biogas transfer system and flow meter devices, farms' personnel shall immediately notify Amazon Carbon. The AWMS manufacturer will be notified to provide warranty or maintenance services, if required. Upon restoration of the system, Amazon Carbon shall be notified. The proximity between the project sites and the manufacturer Head Office will allow fast emergency maintenance. Upon report by all participating farms, BIOTER maintenance team shall arrive on site in less than 48 hours. In the mean time, all participating farms and Amazon Carbon shall work together to identify an alternative method to route the effluent in order not to affect the farm nor result in additional GHG emissions.

4. Energy generators:

Training: Training on the energy generation system shall be provided to farms' personnel by the system manufacturer. Training shall include: system components, normal operation, emergency operation, safety issues, maintenance and request for service. Reporting procedures shall be directly to Amazon Carbon.

Normal operation: The energy generators installed by the project activity are built using standard vehicle engines which are specially adapted to operate with biogas. These equipment are designed to work for 5,000 hours without the need for any corrective maintenance. Normal operation shall be executed as per the Owner Manual. More details on the energy generators are provided in Section A.4.2.

Safety issues: Only authorized and trained personnel shall operate the energy generators. Prior to maintenance, the gas flow must be turned off. Turn off all electrical components as well. Double checking of operational status shall be performed prior to maintenance procedures.

The following safety procedures must be adopted in installing/operating the energy generator:

- ✓ Install the energy generator in ventilated areas, free from dust, inflammable gases and residues of oils and fuels.
- ✓ Place the energy generator on a leveled concrete base at least 5cm thick.

- ✓ All electrical components must be placed away from heat sources and moving parts

Regular inspections: Regular inspections shall be executed at least on a weekly basis, and will include the following procedures:

- ✓ Perform rigorous check of entry gas pressure, according to owner's manual.
- ✓ Check the electronic panel for operational status

Preventive maintenance: Preventive maintenance shall be conducted according to the following table:

ENERGY GENERATOR – PREVENTIVE MAINTENANCE PLAN

	50 hours	100 hours	200 hours	400 hours	1000 hours	2000 hours
Lubricant oil						
Check and refill	X					
Oil change			X			
Filter change				**X**		
Air filter						
Filter cleaning					X	
Filter replacement						X
Fuel system						
Check for leakages		**X**				
Clean filters			**X**			
Clean the gas valve						X
Cooling system						
Check level	**X**					
Change cooling liquid (radiator)						X
Replace timing belt					**X**	
Replace timing belt tensor					**X**	
Replace spark plugs					**X**	
Replace ignition wires					**X**	

5. Flaring System (enclosed flares):

Training: Training on the combustion system shall be provided to farms' personnel by the system manufacturer. Training shall include: system components, normal operation, emergency operation, safety issues, maintenance and request for service. Reporting procedures shall be directly to Amazon Carbon.

Normal operation: The enclosed flares installed by the project activity have an automatic system designed to combust methane whenever biogas is present at the combustion chamber. The system is also equipped with pressure control devices to maintain ideal flow to the flares. More details on the flaring system are provided in Section A.4.2.

Safety issues: This system will be surrounded by a protection fence. Only authorized and trained personnel shall near the combustion system. Prior to maintenance, the gas flow must be turned off. Double checking of operational status shall be performed prior to maintenance procedures.

Regular inspections: Regular inspections shall be executed at least on a weekly basis, and will include the following procedures:

- ✓ Check for flaring operational status by checking the presence of a flame, the temperature of the combustion system and data from DATA-LOGGER.
- ✓ Check for DATA-LOGGER operational status.

Preventive maintenance: Preventive maintenance shall be conducted on a quarterly basis.

Maintenance and Trouble reporting:

In the event of failure in the components of the AWMS installed by the project, including the digesters and the combustion system, all participating farms shall immediately report to Amazon Carbon and to BIOTER. Contact information for emergency situations follows:

Person/ Entity	Phone	e-mail
Amazon Carbon Projects Department	+ 55 48 3024.7152	amazoncarbon@amazoncarbon.com.br
Amazon Carbon Project Developer	+ 55 51 9841.3924	jorge@amazoncarbon.com.br
Amazon Carbon Technology Analyst	+ 55 48 9164.2970	alexandre@amazoncarbon.com.br
BIOTER Head Office	+ 55 49 3322.2061	bioter@bioter.com.br

Data storage:

All monitoring data will be stored by Amazon Carbon. The above contact information applies to the responsible for data storage.

Monitoring Procedures:

Monitoring of emission reduction shall include the following items/procedures:

ID	Item	Performed by	Recording procedures
1	Sludge removal	Farms personnel	Recorded by trained personnel every time sludge removal occurs. Digitally stored in spreadsheets each time sludge removal is performed. Digitally sent to Amazon Carbon on a monthly basis.
2	Biogas produced	Amazon Carbon	Electronically recorded by ROOTS B3 G65 – SSM ICPWS Flow meters continuously. Digitally stored by DATA-LOGGERs. Digitally transferred to Amazon Carbon via internet connection.
3	Methane combusted	Amazon Carbon	Methane combusted will be monitored individually for the fraction of biogas sent to the energy generators and for the fraction of biogas sent to the flares. The procedures for monitoring these parameters are the same, in both cases. Total methane combusted will be obtained by determining the amount of methane in the combusted biogas multiplied by the flare efficiency. Methane content in biogas will be determined by a gas analyzer on a monthly basis. Results will be electronically recorded by the DATA-LOGGER and digitally transferred to Amazon Carbon via internet connection.
4	Flare/combustion efficiency	Amazon Carbon	Flare/combustion efficiency will be monitored individually for the fraction of biogas sent to the energy generators and for the fraction of biogas sent to the flares. The procedures for monitoring these parameters are the same, in both cases. Flare/combustion efficiency will be determined by the temperature in the exhaust gas stream. If the temperature is below 500ºC, the flare efficiency will be considered 0%. Flare efficiency will be considered 90% when the measured temperature is above 500ºC. Data to determine methane combustion efficiency will be electronically detected by Type K temperature sensors. Data on this parameter will be digitally stored by a DATA-LOGGER and digitally transferred to Amazon Carbon via internet connection..

5	Residual gas pressure	Amazon Carbon	The combustion system is equipped with LD301Smart Pressure Transmitter Series, used to assure proper residual gas (biogas) flow to the combustion system. Residual gas pressure is used to determine methane density. Data will be electronically recorded by LD301, digitally stored by a DATA-LOGGER and digitally transferred to Amazon Carbon via internet connection.
6	Residual gas temperature	Amazon Carbon	Measured by Every Control FK200P sensors. Residual gas temperature is used to determined methane density. Data will be electronically recorded by digitally stored by a DATA-LOGGER and digitally transferred to Amazon Carbon via internet connection..

Monitoring Instructions

This Section provides an overview for monitoring the items described above.

1. Sludge Removal: sludge removal shall be executed as follows:

Step	Activity	Recording/storage	Documentation	Comment
1	Determine the need to remove sludge			Sludge will be disposed through soil application on nearby cropping areas
2	Perform sludge removal in accordance to guidance provided		BIOTER guidance on sludge removal (paper)	
3	Document disposal method on monitoring form	Manual recording by all participating farms personnel	Spreadsheet (paper/electronic)	
4	Transfer information to Amazon Carbon	Farm managers shall e-mail Amazon Carbon with the scanned files.	Spreadsheet (Electronic)	
5	Store data in data discs	Monthly backup of monitoring data by Amazon Carbon.	Electronic (DVD)	

2. Biogas produced: Biogas produced shall be monitored as follows:

Step	Activity	Recording/storage	Documentation	Comment
1	Record biogas flow meter reading	Automatically registered by flow meters and stored by the DATA-LOGGER	Electronic	Biogas flow is measured continuously and recorded electronically by a DATA-LOGGER.
2	Check for last 24 hours recording		Electronic	
3	Check DATA-LOGGER and flow meter operational status			If DATA-LOGGER or flow meters are not operating properly, contact Amazon Carbon for maintenance procedures
4	Transfer monitored data to PC terminal	Monthly backup of monitoring data by Amazon Carbon	Electronic	If the PC terminal is not operating properly, contact Amazon Carbon for maintenance procedures.
5	Transfer monitored data to Amazon Carbon Head Office	Monthly backup of monitoring data by Amazon Carbon	Electronic	
6	Store data in data discs	Monthly backup of monitoring data by Amazon Carbon.	Electronic (DVD)	

3. Methane Combusted: shall be monitored as follows

Step	Activity	Recording/storage	Documentation	Comment
1	Prepare the gas analyzer as indicated in operator manual		Gas analyzer operations manual	
2	Connect the gas analyzer to the biogas pipeline system			
3	Open valve on test port			
4	Take gas reading in accordance with Operations manual			
5	Record reading on PC terminal	Recording on gas analysis will be downloaded to	Electronic	If the analysis demonstrate significant differences from previous readings (more than 10% points) contact Amazon Carbon for maintenance procedures
6	Close valve on test port			

7	Disconnect gas analyzer from biogas pipeline			
8	Check PC terminal operational status			If PC terminal are not operating properly, contact Amazon Carbon for maintenance procedures
9	Transfer monitored data to Amazon Carbon Head Office	Monthly backup of monitoring data by Amazon Carbon	Electronic	
10	Store data in data discs	Monthly backup of monitoring data by Amazon Carbon.	Electronic (DVD)	

4. Flare efficiency

Step	Activity	Recording/storage	Documentation	Comment
1	Record temperature of exhaust gas stream	Automatically registered by electronic sensors in the combustion system and recorded by a DATA-LOGGER.	Electronic	
2	Check DATA-LOGGER operational status			If DATA-LOGGER is not operating properly, contact Amazon Carbon for maintenance procedures
3	Check for last 24 hour records to confirm that readings are within expected limits			If the combustion system is not operating properly, immediately contact Amazon Carbon for maintenance procedures.
4	Transfer monitored data to PC terminal	Monthly backup of monitoring data by Amazon Carbon	Electronic	If the PC terminal is not operating properly, contact Amazon Carbon for maintenance procedures.
5	Transfer monitored data to Amazon Carbon Head Office	Monthly backup of monitoring data by Amazon Carbon	Electronic	
6	Store data in data discs	Monthly backup of monitoring data by Amazon Carbon.	Electronic (DVD)	

5. Residual gas pressure

Step	Activity	Recording/storage	Documentation	Comment
1	Record residual gas (biogas) pressure	Automatically recorded by LD301 Smart Pressure Transmitter Series and a DATA-LOGGER.	Electronic	Residual gas temperature is monitored to determine methane density.
2	Check DATA-LOGGER and LD301 operational status			If LD301 or DATA-LOGGER is not operating properly, contact Amazon Carbon for maintenance procedures
3	Check for last 24 hour records to confirm that readings are within expected limits			If the combustion system is not operating properly, immediately contact Amazon Carbon for maintenance procedures.
4	Transfer monitored data to PC terminal	Monthly backup of monitoring data by Amazon Carbon	Electronic	If the PC terminal is not operating properly, contact Amazon Carbon for maintenance procedures.
5	Transfer monitored data to Amazon Carbon Head Office	Monthly backup of monitoring data by Amazon Carbon	Electronic	
6	Store data in data discs	Monthly backup of monitoring data by Amazon Carbon.	Electronic (DVD)	

6. Residual gas temperature

Step	Activity	Recording/storage	Documentation	Comment
1	Record residual gas (biogas) temperature	Automatically recorded by the FK200P sensor and the DATA-LOGGER	Electronic	Residual gas temperature is monitored to determine methane density.
2	Check DATA-LOGGER operational status			If DATA-LOGGER is not operating properly, contact Amazon Carbon for maintenance procedures
3	Check for last 24 hour records to confirm that readings are within expected limits			If the combustion system is not operating properly, immediately contact Amazon Carbon for maintenance procedures.
4	Transfer monitored data to PC terminal	Monthly backup of monitoring data by Amazon Carbon	Electronic	If the PC terminal is not operating properly, contact Amazon Carbon for maintenance procedures.
5	Transfer monitored data to Amazon Carbon Head Office	Monthly backup of monitoring data by Amazon Carbon	Electronic	
6	Store data in data discs	Monthly backup of monitoring data by Amazon Carbon.	Electronic (DVD)	

Sludge removal Guidance:

Sludge removal from the digesters cells will be made using a pumping system. The followings procedures should be adopted when performing sludge removal:

- ✓ Connect the pump flexible pipeline to the appropriate sludge removal pipe, located laterally in the digester cells. Do not connect more than one pipeline at the same time.
- ✓ Place the other pipeline (pump outlet) in the distribution tanks.
- ✓ Activate the pumping system.
- ✓ Dispose sludge on cropping areas.
- ✓ Record data on sludge removal in monitoring spreadsheet.

Sludge disposal is critical to avoid methane emissions. Care should be taken in order:

- ✓ Not to cause sludge spills.
- ✓ Not to use the pumping system longer than necessary. Deactivate the pumping system immediately after removing the necessary amount of sludge.
- ✓ To perform sludge disposal immediately after loading the distribution tanks.
- ✓ Not to dispose sludge in places other than cropping areas.
- ✓ To correctly record data on the monitoring spreadsheet.

Dual wavelength Infra-red refrigerant gas sensor

Specifications

MODEL	Gas	Accuracy*	Stability	Repeatability @ zero	Repeatability @ span
Guardian Plus 0-3000ppm	CO_2	+/- 2.5% of range	+/- 2% of range over 12 months	+/- 0.3%	+/- 2%
Guardian Plus 0-1%	CO_2	+/- 2.5% of range	+/- 2% of range over 12 months	+/- 0.3%	+/- 2%
Guardian Plus 0-3%	CO_2	+/- 2.5% of range	+/- 2% of range over 12 months	+/- 0.3%	+/- 2%
Guardian Plus 0-5%	CO_2	+/- 2.5% of range	+/- 2% of range over 12 months	+/- 0.3%	+/- 2%
Guardian Plus 0-10%	CO_2	+/- 2.5% of range	+/- 2% of range over 12 months	+/- 0.3%	+/- 2%
Guardian Plus 0-30%	CO_2	+/- 2.5% of range	+/- 2% of range over 12 months	+/- 0.3%	+/- 2%
Guardian Plus 0-100%	CO_2	+/- 2.5% of range	+/- 2% of range over 12 months	+/- 0.3%	+/- 2%
*Guardian Plus 0-5%	CH4	+/- 3% of range	+/- 3% of range over 12 months	+/- 0.3%	+/- 2.5%
Guardian Plus 0-10%	CH4	+/- 2.5% of range	+/- 2% of range over 12 months	+/- 0.3%	+/- 2%
Guardian Plus 0-30%	CH4	+/- 2.5% of range	+/- 2% of range over 12 months	+/- 0.3%	+/- 2%
Guardian Plus 0-100%	CH4	+/- 2.5% of range	+/- 2% of range over 12 months	+/- 0.3%	+/- 2%

RESPONSE TIME:	T_{90} = 30 seconds
OPERATING TEMPERATURE:	0-40ºC
WARM-UP TIME:	3 minutes (initial), 40 minutes (full specification)
HUMIDITY:	Measurements are unaffected by 0-99% relative humidity, non-condensing
CONTROLS FITTED:	Zero and span adjustment potentiometers Setpoint 1 and setpoint 2 adjustment View setpoint 1 button, view setpoint 2 button Indicator LED and display test button
BITSWITCH PARAMETERS:	Analogue (current) output: 0 - 20mA or 4 - 20mA Linear or non-linear output Alarm settings: alarm 1 high/low, alarm 2 high/low, alarm 1 normal/latch, alarm 2 normal/latch Buzzer sounds on both alarms or only on alarm 2 Low flow warning (flashing lamp) or low flow alarm (audible alarm, LCD displays 'ERR', flashing lamp, etc)
VISUAL DISPLAY:	Four-digit LCD Alarm 1 LED, alarm 2 LED Fault LED Low flow/flow fail LED
RELAY CONTACTS:	Volt-free changeover contacts Resistive load @ 24V DC = 8A Resistive load @ 250V AC = 8A
PUMP CHARACTERISTICS:	Typical flow rate = 1 litre/minute Maximum sampling distance = 30 metres
POWER REQUIREMENTS:	88V - 138V AC or 172V - 276V AC (switch selectable)
POWER CONSUMPTION:	13 W (typical)
WEIGHT:	2.5Kg
DIMENSIONS:	267 x 258 x 148mm
ENCLOSURE:	IP54 rated
ELECTRICAL CONFORMITY:	CE marked
	(*stated accuracy includes calibration gas tolerance of +/- 1%)

Gas analyzers will measure methane content in produced biogas in parts per million (ppm). Gas analyzers will be calibrated according to manufacturer specifications. Calibration certificates will be provided when the equipment is installed in project sites. Calibration certificates shall be made available during the crediting period.

Calibration frequency will be determined by frequent recalibration of gas analyzers in the first months of operation. Calibration frequency, however, shall not exceed two years. Calibration is done using Industrial Pure gas cylinders, such as Synthetic Air or Nitrogen. Recalibration shall be done according to equipment manual by trained personnel.

ROOTS B3 G65 – SSM ICPWS Flow meter

Specifications

SERIES B3: G65 ROOTS® Meter

	UNITS	Metric
Temperature Range	deg. C	-40 to +60
Base Rating (Q Max.)	m³/h	100
Max. Operating Pressure (MAOP)	bar	12
Leak Test (125% MAOP)	bar	15
Static Test (2 x MAOP)	bar	24
Rangeability +/- 1%	ratio	89:1
Rangeability +/- 2%	ratio	163:1
Start Rate	m³/h	0,0595
Stop Rate	m³/h	0,0510
Flow Rate @ 1,25 mbar, Gas	m³/h	73,1
Avg. Differential, 100% Flow	mbar	3,2
Max. Pressurization Rate	kPa/sec	35
Max. Operating Speed	rpm	2350
Gear Ratio	ratio	141,1764:1
Displaced Volume/Revolution	m³	0,000708
Drive Rate, CD	m³/rev	0,1
Min. Odometer Reading	m³	0,002
Odometer Turnover	yrs.	1,14
Nominal Pipe Size	mm	50
Flange-to-Flange	mm	172
Flange Connection	ANSI	150#FF
Bolts per Flange	qty.	4
Bolt Size[1]	in.	5/8 - 11
Flange Bolt Hole Depth	mm	23,8
Bolt Torque: Lubricated/Non-Lub.	N-m	74/81
Restricting Orifice (120%)	mm	9,525
Oil Capacity – Side Inlet	ml	37
Oil Capacity – Top Inlet	ml	226
Counter Version (CTR)[2]		
Net Weight	kg	13
Shipping Weight	kg	14
Carton Size	cm	69 x 28 x 23
Counter with Instrument Drive (CD)[2]		
Net Weight	kg	15
Shipping Weight	kg	17
Carton Size	cm	79 x 38 x 33

NOTES:
[1] Bolt Length varies by application.
[2] Weights and dimensions available for CPS upon request.

ROOTS B3 G65 – SSM ICPWS Flow meters are built and calibrated according to INMETRO (National Institute of Metrology, Standardization and Industrial Quality) Standard 114/1997 and OIML (International Organization of Legal Metrology) Recommendation 32. Standards and recommendations are annexed to this document.

Calibration frequency will be determined by sample checking of flow meters in the first months of operation. Calibration frequency, however, shall not exceed five years, as stated in INMETRO Standard 114/1997. Calibration is done using ROOTS® Proving System. This equipment is certified according to NMI (Netherlands Measurement Institute) standards. System specification follows:

ROOTS® Proving System Model 5 2M/10M

Specifications
(excludes computer)

Accuracy:		+/- 0.55%
Repeatability:		+/- 0.15%
Ambient Operating Temperature:	Master Meter:	+32° to +140°F 0° to +60°C
	Controller, etc.:	-4° to +140°F -20° to +60°C
Ambient Storage Temperature:	Master Meter:	-40° to +140°F -40° to +60°C
	Controller, etc.:	-40° to +185°F -40° to +85°C
Humidity:		Up to 95% non-condensing
AC Power:	Blower: Electronics:	120 or 240 volts ± 15%, 48 to 62 hertz 120 or 240 volts ± 15%, 48 to 62 hertz
Blower Capacity:	Single:	0 to 7,200 ACFH at 10 inch differential 0 to 200 m^3/h at 25 millibar differential
Blower Capacity:	Dual:	0 to 14,400 ACFH at 10 inch differential 0 to 400 m^3/h at 25 millibar differential
Compliance:		Meets FCC Part-15 requirements NMi and NIST Traceable
Test Medium:		Air
Test Flow Rate:	10M Master Meter:	100 to 10,000 ACFH 2.83 to 283 m^3/h
	2M Master Meter:	35 to 2,300 ACFH 1 to 65.1 m^3/h
Safety Rating:		Complies with Underwriters Laboratory Requirements
Inverter Capacity Required:		2000 watts continuous
Net Weight:		10M only 143 lbs. 2M/10M 173 lbs. Hose Carton* 50 lbs
Shipping Weight:		10M only 198 lbs. 2M/10M 228 lbs. Hose Carton 60 lbs.
Overall Prover Dimensions (l x w x h):		51" x 19.5" x 29.5"
Prover Shipping Dimensions (l x w x h):		54" x 24" x 32"
Hose Carton Shipping Dimensions (l x w x h):		41" x 22" x 35"

*Hose Carton contains prover Hose and Tool Kit

Minimum Computer System Requirements:

- Microsoft Windows® 95 or Windows® 98 Me, Windows NT® 4.0
- Pentium 200Mhz processor with 32 Megabytes of RAM
- 256 color video with 800 x 600 capability
- 100 MB of free Hard Disk space

DRESSER Roots Meters & Instruments

Dresser Roots Meters & Instruments — **Dresser, Inc.**

P.O. Box 42176
Houston, TX USA 77242-2176
website: www.dresser.com

Inside US Ph: 800.521.1114
Outside US Ph: 832.590.2303

Fax: 800.335.5224
Fax: 832.590.2494
www.rootsmeters.com

TS:MODEL 5
9.02

LD301 Smart Pressure Transmitter Series

Specifications

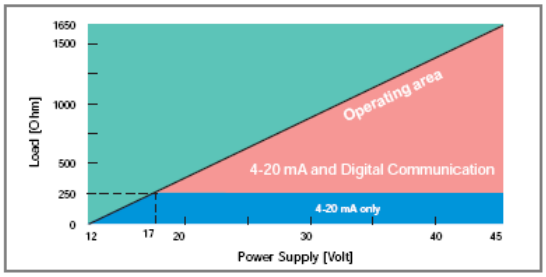
Functional Specifications

Process Fluid
Liquid, gas or vapor.

NEW **Output Signal**
Two-wire, 4-20 mA controlled according to NAMUR NE43 Specification, with superimposed digital communication (HART® Protocol).

Power Supply
12 to 45 Vdc.

Load Limitation

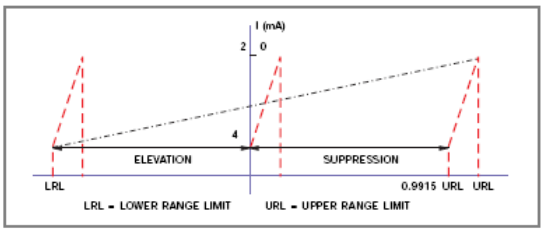


Indicator
Optional 4½-digit numerical and 5-character alphanumerical LCD indicator.

Hazardous Area Certifications
Explosion proof, weather proof and intrinsically safe (NEMKO, DMT, CEPEL, CSA and FM standards).

Zero and Span Adjustments
Noninteractive, via digital communication.

Zero Adjustment Limits



Calibrated span shall not be less than 0.0085 URL and shall not exceed 2 URL.
Low range value shall not be below LRL.
Upper range value shall not be greater than URL.

(LRL = -URL for all models, except absolute, where LRL = vacuum).

Temperature Limits

Ambient:	-40 to 85 °C (-40 to 185 °F).
Process:	-40 to 100 °C (-40 to 212 °F) (Silicone Oil).
	0 to 85 °C (-32 to 185 °F) (Fluorolube Oil).
	-40 to 150 °C (-40 to 302 °F) for LD301L.
	-25 to 85 °C (-13 to 185 °F) (Viton O-Rings).
Storage:	-40 to 100 °C (-40 to 212 °F).
Digital Display:	-10 to 60 °C (14 to 140 °F).
	-40 to 85 °C (-40 to 185 °F) without damage.

NEW **Failure Alarm**
In case of sensor or circuit failure, the self diagnostics drives the output to 3.6 or 21.0 mA, according to the user's choice.

Turn-on Time
Performs within specifications in less than 5.0 seconds after power is applied to the transmitter.

Volumetric Displacement
Less than 0.15 cm^3 (0.01 in^3).

Overpressure and Static Pressure Limits
From 3.45 kPa abs. (0.5 psia)* to:
8 MPa (1150 psi) for range 1.
16 MPa (2300 psi) for ranges 2, 3 & 4.
32 MPa (4600 psi) for models H & A5.
40 MPa (5800 psi) for model M5.
52 MPa (7500 psi) for model M6.

* except the LD301A model.
Flange Test Pressure: 60 MPa (8570 psi).

For ANSI/DIN Level flanges (LD301L models):
150lb: 6 psia to 275 psi at 38 °C (-0.6 to 19 bar).
300lb: 6 psia to 720 psi at 38 °C (-0.6 to 50 bar).
PN10/16: -60 kPa to 1.4 MPa at 120 °C.
PN25/40: -60 kPa to 4 MPa at 120 °C.

These pressures will not damage the transmitter, but a new calibration may be necessary.

Humidity Limits
0 to 100% RH.

Damping Adjustment
User configurable from any value higher than zero seconds in addition to intrinsic sensor response time (0.2s) (via digital communication).

Configuration
By digital communication (HART® protocol) using the Configuration Interface CONF301 or the Hart Pocket Configurator HPC301. Can be done partially, through local adjustment.

Performance Specifications

Reference conditions: range starting at zero, temperature 25 °C (77 °F), atmospheric pressure, power supply of 24 Vdc, silicone oil fill fluid, isolating diaphragms in 316L SS and digital trim equal to lower and upper range values.

Accuracy
0.1 URL ≤ span ≤ URL:
±0.075% of span;
0.025 URL ≤ span ≤ 0.1 URL:
±0.0375 [1+0.1 URL/span]% of span;
0.0085 URL ≤ span ≤ 0.025 URL:
±[0.0015+0.00465 URL/span]% of span (*).

(*) - Recommended minimum span for Range 1 is 0.025 URL.

For ranges 5 and 6, Absolute models, diaphragms in Tantalum, Monel or fill fluid in Fluorolube:
0.1 URL ≤ span ≤ URL:
± 0.1% of span;
0.025 URL ≤ span ≤ 0.1 URL:
±0.05 [1+0.1 URL/span]% of span;
0.0085 URL ≤ span ≤ 0.025 URL:
±[0.01+0.006 URL/span]% of span.

For Absolute - range 1:
± 0.2% of span
Linearity, hysteresis and repeatability effects are included.

Stability
± 0.1% of URL for 24 months for ranges 2, 3, 4, 5 & 6.
± 0.2% of URL for 12 months for range 1 & L models.
± 0.25% of URL for 5 years, at 20 °C temperature change and up to 7 MPa (1000 psi) of static pressure.

Temperature Effect
± (0.02% URL+0.1% span) per 20 °C (36 °F) for ranges 2, 3, 4, 5 & 6.
± (0.05% URL+0.15% span) per 20 °C (36 °F) for range 1.

For LD301L:
6 mmH_2O per 20 °C for 4" and DN100.
17 mmH_2O per 20 °C for 3" and DN80.
Consult for other flange dimensions and fill fluid.

Static Pressure Effect
Zero error:
± 0.1% URL per 7 MPa (1000 psi) for ranges 2, 3, 4 & 5, or 3.5 MPa (500 psi) for L models or 1.7 MPa (250 psi) for range 1. This is a systematic error that can be eliminated by calibrating at the operating static pressure.
Span error:
Correctable to ± 0.2% of reading per 7 MPa (1000 psi) for ranges 2, 3, 4 & 5 or 3.5 MPa (500 psi) for range 1 and L models.

Power Supply Effect
± 0.005% of calibrated span per volt.

Mounting Position Effect
Zero shift of up to 250 Pa (1 inH_2O) which can be calibrated out. No span effect.

Electro-Magnetic Interference Effect
Designed to comply with IEC 61000-6-2:1999, IEC 61000-6-4: 1997, IEC 61326: 2000.

Vibration Effects
Designed according to SAMA PMC 31.1 standard

Physical Specifications

Electrical Connection
½ - 14 NPT, Pg 13,5 or M20 x 1,5 metric.

Process Connection
¼ - 18 NPT or ½ -14 NPT (with adapter). For L models see ordering code.

Wetted Parts
- **Isolating Diaphragms**
  316L SST, Hastelloy C276, Monel 400 or Tantalum.
- **Drain/Vent Valves and Plug**
  316 SST, Hastelloy C276 or Monel 400.
- **Flanges**
  Plated carbon steel, 316 SST, Hastelloy C276 or Monel 400.
- **Wetted O-Rings (For Flanges and Adapters)**
  Buna N, Viton™ or PTFE. Ethylene-Propylene on request.

  The LD301 is available in NACE MR-01-75 compliant materials.

Nonwetted Parts
- **Electronic Housing**
  Injected aluminum with polyester painting or 316 SST (NEMA 4X, IP67).
- **Blank Flange**
  Plated carbon steel, when the wetted flange is made of this same material, and 316 SST in the other cases.
- **Level Flange (LD301L)**
  316 SST.
- **Fill Fluid**
  Silicone or Fluorolube Oil.
- **Cover O-Rings**
  Buna N.
- **Mounting Bracket**
  Plated carbon steel with polyester painting or 316 SST. Accessories (bold, nuts, washers and U-clamps) in carbon steel or 316 SST.
- **Flange Bolts and Nuts**
  Plated carbon steel:
  Grade 7, 316 SST or Carbon Steel B7M (for nace applications).
- **Identification Plate**
  316 SST.

Mounting
a) Flange mounted for models LD301L.
b) Optional universal mounting bracket for surface or vertical/horizontal (DN 50) 2"-pipe (optional).
c) Via bracket on manifold valve (optional).
d) Directly on piping for closely coupled transmitter/orifice flange combinations.

Approximate Weights
3.15 kg (7 lb): all models, except L models.
5.85 to 9.0 kg (13 lb to 20 lb): L models depending on the flanges, extension and materials.

Control Characteristics (optional)
PID
Proportional Gain: 0 to 100.
Integral Time: 0.01 to 999 min/rep.
Derivative Time: 0 to 999 s.
Direct / Reverse Action.
Lower and Upper output limits.
Output rate-of-change limit: 0 to 100%/s.
Power-on safety output.
Antireset windup.
Bumpless Auto/Manual transfer.
16 point table for PID input and output, freely user configurable.

The LD301 coordinates all systems through pressure controlling devices. Once the ideal biogas pressure is present, the ignition system is activated and monitoring information recorded (regarding biogas flow, temperature and temperature of the flaring process).

Calibration

LD301 Smart Pressure Transmitter Series are built and calibrated in accordance with INMETRO. Conformity tests were made by the Centre of Electrical Energy Research, organization that is accredited by INMETRO for such testing. Certificates of Conformity are annexed to this document. Testing and certification will be executed during the crediting period to ensure proper operation of LD301 Transmitters.

EXHAUST GAS TEMPERATURE SENSOR

Exhaust gas temperature will be measured by Type K sensors are built and calibrated according to ASTM standard ASTM-E 230/77. These sensors have a temperature range of 0 to 1 100ºC. Sensors will be regulated to operate with maximal temperature of 600 to 700ºC.

The sensor provides +- 2.2 ºC accuracy in temperature reading. The sensors are connected to the DATA-LOGGER, which records readings on an hourly basis, on Celsius degrees. These sensors do not need to be recalibrated. Sensors will be replaced as needed.

BIBLIOGRAPHY

The following references were used to determine the information described in this PDD:

- 2006 IPCC Guidelines for National GHG Inventories, Chapter 10;
- Approved methodology ACM0010, version 3, equation (2);
- Approved small-scale methodology AMS.III.D., version 13;
- First Brazilian Inventory on GHG Anthropogenic Emissions – Support Report – Agriculture and Animal Husbandry;
- Methodological Tool to determine project emissions from flaring gases containing methane;
- Technological Inventory of EMBRAPA for Swine Manure Management Systems, pages 17 and 29 to 37