



# **CAIEIRAS LANDFILL GAS EMISSION REDUCTION**

## **ESSENCIS SOLUÇÕES AMBIENTAIS SA**

CTR CAIEIRAS – SP BRAZIL

REFERENCE NUMBER: 0171  
Version 1

Crediting Period:  
March, 31<sup>st</sup> 2006 to March 30<sup>th</sup> 2013

Monitoring Period:  
March, 31<sup>st</sup> 2006 to October, 31<sup>st</sup> 2007

November/2007

## **INDEX**

INDEX.....	2
GLOSSARY OF TERMS .....	3
INTRODUCTION .....	4
OBJECTIVE.....	4
GENERAL DESCRIPTION OF THE PROJECT .....	4
Project Participants:.....	4
Project location / general data: .....	4
BASELINE AND MONITORING METHODOLOGY .....	5
CER VOLUME REQUIRED .....	9
Calculation MEMO:.....	9
SUSTAINABLE DEVELOPMENT MEMO.....	9
COMMENT .....	10
ANNEX .....	11

## ***GLOSSARY OF TERMS***

AM	Approved Methodology
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CF	Conversion Factor
CH <sub>4</sub>	Methane
CLP	Logical programmed control
CNTP	Standard Temperature and Pressure Condition
CO <sub>2</sub>	Carbon dioxide
CTRC	Caieiras Landfill
DNV	Det Norske Veritas
ER	Emission Reduction
ERM	Environment Resources Management Ltd.
GHG	Greenhouse Gases
GWP	Global Warming Potential
LFG	Landfill Gas
MVP	Monitoring and Verification Protocol
Nm <sup>3</sup>	Normal cubic meters
O <sub>2</sub>	Oxygen
P	Pressure
PDD	Project Design Document
PTO	Operational Procedure
RSD	Household solid waste
SD	Sustainable Development
SGS	Société Generale de Surveillance
TCO <sub>2e</sub>	Tonne of Carbon Dioxide Equivalent

## ***INTRODUCTION***

ESSENCIS SOLUÇÕES AMBIENTAIS SA is located in Bandeirantes highway, Km 33, Caieiras, São Paulo, Brazil and implanted the LANDFILL GAS EMISSIONS REDUCTION in the CTR Caieiras (CTRC) according to Project Design Document version 3 of September 2005. The project was properly validated in December/2004 (as by the validation report DNV No. 2005-458 ver.4 of May 1st, 2005), approved by the Brazilian Government on August 24<sup>th</sup>, 2005 and registered at Executive Board at March 9<sup>th</sup>, 2006. The crediting period is 21 years.

The biogas system has been inserted in the ESSENCIS ISO 9001 systems in May 30<sup>th</sup>. The company is certified ISO 14001 since Jun 16<sup>th</sup>, 2006. The certification scope from the Biogas management activity was audited and approved by BSI.

## ***OBJECTIVE***

The purpose of this report is to quantify the volume performed of Greenhouse Gas Emission Reductions (ER), in tones of carbon dioxide equivalent from March 31<sup>st</sup> of 2006 to October 31<sup>st</sup> of 2007 to be certified by the Designated Operational Entity as per The Kyoto Protocol and CDM Modalities Procedures requirements (Decision 17.CP7).

## ***GENERAL DESCRIPTION OF THE PROJECT***

The project activity in question is located inside the CTR Caieiras, and consists of the capture of methane produced by waste decomposition and its complete destruction by combustion at high temperatures.

### **Project Participants:**

Project operator: ESSENCIS SOLUÇÕES AMBIENTAIS S.A.  
BRAZIL, (project developer)

Annex 1 Party: JPOWER DEVELOPMENT CO. LTD. - JAPAN

### **Project location / general data:**

The CTR Caieiras is located on the extreme northeast of Caieiras municipality, on the Metropolitan Area of São Paulo (RMSP).

## BASELINE AND MONITORING METHODOLOGY

Approved consolidated monitoring methodology ACM0001 version 2: “Consolidated monitoring methodology for landfill gas project activities”.

*This methodology is applicable to landfill gas capture project activities where the baseline is the partial or total atmospheric release of the gas and the project activities include situations such as:*

*a) the captured gas is flared”*

The items b and c are not applicable to Caieiras landfill gas emission reduction project and then will not be mentioned in this PDD.

The electricity generation from biogas was not contemplated by the project for this period. The electricity used to pump biogas (potential leakage) is from the grid, hydro power source predominant in the region.

Methane collected and flared:

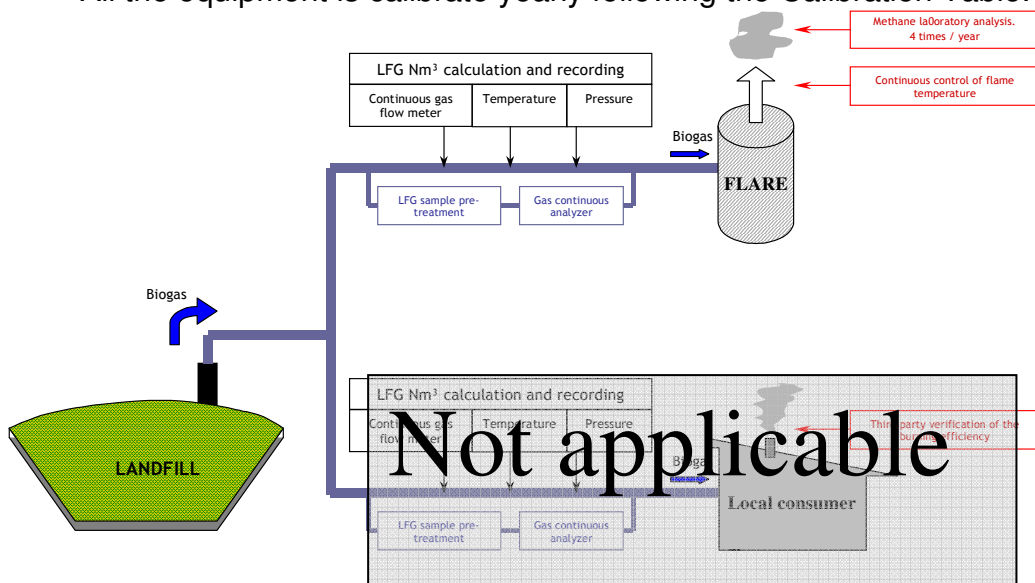
The amount of methane actually flared ( $MD_{\text{flared},y}$ ) will be determined by monitoring, as follows:

- Amount of landfill gas collected ( $LFG_y$ ) in  $m^3$ , using a continuous flow meter;
- Percentage of landfill gas that is methane ( $w_{CH_4y}$ ) in %, using a continuous analyzer;

In addition, the methane content of the flare emissions will be analyzed at least quarterly to determine the flare efficiency (FE), the fraction of methane destroyed.

And also, regarding quality procedures:

- The equipment to measure the biogas flow must be appropriated to the local climate conditions and to any contaminant that might exist in the biogas;
- All the equipment is calibrate yearly following the Calibration Table.



**Data collected in order to monitor emissions from the project activity, and how this data will be archived:**

<b>ID number</b>	<b>Data variable</b>	<b>Source of data</b>	<b>Data unit</b>	<b>Measured (m), calculated (c), estimated (e),</b>	<b>Recording frequency</b>	<b>Proportion of data to be monitored</b>	<b>How will the data be archived? (electronic/ paper)</b>	<b>Comment</b>
1	LFG <sub>total,y</sub>	Total amount of landfill gas captured and flared	[m <sup>3</sup> ]	m and c	Continuous/ periodic	100%	electronic	Measured by a flow meter. For this period, 100% of gas measured is flared. Data aggregate monthly and yearly. The register is each 10 seconds.
2	LFG <sub>flare,y</sub>	Amount of landfill gas flared	[m <sup>3</sup> ]	m and c	Continuous	100%	electronic	Measured by continuous gas quality analyzer and flow meter, or complementary method ( % CH <sub>4</sub> , Sm <sup>3</sup> /h of LFG, LFG temperature and pressure, flare temperature, flare working hours)
3	LFG <sub>electricity,y</sub>	Amount of landfill gas going into electricity generator	[m <sup>3</sup> ]	m and c	Continuous	100%	electronic	Not Applicable. The project didn't generate electricity in the requested period.

4	FE	Flare combustion/ efficiency determined by the operation hours (1) and the methane content in the exhaust gas (2)	%	m and c	Quarterly and continually	N/a	electronic	(1) Periodic measurement of methane content of flare exhaust gas. (2) Continuous measurement of operation time of flare (e.g. with temperature)
5	W <sub>CH<sub>4</sub></sub>	Methane fraction in the landfill gas	%	m and c	Continuous	100%	electronic	Measured by continuous gas quality analyzer
6	T	Temperature of the landfill gas	[°C]	m	Continuous / periodic	100%	electronic	Measured to convert the flow from m <sup>3</sup> to Nm <sup>3</sup>
7	P	Pressure of the landfill gas	[Pa]	m	Continuous / periodic	100%	electronic	Measured to convert the flow from m <sup>3</sup> to Nm <sup>3</sup>
8	Energy	Total amount of electricity and/or other energy carriers used in the project for gas pumping and heat transport (not derived from de gas)	[MWh]	m	Continuous	100%	electronic	Required to determine CO <sub>2</sub> emissions from use of electricity or other energy carriers to operate the project activity
9	CO <sub>2</sub> emission	CO <sub>2</sub> emission intensity of the electricity and/or other energy carriers in ID 3.9	[m <sup>3</sup> ]	m	Annually	100%	electronic	Required to determine CO <sub>2</sub> emissions from use of electricity or other energy carriers to operate the project activity

10	HE	Regulatory requirements relating to landfill gas projects	Test	n/a	Annually	100%	electronic	Required for any changes to the adjustment factor (AF) or directly MDreg,y
11	MDindustry,y	Amount of methane sold to industry	[m <sup>3</sup> ]	m	Continuous	100%	Electronic and invoice	Not Applicable. The project didn't sell methane to industry in this period.



## CER VOLUME REQUIRED

The CER volume required for 2007 is **102.984 tons**.

### Calculation MEMO:

The supervisor system calculates the methane flow in Nm<sup>3</sup>/h according to the monitoring plan (annex 4 PDD).

$$ER = Q_{CH_4} \times \text{Density}_{\text{biogas}} \times \text{Global Warming Potential of Methane} \times \text{Baseline factor} \times \text{Methane efficiency destruction factor}$$

$$ER = (1.579.796,35 \times 0,0007168 \times 21 \times 0,8 \times 0,90) + (7.140.983,35 \times 0,0007168 \times 21 \times 0,8 \times 0,999648)$$

**Q<sub>CH<sub>4</sub></sub>** = 1.579.796,35 Total Methane Flow (Nm<sup>3</sup>) (from February 1<sup>st</sup> to April 30<sup>th</sup>)

**Q<sub>CH<sub>4</sub></sub>** = 7.140.983,92 Total Methane Flow (Nm<sup>3</sup>) (from May 1<sup>st</sup> to October 31<sup>th</sup>)

**Density<sub>biogas</sub>** = 0,0007168 t/Nm<sup>3</sup>;

**Global Warming Potential of Methane** = 21t CO<sub>2</sub>e/tCH<sub>4</sub>;

**Baseline factor** = 0,8;

**Methane efficiency destruction factor** = 0,999648

(The values which the burn temperature was bellow 500 °C had not been considered. For values above 500 °C we used the lower efficiency of burned in the last 3 tests. For temperatures between 500°C and 629°C that happens in the first 3 months, the default value for methane destruction bellow were used);

**Default value for the methane destruction efficiency** = 0,90

**Emission Factor of the S-SE-CO Brazilian Grid (EF)** = 0,2677 tCO<sub>2</sub>e/MWh;

**Emission factor from the LGP (EF<sub>LGP</sub>)** = 3 tCO<sub>2</sub>e/t GLP;

TOTAL ER in 2007 w/o leakage:	TCO <sub>2</sub> e	103.085
Leakage – Electric energy (361 MWh)	TCO <sub>2</sub> e	-97
Leakage – Butane/Propane (1,35 t)	TCO <sub>2</sub> e	-4

<b>TOTAL CER in 2007</b>	<b>TCO<sub>2</sub>e</b>	<b>102.984</b>
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## SUSTAINABLE DEVELOPMENT MEMO

Investments in sustainable development project will be executed with allocated amount of 2% of value from net proceeds from CER sales.

As there has not been any CER production issued yet, most investments could be scheduled for the subsequent reference year. But ESSENCIS has a social responsibility and allocated investments to a Health Social Post

The total invested until the present date is R\$ 166.368,91, that represent much more than 2% and will be accumulate to the next years.

The surrounding area gets a benefit of odours emissions reductions.

The municipal local community improve the economy employing 5 local people and others local subcontracts.

The project produces technology and research in the geotechnical landfill area and energy.

Students that visit constantly the landfill are followed by engineers from landfill and from biogas collection system.

#### **Professionals in charge:**

Luzia Galdeano -	Operacional Manager
Fernando Freitas -	Operacional Supervisor
Mark Zulauf -	Technical Consultant

#### **COMMENT**

\*1) The measure of methane concentration in the landfill gas flared is continuous by the gas analyzer and the register is electronic and made of 10 in 10 seconds in "IMP 403 – Dados Registrador Isodoc", according to the methodology and Section D 2.2.1, item 3.6 of PDD.

\*2) From March, 31<sup>st</sup> 2006 to January, 31<sup>st</sup> 2007 were not monitored because there was a delay in the project implantation.

## ***ANNEX***


Example of the electronic CER report registration that is made each 10 seconds "IMP 403 – Dados Registrador Isodoc"

	<b>DADOS DO REGISTRADOR</b>	<b>Unidade:</b> CTR Caieiras <b>Data:</b> 30/1/2007 <b>Folha:</b> 01 de 01
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Densidade CH4	0,7168	kg/m3
Eficiência Flare	0,995 (valor estimado)	
GLP		
Energia Elétrica		
Fator LB	0,8	

Hora Registro	FT-01	PT-02	%CH4	TT-02	TT-11	Massa Metano Unitária (10 seg.)	Massa Metano Acumulada	CER Bruto Acumulado	CER Líquido Acumulado
10 em 10 seg.	m3/h	mBar	%	°C	°C	kg	kg	ton	ton
26/10/2007 17:25	5436,6	16,7	41,8	46,8	921,1	4,23	6083618,84	127755,9957	101.693,7726
26/10/2007 17:25	5436,7	16,8	41,8	46,7	920,2	4,23	6083623,07	127756,0846	101.693,8433
26/10/2007 17:25	5410,1	16,8	41,8	46,7	919,7	4,21	6083627,28	127756,1730	101.693,9137
26/10/2007 17:25	5417,6	16,6	41,9	46,7	919,2	4,23	6083631,51	127756,2617	101.693,9843
26/10/2007 17:25	5416,6	16,8	41,9	46,7	918,6	4,23	6083635,73	127756,3504	101.694,0549
26/10/2007 17:25	5426,6	16,7	41,9	46,7	918,5	4,23	6083639,97	127756,4393	101.694,1257
26/10/2007 17:26	5424,6	16,7	41,9	46,7	918,2	4,23	6083644,20	127756,5282	101.694,1964
26/10/2007 17:26	5418,1	16,5	41,9	46,7	917,6	4,23	6083648,42	127756,6169	101.694,2670
26/10/2007 17:26	5419	16,8	41,9	46,7	917,8	4,23	6083652,65	127756,7056	101.694,3377
26/10/2007 17:26	5409,9	16,6	41,9	46,7	919,5	4,22	6083656,87	127756,7942	101.694,4082
26/10/2007 17:26	5398	16,7	41,9	46,7	920,2	4,21	6083661,08	127756,8827	101.694,4786
26/10/2007 17:26	5413,3	16,8	41,9	46,7	920,2	4,22	6083665,30	127756,9713	101.694,5492
26/10/2007 17:27	5421,5	16,7	41,9	46,7	920,4	4,23	6083669,53	127757,0601	101.694,6199
26/10/2007 17:27	5426,7	16,6	41,9	46,7	919,8	4,23	6083673,76	127757,1490	101.694,6906
26/10/2007 17:27	5416,4	16,7	41,9	46,7	919,3	4,22	6083677,99	127757,2377	101.694,7612
26/10/2007 17:27	5419,4	16,6	41,9	46,7	918,3	4,23	6083682,21	127757,3265	101.694,8319
26/10/2007 17:27	5432,1	16,7	41,9	46,7	919,2	4,24	6083686,45	127757,4154	101.694,9027
26/10/2007 17:27	5434,4	16,8	41,9	46,7	920,3	4,24	6083690,69	127757,5045	101.694,9736
26/10/2007 17:28	5423,4	16,7	41,9	46,7	918,4	4,23	6083694,92	127757,5933	101.695,0443
26/10/2007 17:28	5423,1	16,7	41,9	46,6	919,3	4,23	6083699,15	127757,6821	101.695,1150
26/10/2007 17:28	5415,3	16,7	41,9	46,6	918,7	4,22	6083703,37	127757,7709	101.695,1856
26/10/2007 17:28	5421,4	16,7	41,9	46,6	919,4	4,23	6083707,60	127757,8597	101.695,2563
26/10/2007 17:28	5400,3	16,7	41,9	46,6	919,3	4,21	6083711,82	127757,9482	101.695,3267
26/10/2007 17:28	5406,8	16,7	41,9	46,6	919,3	4,22	6083716,04	127758,0368	101.695,3973
26/10/2007 17:29	5401,6	16,8	41,9	46,6	917,7	4,21	6083720,25	127758,1253	101.695,4677
26/10/2007 17:29	5404,4	16,6	41,9	46,6	918,1	4,22	6083724,47	127758,2138	101.695,5382
26/10/2007 17:29	5404,2	16,7	41,9	46,6	918,7	4,22	6083728,68	127758,3023	101.695,6087
26/10/2007 17:29	5405	16,7	42	46,6	917,6	4,23	6083732,91	127758,3911	101.695,6793
26/10/2007 17:29	5408,4	16,7	42	46,6	917,7	4,23	6083737,14	127758,4799	101.695,7500
26/10/2007 17:29	5415,7	16,8	42	46,6	920,2	4,24	6083741,38	127758,5689	101.695,8208
26/10/2007 17:30	5405,8	16,7	42	46,6	920	4,23	6083745,60	127758,6577	101.695,8915
26/10/2007 17:30	5409,7	16,7	42	46,6	922,5	4,23	6083749,83	127758,7465	101.695,9622
26/10/2007 17:30	5408,9	16,7	42	46,6	920,3	4,23	6083754,06	127758,8353	101.696,0329

## TABLE SUMMARY (\*2)

			TABLE SUMMARY							
ACCUMULATED			total volume of treat methane	Methane flow	Biogas total collected	Methane total collected	Average methane concentration (*1)	Consumption of energy	LGP consumption	Social workmanships
Date	Accumulated Methane Mass (Flow x Density)	Accumulated Methane Flow								
	Kg	Nm3	Nm3/day	Nm3/h	Nm3	Nm3	%	Kw/h	Kg	R\$
1/2/2007 17:12	0,00	0,00	0,00	-						
2/2/2007 19:08	0,00	0,00	0,00	-						
3/2/2007 13:55	30,31	42,28	42,28	1,76						
4/2/2007 17:30	0,00	0,00	0,00	-						
5/2/2007 17:30	0,00	0,00	0,00	-						
6/2/2007 09:33	220,80	308,03	265,75	11,07						
7/2/2007 22:40	574,67	801,71	493,68	20,57						
8/2/2007 17:26	1.128,61	1.574,52	772,80	32,20						
9/2/2007 17:31	12.695,46	17.711,31	16.136,79	672,37						
10/2/2007 17:30	25.147,85	35.083,50	17.372,20	723,84						
11/2/2007 17:30	40.093,08	55.933,43	20.849,92	868,75						
12/2/2007 17:30	46.091,48	64.301,73	8.368,30	348,68						
13/2/2007 17:30	60.810,55	84.836,15	20.534,42	855,60						
14/2/2007 17:30	69.881,19	97.490,50	12.654,35	527,26	1.112.682	224.824	20%	10.429	720	
15/2/2007 17:52	78.545,91	109.578,56	12.088,06	503,67						
16/2/2007 05:38	0,00	0,00	0,00	-						
17/2/2007 00:00	0,00	0,00	0,00	-						
18/2/2007 00:00	0,00	0,00	0,00	-						
19/2/2007 17:30	79.739,35	111.243,52	1.664,95	69,37						
20/2/2007 17:30	82.406,86	114.964,92	3.721,41	155,06						
21/2/2007 17:30	88.674,73	123.709,16	8.744,24	364,34						
22/2/2007 17:30	91.143,95	127.153,95	3.444,79	143,53						
23/2/2007 17:36	104.189,67	145.353,90	18.199,95	758,33						
24/2/2007 17:30	112.802,20	157.369,15	12.015,25	500,64						
25/2/2007 17:30	125.788,18	175.485,74	18.116,59	754,86						
26/2/2007 17:38	140.107,57	195.462,58	19.976,84	832,37						
27/2/2007 17:30	153.150,59	213.658,75	18.196,17	758,17						
28/2/2007 17:48	161.154,08	224.824,33	11.165,58	465,23						
1/3/2007 17:30	173.021,04	241.379,80	16.555,47	689,81						
2/3/2007 17:33	182.766,20	254.975,17	13.595,37	566,47						
3/3/2007 17:30	195.721,74	273.049,31	18.074,14	753,09						
4/3/2007 17:58	205.758,48	287.051,46	14.002,15	583,42						
5/3/2007 18:12	215.451,90	300.574,64	13.523,19	563,47						
6/3/2007 17:49	223.580,20	311.914,35	11.339,70	472,49						
7/3/2007 17:30	233.646,45	325.957,65	14.043,31	585,14						
8/3/2007 17:37	238.362,43	332.536,88	6.579,22	274,13						
9/3/2007 17:30	252.466,76	352.213,67	19.676,79	819,87						
10/3/2007 17:30	271.242,61	378.407,66	26.193,99	1.091,42						
11/3/2007 17:30	286.704,21	399.977,97	21.570,32	898,76						
12/3/2007 17:30	302.814,61	422.453,41	22.475,44	936,48						
13/3/2007 17:30	320.741,72	447.463,34	25.009,93	1.042,08						
14/3/2007 18:04	336.995,31	470.138,55	22.675,21	944,80						
15/3/2007 17:48	353.177,18	492.713,70	22.575,15	940,63						
16/3/2007 20:12	364.855,97	509.006,66	16.292,96	678,87	1.952.650	672.442	34%	12.034	135	
17/3/2007 17:30	379.838,22	529.908,24	20.901,58	870,90						
18/3/2007 17:30	397.760,71	554.911,71	25.003,47	1.041,81						
19/3/2007 17:30	418.127,48	583.325,17	28.413,47	1.183,89						
20/3/2007 17:30	438.623,26	611.918,62	28.593,44	1.191,39						
21/3/2007 17:30	457.704,82	638.539,09	26.620,48	1.109,19						
22/3/2007 17:30	477.775,71	666.539,78	28.000,69	1.166,70						
23/3/2007 17:43	497.236,58	693.689,42	27.149,64	1.131,24						
24/3/2007 17:30	516.435,04	720.472,99	26.783,56	1.115,98						
25/3/2007 17:30	538.251,25	750.908,55	30.435,56	1.268,15						
26/3/2007 17:30	557.939,50	778.375,42	27.466,87	1.144,45						
27/3/2007 17:30	573.403,66	799.949,30	21.573,88	898,91						
28/3/2007 19:07	585.981,52	817.496,54	17.547,24	731,14						
29/3/2007 17:30	603.536,24	841.986,95	24.490,41	1.020,43						
30/3/2007 17:30	621.576,99	867.155,40	25.168,45	1.048,69						
31/3/2007 17:30	643.160,61	897.266,47	30.111,07	1.254,63						
1/4/2007 17:30	663.595,98	925.775,64	28.509,16	1.187,88						
2/4/2007 17:30	681.864,07	951.261,25	25.485,62	1.061,90						
3/4/2007 17:30	701.876,38	979.180,21	27.918,96	1.163,29						
4/4/2007 17:30	720.373,63	1.004.985,53	25.805,31	1.075,22						
5/4/2007 17:30	739.902,96	1.032.230,69	27.245,16	1.135,21						
6/4/2007 17:30	759.326,20	1.059.327,84	27.097,16	1.129,05						
7/4/2007 17:30	776.514,28	1.083.306,75	23.978,91	999,12						
8/4/2007 17:30	796.778,95	1.111.577,78	28.271,03	1.177,96						
9/4/2007 17:30	815.460,39	1.137.640,05	26.062,27	1.085,93						
10/4/2007 17:30	832.854,68	1.161.906,65	24.266,60	1.011,11						
11/4/2007 17:30	849.143,28	1.184.630,69	22.724,05	946,84						
12/4/2007 17:30	865.783,05	1.207.844,65	23.213,96	967,25						
13/4/2007 17:30	884.405,24	1.233.824,27	25.979,62	1.082,48						
14/4/2007 17:30	901.637,46	1.257.864,77	24.040,50	1.001,69						
15/4/2007 17:30	917.634,62	1.280.182,23	22.317,46	929,89						
16/4/2007 17:30	935.250,70	1.304.758,23	24.576,01	1.024,00	2.166.143	682.530	32%	26.091		
17/4/2007 17:30	949.794,81	1.325.048,56	20.290,33	845,43						
18/4/2007 17:30	963.095,99	1.343.604,90	18.556,34	773,18						
19/4/2007 17:54	973.641,39	1.358.316,67	14.711,77	612,99						
20/4/2007 17:30	983.623,22	1.372.242,21	13.925,54	580,23						
21/4/2007 17:30	995.241,40	1.388.450,62	16.208,41	675,35						
22/4/2007 17:30	1.008.307,25	1.406.678,65	18.228,03	759,50						
23/4/2007 17:30	1.022.108,31	1.425.932,35	19.253,70	802,24						
24/4/2007 17:30	1.035.660,27	1.444.838,54	18.906,20	787,76						
25/4/2007 17:30	1.051.099,52	1.466.377,68	21.539,14	897,46						
26/4/2007 17:30	1.064.532,66	1.485.118,10	18.740,42	780,85						
27/4/2007 17:30	1.076.533,61	1.501.860,50	16.742,40	697,60						
28/4/2007 17:30	1.087.237,80	1.516.793,81	14.933,31	622,22						
29/4/2007 17:30	1.109.179,90	1.547.404,99	30.611,18	1.275,47						
30/4/2007 17:30	1.132.398,02	1.579.796,35	32.391,36	1.349,64						

ACCUMULATED			total volume of treat methane	Methane flow	Biogas total collected	Methane total collected	Average methane concentration (*1)	Consumption of energy	LGP consumption	Social workmanships
Date	Accumulated Methane Mass (Flow x Density)	Accumulated Methane Flow								
	Kg	Nm3	Nm3/day	Nm3/h	Nm3	Nm3	%	Kw/h	Kg	R\$
1/5/2007 17:30	1.152.858,17	1.608.340,08	28.543,73	1.189,32						
2/5/2007 17:30	1.174.432,36	1.638.438,00	30.097,92	1.254,08						
3/5/2007 17:30	1.196.690,26	1.669.489,75	31.051,75	1.293,82						
4/5/2007 17:30	1.216.353,60	1.696.921,88	27.432,12	1.143,01						
5/5/2007 17:30	1.236.694,68	1.725.299,49	28.377,62	1.182,40						
6/5/2007 17:30	1.256.433,25	1.752.836,56	27.537,07	1.147,38						
7/5/2007 17:30	1.275.003,33	1.778.743,48	25.906,92	1.079,46						
8/5/2007 17:30	1.295.334,12	1.807.106,75	28.363,27	1.181,80						
9/5/2007 17:30	1.311.153,32	1.829.175,95	22.069,19	919,55						
10/5/2007 17:30	1.331.449,01	1.857.490,25	28.314,30	1.179,76						
11/5/2007 17:30	1.349.439,21	1.882.588,19	25.097,94	1.045,75						
12/5/2007 17:30	1.368.776,56	1.909.565,52	26.977,33	1.124,06						
13/5/2007 17:30	1.387.608,52	1.935.837,78	26.272,26	1.094,68						
14/5/2007 17:30	1.407.430,82	1.963.491,66	27.653,88	1.152,24						
15/5/2007 17:30	1.427.752,70	1.991.842,50	28.350,84	1.181,29						
16/5/2007 17:30	1.446.057,55	2.017.379,39	25.536,90	1.064,04	2.315.309	860.432	37%	33.363	180	45.187,06
17/5/2007 17:30	1.465.491,89	2.044.492,03	27.112,64	1.129,69						
18/5/2007 17:30	1.485.715,90	2.072.706,34	28.214,30	1.175,60						
19/5/2007 17:30	1.505.252,88	2.099.962,17	27.255,83	1.135,66						
20/5/2007 17:30	1.525.831,65	2.128.671,39	28.709,22	1.196,22						
21/5/2007 17:30	1.546.158,91	2.157.029,73	28.358,34	1.181,60						
22/5/2007 17:30	1.566.809,96	2.185.839,79	28.810,05	1.200,42						
23/5/2007 17:30	1.587.801,03	2.215.124,20	29.284,41	1.220,18						
24/5/2007 17:30	1.607.912,02	2.243.180,83	28.056,63	1.169,03						
25/5/2007 17:30	1.628.055,89	2.271.283,33	28.102,50	1.170,94						
26/5/2007 17:30	1.648.611,47	2.299.960,20	28.676,87	1.194,87						
27/5/2007 17:30	1.669.544,52	2.329.163,67	29.203,48	1.216,81						
28/5/2007 17:30	1.690.149,92	2.357.910,05	28.746,37	1.197,77						
29/5/2007 17:30	1.710.223,22	2.385.914,09	28.004,05	1.166,84						
30/5/2007 17:30	1.729.672,05	2.413.046,95	27.132,86	1.130,54						
31/5/2007 17:30	1.749.155,54	2.440.228,16	27.181,21	1.132,55						
1/6/2007 17:30	1.770.478,52	2.469.975,61	29.747,45	1.239,48						
2/6/2007 17:30	1.792.855,53	2.501.193,54	31.217,93	1.300,75						
3/6/2007 17:30	1.812.110,32	2.528.055,69	26.862,15	1.119,26						
4/6/2007 17:30	1.833.307,82	2.557.628,10	29.572,41	1.232,18						
5/6/2007 17:30	1.855.419,45	2.588.475,79	30.847,69	1.285,32						
6/6/2007 17:30	1.876.800,16	2.618.303,79	29.828,00	1.242,83						
7/6/2007 17:30	1.898.771,55	2.648.955,85	30.652,06	1.277,17						
8/6/2007 17:30	1.921.870,55	2.681.181,02	32.225,17	1.342,72						
9/6/2007 17:30	1.944.589,20	2.712.875,57	31.694,55	1.320,61						
10/6/2007 17:30	1.966.685,57	2.743.701,97	30.826,40	1.284,43						
11/6/2007 17:30	1.988.420,40	2.774.024,00	30.322,04	1.263,42						
12/6/2007 17:30	2.009.702,81	2.803.714,86	29.690,86	1.237,12						
13/6/2007 17:30	2.031.516,04	2.834.146,26	30.431,40	1.267,97						
14/6/2007 17:30	2.052.351,61	2.863.213,74	29.067,49	1.211,15						
15/6/2007 17:30	2.072.572,28	2.891.423,38	28.209,63	1.175,40	2.483.648	903.006	36%	24.070		
16/6/2007 17:30	2.092.666,70	2.919.456,90	28.033,52	1.168,06						
17/6/2007 17:30	2.112.835,18	2.947.593,72	28.136,83	1.172,37						
18/6/2007 17:30	2.132.996,85	2.975.721,05	28.127,33	1.171,97						
19/6/2007 17:30	2.154.070,26	3.005.120,34	29.399,29	1.224,97						
20/6/2007 17:30	2.175.525,79	3.035.052,72	29.932,37	1.247,18						
21/6/2007 17:30	2.195.330,63	3.062.682,23	27.629,52	1.151,23						
22/6/2007 17:30	2.214.568,14	3.089.520,29	26.838,06	1.118,25						
23/6/2007 17:30	2.234.599,50	3.117.465,81	27.945,52	1.164,40						
24/6/2007 17:30	2.255.403,18	3.146.488,81	29.023,00	1.209,29						
25/6/2007 17:30	2.274.870,35	3.173.647,25	27.158,43	1.131,60						
26/6/2007 17:30	2.298.667,16	3.206.845,93	33.198,68	1.383,28						
27/6/2007 17:30	2.322.943,16	3.240.713,12	33.867,19	1.411,13						
28/6/2007 17:30	2.348.076,12	3.275.775,84	35.062,73	1.460,95						
29/6/2007 17:30	2.372.616,78	3.310.012,25	34.236,41	1.426,52						
30/6/2007 17:30	2.396.429,96	3.343.233,76	33.221,51	1.384,23						
1/7/2007 17:30	2.421.181,53	3.377.764,40	34.530,64	1.438,78						
2/7/2007 17:30	2.447.100,32	3.413.923,43	36.159,03	1.506,63						
3/7/2007 17:30	2.477.166,20	3.455.868,03	41.944,59	1.747,69						
4/7/2007 17:30	2.508.402,34	3.499.445,23	43.577,20	1.815,72						
5/7/2007 17:30	2.539.564,59	3.542.919,36	43.474,13	1.811,42						
6/7/2007 17:30	2.570.136,20	3.585.569,48	42.650,13	1.777,09						
7/7/2007 17:30	2.601.372,08	3.629.146,31	43.576,83	1.815,70						
8/7/2007 17:30	2.630.460,90	3.669.727,82	40.581,51	1.690,90						
9/7/2007 17:30	2.659.423,80	3.710.133,64	40.405,82	1.683,58						
10/7/2007 17:30	2.688.347,59	3.750.484,92	40.351,27	1.681,30						
11/7/2007 17:30	2.694.629,59	3.759.248,87	8.763,95	365,16						
12/7/2007 17:30	2.722.410,06	3.798.005,10	38.756,23	1.614,84						
13/7/2007 20:09	2.749.640,12	3.835.993,47	37.988,37	1.582,85						
14/7/2007 17:30	2.773.826,74	3.869.735,96	33.742,49	1.405,94						
15/7/2007 17:30	2.804.357,70	3.912.329,38	42.593,42	1.774,73						
16/7/2007 17:30	2.835.908,94	3.956.346,18	44.016,81	1.834,03	3.527.254	1.340.318	38%	33.462		61.765,49
17/7/2007 17:30	2.867.570,26	4.000.516,55	44.170,37	1.840,43						
18/7/2007 17:30	2.897.798,80	4.042.688,06	42.171,51	1.757,15						
19/7/2007 17:30	2.929.563,86	4.087.003,16	44.315,09	1.846,46						
20/7/2007 17:30	2.963.593,29	4.134.477,24	47.474,09	1.978,09						
21/7/2007 17:30	2.998.660,92	4.183.399,73	48.922,48	2.038,44						
22/7/2007 17:30	3.033.227,13	4.231.622,66	48.222,94	2.009,29						
23/7/2007 17:30	3.065.555,38	4.276.723,47	45.100,81	1.879,20						
24/7/2007 17:30	3.101.942,04	4.327.486,10	50.762,63	2.115,11						
25/7/2007 17:30	3.140.470,89	4.381.237,29	53.751,19	2.239,63						
26/7/2007 17:30	3.172.027,72	4.425.261,89	44.024,60	1.834,36						
27/7/2007 17:30	3.208.339,45	4.475.919,99	50.658,10	2.110,75						
28/7/2007 17:30	3.245.221,17	4.527.373,28	51.453,29	2.143,89						
29/7/2007 17:30	3.283.856,68	4.581.273,27	53.899,99	2.245,83						
30/7/2007 17:30	3.320.132,71	4.631.881,57	50.608,30	2.108,68						
31/7/2007 17:30	3.357.170,08	4.683.552,01	51.670,44	2.152,94						

ACCUMULATED			total volume of treat methane	Methane flow	Biogas total collected	Methane total collected	Average methane concentration (*1)	Consumption of energy	LGP consumption	Social workmanships
Date	Accumulated Methane Mass (Flow x Density)	Accumulated Methane Flow								
	Kg	Nm3	Nm3/day	Nm3/h	Nm3	Nm3	%	Kw/h	Kg	R\$
1/8/2007 17:30	3.391.119,60	4.730.914,62	47.362,61	1.973,44						
2/8/2007 17:30	3.426.477,71	4.780.242,34	49.327,71	2.055,32						
3/8/2007 17:30	3.462.162,64	4.830.026,01	49.783,67	2.074,32						
4/8/2007 17:30	3.498.428,16	4.880.619,65	50.593,64	2.108,07						
5/8/2007 17:30	3.534.627,30	4.931.120,68	50.501,03	2.104,21						
6/8/2007 17:30	3.569.970,94	4.980.428,20	49.307,52	2.054,48						
7/8/2007 17:30	3.605.012,24	5.029.313,95	48.885,75	2.036,91						
8/8/2007 17:30	3.639.646,94	5.077.632,45	48.318,50	2.013,27						
9/8/2007 17:30	3.673.426,63	5.124.758,13	47.125,68	1.963,57						
10/8/2007 17:00	3.707.549,16	5.172.362,12	47.603,99	1.983,50						
11/8/2007 17:00	3.743.307,03	5.222.247,53	49.885,42	2.078,56						
12/8/2007 17:00	3.778.245,98	5.270.990,48	48.742,95	2.030,96						
13/8/2007 17:00	3.814.322,22	5.321.320,06	50.329,57	2.097,07						
14/8/2007 17:00	3.848.955,80	5.369.637,00	48.316,95	2.013,21						
15/8/2007 17:00	3.882.295,92	5.416.149,45	46.512,45	1.938,02						
16/8/2007 17:00	3.917.655,44	5.465.479,13	49.329,68	2.055,40	3.746.463	1.509.146	40%	35.095	135	
17/8/2007 17:30	3.954.078,35	5.516.292,34	50.813,22	2.117,22						
18/8/2007 17:30	3.989.113,74	5.565.169,84	48.877,49	2.036,56						
19/8/2007 17:30	4.024.306,81	5.614.267,31	49.097,47	2.045,73						
20/8/2007 17:30	4.059.882,57	5.663.898,68	49.631,37	2.067,97						
21/8/2007 17:30	4.094.886,92	5.712.732,86	48.834,19	2.034,76						
22/8/2007 17:30	4.129.385,66	5.760.861,69	48.128,83	2.005,37						
23/8/2007 17:30	4.162.843,48	5.807.538,34	46.676,65	1.944,86						
24/8/2007 17:30	4.196.565,08	5.854.582,98	47.044,64	1.960,19						
25/8/2007 17:30	4.229.672,63	5.900.770,97	46.187,99	1.924,50						
26/8/2007 17:30	4.263.945,13	5.948.584,17	47.813,20	1.992,22						
27/8/2007 17:30	4.295.946,70	5.993.229,21	44.645,04	1.860,21						
28/8/2007 17:30	4.330.741,24	6.041.770,71	48.541,50	2.022,56						
29/8/2007 17:30	4.366.659,22	6.091.879,49	50.108,78	2.087,87						
30/8/2007 17:30	4.403.283,06	6.142.973,02	51.093,53	2.128,90						
31/8/2007 17:30	4.438.925,88	6.192.697,93	49.724,91	2.071,87						
1/9/2007 17:30	4.475.313,83	6.243.462,38	50.764,45	2.115,19						
2/9/2007 17:30	4.511.902,47	6.294.506,80	51.044,42	2.126,85						
3/9/2007 17:30	4.547.810,89	6.344.602,24	50.095,44	2.087,31						
4/9/2007 17:30	4.581.603,79	6.391.746,36	47.144,12	1.964,34						
5/9/2007 17:30	4.619.247,29	6.444.262,40	52.516,04	2.188,17						
6/9/2007 17:30	4.656.776,91	6.496.619,57	52.357,17	2.181,55						
7/9/2007 17:30	4.694.332,85	6.549.013,46	52.393,89	2.183,08						
8/9/2007 17:30	4.729.206,47	6.597.665,27	48.651,81	2.027,16						
9/9/2007 17:30	4.763.573,63	6.645.610,53	47.945,26	1.997,72						
10/9/2007 17:30	4.798.843,01	6.694.814,47	49.203,94	2.050,16						
11/9/2007 17:30	4.835.470,94	6.745.913,69	51.099,22	2.129,13						
12/9/2007 00:00	0,00	0,00	0,00	-						
13/9/2007 00:00	0,00	0,00	0,00	-						
14/9/2007 18:07	4.860.493,84	6.780.822,87	34.909,18	1.454,55						
15/9/2007 17:30	4.892.876,97	6.826.000,24	45.177,37	1.882,39	2.969.397	1.213.101	41%	44.241		
16/9/2007 00:00	0,00	0,00	0,00	-						
17/9/2007 17:38	4.934.592,99	6.884.197,81	58.197,57	2.424,90						
18/9/2007 17:13	4.963.998,80	6.925.221,55	41.023,73	1.709,32						
19/9/2007 17:30	4.991.398,24	6.963.446,21	38.224,66	1.592,69						
20/9/2007 16:29	5.026.175,99	7.011.964,27	48.518,06	2.021,59						
21/9/2007 17:30	5.054.373,75	7.051.302,67	39.338,40	1.639,10						
22/9/2007 17:30	5.087.861,88	7.098.021,59	46.718,92	1.946,62						
23/9/2007 00:00	0,00	0,00	0,00	-						
24/9/2007 17:30	5.114.904,97	7.135.749,12	37.727,53	1.571,98						
25/9/2007 17:30	5.148.446,73	7.182.542,87	46.793,75	1.949,74						
26/9/2007 17:30	5.180.621,59	7.227.429,67	44.886,80	1.870,28						
27/9/2007 17:30	5.213.732,51	7.273.622,36	46.192,69	1.924,70						
28/9/2007 17:30	5.247.073,30	7.320.135,74	46.513,38	1.938,06						
29/9/2007 17:05	5.280.033,02	7.366.117,50	45.981,76	1.915,91						
30/9/2007 17:30	5.308.476,93	7.405.799,28	39.681,78	1.653,41						
1/10/2007 17:30	5.342.429,49	7.453.166,14	47.366,86	1.973,62						
2/10/2007 17:30	5.375.967,68	7.499.954,92	46.788,77	1.949,53						
3/10/2007 17:30	5.406.967,67	7.543.202,67	43.247,75	1.801,99						
4/10/2007 17:30	5.435.358,22	7.582.810,02	39.607,35	1.650,31						
5/10/2007 17:30	5.465.735,56	7.625.189,12	42.379,11	1.765,80						
6/10/2007 17:30	5.496.247,57	7.667.756,10	42.566,98	1.773,62						
7/10/2007 17:30	5.526.471,24	7.709.920,82	42.164,72	1.756,86						
8/10/2007 17:30	5.556.110,09	7.751.269,65	41.348,83	1.722,87						
9/10/2007 17:30	5.583.348,85	7.789.270,16	38.000,51	1.583,35						
10/10/2007 17:30	5.611.534,42	7.828.591,55	39.321,39	1.638,39						
11/10/2007 15:32	5.638.818,98	7.866.655,95	38.064,40	1.586,02						
12/10/2007 17:30	5.668.386,23	7.907.904,89	41.248,95	1.718,71						
13/10/2007 17:30	5.698.830,64	7.950.377,57	42.472,68	1.769,69						
14/10/2007 17:30	5.728.882,59	7.992.302,72	41.925,14	1.746,88						
15/10/2007 17:30	5.758.760,98	8.033.985,74	41.683,02	1.736,79						
16/10/2007 17:30	5.790.629,21	8.078.444,77	44.459,03	1.852,46	3.622.630	1.314.981	36%	54.786	180	59.416,36
17/10/2007 17:30	5.823.717,35	8.124.605,68	46.160,91	1.923,37						
18/10/2007 00:00	0,00	0,00	0,00	-						
19/10/2007 17:25	5.848.239,79	8.158.816,67	34.210,99	1.425,46						
20/10/2007 17:30	5.881.211,47	8.204.815,10	45.998,43	1.916,60						
21/10/2007 17:30	5.913.303,22	8.249.585,96	44.770,86	1.865,45						
22/10/2007 17:30	5.946.494,02	8.295.890,10	46.304,14	1.929,34						
23/10/2007 17:30	5.980.257,95	8.342.993,79	47.103,69	1.962,65						
24/10/2007 17:30	6.013.576,59	8.389.476,26	46.482,47	1.936,77						
25/10/2007 17:30	6.048.769,18	8.438.573,08	49.096,82	2.045,70						
26/10/2007 17:30	6.083.754,06	8.487.380,11	48.807,03	2.033,63						
27/10/2007 17:30	6.119.369,93	8.537.067,42	49.687,31	2.070,30						
28/10/2007 17:30	6.147.608,25	8.576.462,40	39.394,98	1.641,46						
29/10/2007 17:30	6.182.432,20	8.625.044,92	48.582,52	2.024,27						
30/10/2007 17:30	6.215.248,18	8.670.826,15	45.781,22	1.907,55						
31/10/2007 17:30	6.251.055,30	8.720.780,27	49.954,12	2.081,42						