

**MONITORING REPORT FORM (CDM-MR)**  
**Version 01 - in effect as of: 28/09/2010**

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**MONITORING REPORT**  
**Version 07, Date: 16/06/2011**  
**Project Title: Alto-Tietê landfill gas capture project**  
**Project Reference Number: 1636**  
**Monitoring period #2: 05/03/2009 – 31/05/2010**

**SECTION A. General description of the project activity**

**A.1. Brief description of the project activity: >>**

A gas collection and flaring system was built in 2008 in the Itaquaquecetuba landfill operated by Empreiteira Pajoan Ltda. The purpose of the project activity is to collect and flare the methane of the landfill gas (LFG) generated at the landfill site, converting it to carbon dioxide and thus reducing the overall greenhouse gas emissions.

The LFG collection system consists of HDPE pipes which connect the LFG wells to two centrifugal blowers. The blowers provide adequate vacuum to the collection pipelines and pressurizes the LFG to a 8,000 Nm<sup>3</sup>/h capacity flare. Condensate traps and a liquid separator equipped with a demister capture any occasional leachate that is present in the LFG. Leachate from the liquid separator is pumped to the landfill's wastewater treatment plant. The systems are equipped with adequate instruments which indicate, transmit and register process parameters, which are described in the monitoring plan of the project activity. The process is controlled by a PLC (programmable logic controller) and is monitored by a supervisory system, installed in a computer. All electronic records of operation are kept in an inviolable data logger. More details about the installed technology are presented in Section C.

The capturing and flaring systems were built in the second and third quarter of 2008 and commissioned in mid September 2008. Continuous operations started in 25/09/2008.

The Emission Reductions (ER) achieved for the period from 05/03/2009 to 31/05/2010 is **280,265 t CO<sub>2</sub>e**.

**A.2. Project Participants**

The project participants are the project developer, ALTO-TIETÊ BIOGÁS, Redução de Emissões e Geração de Energia Ltda., Carbon Capital Markets Ltd. and Trading Emissions PLC.

**A.3. Location of the project activity:**

The project activity is located in the municipality of Itaquaquecetuba, 40 km from the State Capital, São Paulo, in Brazil, in the landfill operated by the private company Empreiteira Pajoan Ltda. The geographical coordinates are Latitude South: 23°26'00'' and 23°26'20'', Longitude West: 46°17'30'' and 46°17'45''.

**A.4. Technical description of the project**

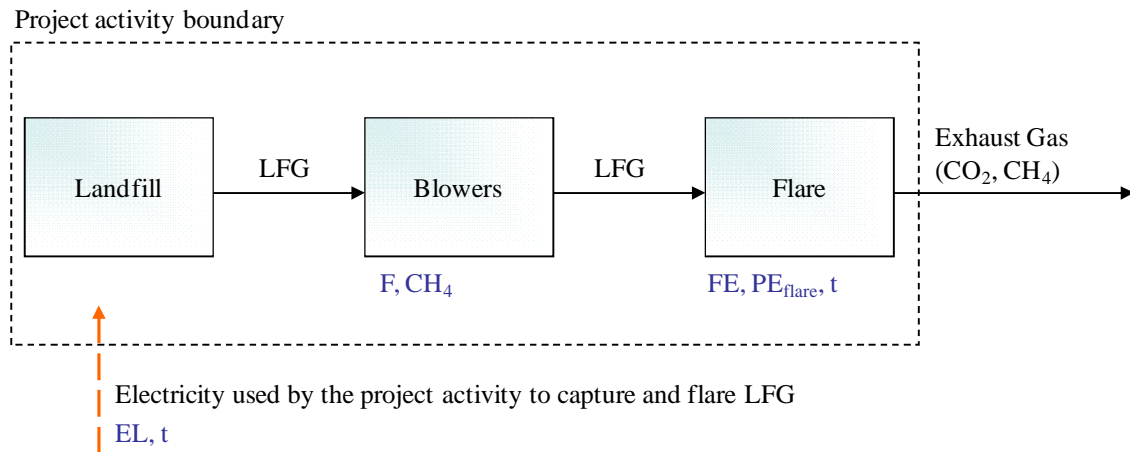
The project activity consists of capturing and flaring the landfill gas which is generated by the decomposition of the waste accepted in the landfill.

The project design includes an active gas recovery system composed by a collection and transportation pipeline network and a gas flaring system.

Drains to extract LFG installed in the landfill site are equipped with sampling points that allow measurement of LFG flow and composition. The drains are connected to HDPE pipes which transport

LFG to the gas capturing and flaring system. HDPE pipes are connected to manifolds, which in turn are connected to main collection headers. Two centrifugal blowers generate adequate vacuum to collect the LFG and pressurize the extracted gas to an enclosed flare. The LFG is flared under controlled temperature conditions. Field instrumentation feed the PLC (programmable logic controller) continuously with LFG temperature, pressure, flow and composition and with exhaust gas temperature and composition. The entire process is controlled by the PLC and is monitored by a supervisory system, installed in a computer.

A simplified diagram of the project activity is shown below:



Measurements:

CH<sub>4</sub>: fraction of CH<sub>4</sub>

F: flow rate of LFG

FE: flaring process efficiency

EL: electricity imported / exported

t: operating hours

PE<sub>flare</sub>: project emissions from flaring of the residual gas stream

Sources of emissions:

Flare: CO<sub>2</sub> and CH<sub>4</sub>

Electricity used to operate the project activity

In addition to its efforts in reducing the levels of GHG emissions, the project activity promotes local sustainable development as it foresees the future possibility of energy generation from a renewable source.

**A.5. Title, reference and version of the baseline and monitoring methodology applied to the project activity:**

Methodology and tools applied to the project activity:

- Consolidated methodology for landfill gas project activities – ACM0001, Version 5.
- Tool to determine project emissions from flaring gases containing methane (EB28 – Annex 13).

<b>A.6. Registration date of the project activity:</b>
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The project was registered under the Clean Development Mechanism at the UNFCCC, according to the Project Design Document Version 06 of 13/12/2007, using the approved methodology ACM0001, Version 5.

The Project Design Document was validated by TÜV NORD CERT GmbH on 13/12/2007, approved by the Brazilian Government on 26/02/2008 and registered at the Executive Board on 29/05/2008.

A revision of the Monitoring Plan was also submitted to the Executive Board and approved on 23/12/2009.

<b>A.7. Crediting period of the project activity and related information (start date and choice of crediting period):</b>
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According to the registered Project Design Document, the crediting period starts in 01/03/2008. A change in the starting date, from 01/03/2008 to 25/09/2008, was approved by the Executive Board.

The choice of the monitoring period is 21 years, consisting of three renewable periods of 7 years each.

**A.8. Name of responsible person(s)/entity(ies):**

ENVIRON ARQUIPÉLAGO ENGENHARIA AMBIENTAL was retained by the project developer, ALTO-TIETÊ BIOGÁS, to complete the monitoring report form.

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ENVIRON ARQUIPÉLAGO ENGENHARIA AMBIENTAL: Amauri Rodrigues Junior, [arodrigues@environcorp.com](mailto:arodrigues@environcorp.com); +55 19 3859 1795; +55 11 6194 2932.

**SECTION B. Implementation of the project activity**
**B.1. Implementation status of the project activity**

The continuous operation of the project activity started on 25/09/2008, with the collection and flaring of the LFG generated at the existing cells and at new cells located next to the waste disposal areas.

The following table summarizes the availability of the flaring system during the monitoring period covered by this report:

Month	Operational Hours	
	Hours	%
March 2009 (*)	578.5	89
April 2009	704.9	98
May 2009	709.4	95
June 2009	715.5	99
July 2009	727.3	98
August 2009	723.6	97
September 2009	708.9	98
October 2009	701.9	94
November 2009	696.9	97
December 2009	711.8	96
January 2010	682.5	92
February 2010	625.7	93
March 2010	696.8	94
April 2010	681.4	95
May 2010 (**)	694.3	93
<b>Total:</b>	<b>10,359.4</b>	<b>-</b>
<b>Average:</b>	<b>690.6</b>	<b>95%</b>

(\*) Starting in 05/03/2009

(\*\*) Until 31/05/2010

During the monitoring period covered by this report, the system went out of operation due to the following reasons (decreasing order of significance):

- Electricity supply failure;
- Preventive maintenance (blowers, flare, general);
- Process alarms and corrective maintenance (equipment, instruments);
- Calibration of instruments.

All operations are registered in forms and in electronic spreadsheets. All maintenance procedures in the critical pieces of equipment (flare, blowers, gas analyzer, air compressor) are also registered. Instrumentation calibration records are registered in a workbook and the certificates of calibration are kept in files.

The flare efficiency is measured continuously, as described in the methodology ACM0001 Version 05 and the “Tool to determine project emissions from flaring gases containing methane” by measuring methane and oxygen content in the exhaust gas.

During the monitoring period, the gas analyzer AG-02 was continuously on-line during the operation of the landfill gas capturing and flaring system, over the entire monitoring period. This instrument was occasionally off-line during maintenance or calibration activities, but, in these situations, the flaring system was not operating and no ERs were claimed. AG-02 sometimes provided negative values. When the readings were lower than 0 and higher or equal to -13 ppmv, they were assumed to be zero and thus the efficiency was calculated as 100%. When the readings were lower than -13ppmv, and when all other monitored parameters were registered and the flaring system operated according to manufacturer’s specifications, although calibration and maintenance procedures in place suggest that the gas analyzer was in good conditions, a flare efficiency of 90% was assumed, according to STEP 6 of the “Tool to determine project emissions from flaring gases containing methane”.

#### **B.2. Revision of the monitoring plan**

A revision of the Monitoring Plan was submitted to the Executive Board and approved in 23/12/2009.

#### **B.3. Request for deviation applied to this monitoring period**

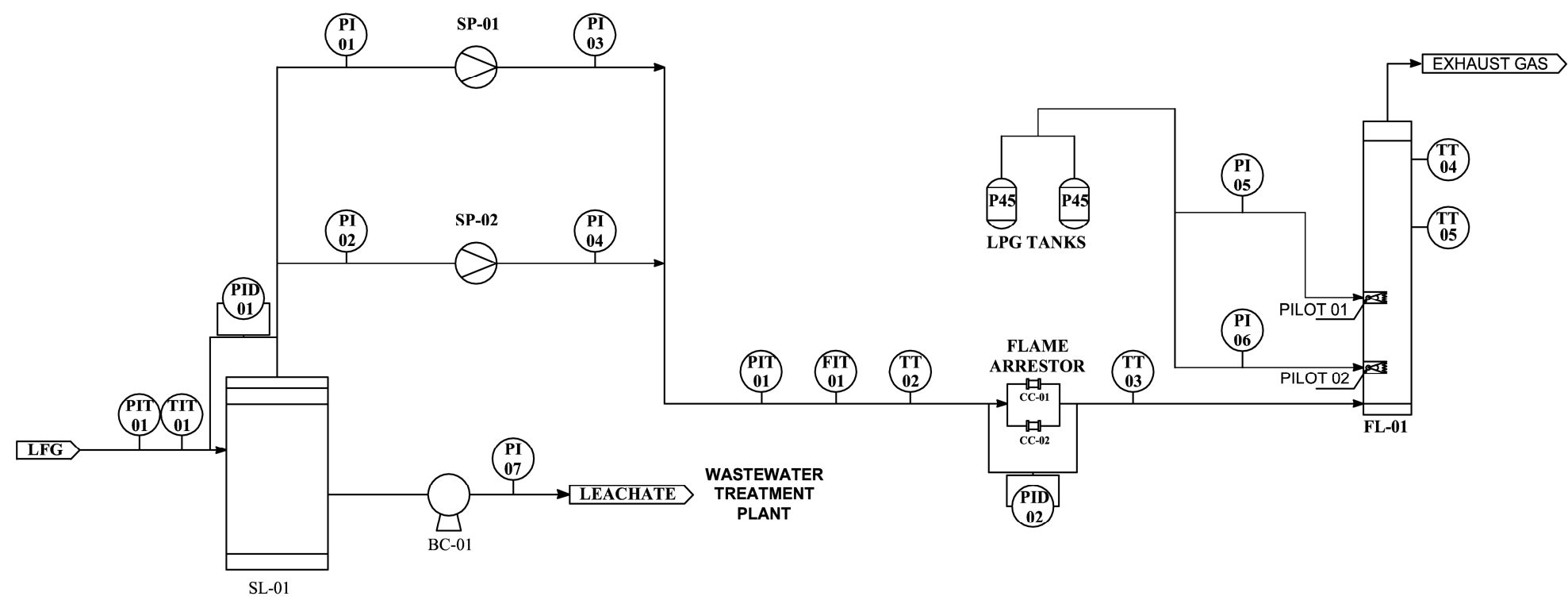
Not applicable.

#### **B.4. Notification or request of approval of changes**

Not applicable.

### **SECTION C. Description of the monitoring system**

The simplified pipe and instrumentation diagram (P&ID), **Figure 1**, shows the instrumentation and measurement points of the system.



LEGEND:

	FLOW INDICATOR TRANSMITTER	SL-01	LIQUID SEPARATOR
	TEMPERATURE INDICATOR TRANSMITTER	BC-01	HELICOIDAL PUMP
	PRESSURE INDICATOR	SP-01	BLOWER
	PRESSURE INDICATOR TRANSMITTER	CC-01	FLAME ARRESTOR
	DIFFERENTIAL PRESSURE INDICATOR	FL-01	FLARE
	TEMPERATURE TRANSMITTER		

A flow meter (FIT-01), installed between the blowers (which promote the capture of the LFG from the landfill) and the flare, measures the LFG flow rate to the flare ( $F_{V_{RG,h}}$ ) in wet basis. A gas analyzer (AG-01) measures the methane fraction in the landfill gas ( $W_{CH_4,y}$ ) and the volumetric fraction of  $CH_4$ ,  $CO_2$  and  $O_2$  in the residual gas, in wet basis. The sampling point of AG-01 is located between the blowers and the flare. A second gas analyzer (AG-02) measures the volumetric fraction of  $O_2$  ( $t_{O_2,h}$ ) and the concentration of methane ( $f_{V_{CH_4,FG,h}}$ ) in the exhaust gas of the flare, in wet basis. Two thermocouples (TT-04 and TT-05) measure the temperature in the exhaust gas of the flare ( $T_{flare}$ ).

The electricity consumption ( $EL_{IMP}$ ) is measured by the utility company's meter.

A data book contains detailed technical information of all equipment and instruments used in the LFG capturing and flaring system.

The operation and monitoring procedures are described in the operation manual ("Manual de Partida e Operação" prepared by Arquipélago Engenharia Ambiental Ltda., ref.# P459/R03/V01/08).

Relevant procedures are also described in the maintenance manual ("Manual de Manutenção" prepared by Arquipélago Engenharia Ambiental Ltda., ref.# P459/R04/V01/08) and monitoring manual ("Manual de Monitoramento" prepared by Arquipélago Engenharia Ambiental Ltda., ref# P459/R05/V01/08).

Daily written records of operation are kept in an operations log book. The contents of the operation records are free. Minimal mandatory information include: start time and end time of each working shift, conditions of the flaring system in the beginning and in the end of the shift, recognition of the operation records of the previous shift, records of alarms issued by the supervisory and control systems whenever there is a system shutdown.

Electronic records of operation are automatically saved in a data logger. The operators weekly export data from the data logger to a computer which is installed in the plant and they also make a back-up copy of the data.

The operators also perform daily readings of the instruments installed at the LFG capturing and flaring system (pressure, temperature, composition, flow rate).

Daily readings at the LFG extraction network (pressure, methane concentration, oxygen concentration, carbon dioxide concentration, temperature, flow rate) are performed with a portable instrument. These written records are kept in files. Monitoring points include each manifold and each LFG drain.

Safety procedures are described in the risk management plan ("Programa de Gerenciamento de Riscos" prepared by Arquipélago Engenharia Ambiental Ltda., ref.# P459/R01/V01/08) and in the emergency plan ("Plano de Ação de Emergência" prepared by Arquipélago Engenharia Ambiental Ltda., ref.# P459/R02/V01/08). A quantitative risk assessment was also performed for the system ("Estudo de Análise de Risco" prepared by Arquipélago Engenharia Ambiental Ltda. ref# P459/R06/V00/08). Emergency procedures include planned actions in the events of LFG or LPG (liquefied petroleum gas) leaks, fires and explosions, which are targeted to protect the employees, the neighbor community, the environment and the installed equipment.


All operators were trained for operation, maintenance and safety procedures and were granted certificates. The gas analyzer manufacturer SIEMENS also trained all operators to handle and calibrate the equipments AG-01 (residual gas analyzer) and AG-02 (exhaust gas analyzer).

ATB has the following organizational structure:



- Coordinator: responsible for conducting internal audits, scheduling maintenance and calibration routines, managing the interface landfill operation x LFG flaring operation, orientation of staff, data monitoring and reporting to the Management;
- Operators: responsible for operating the LFG capturing and flaring system, reading field instrumentation, reading LFG data in the LFG extraction pipelines and reporting to the Coordinator;
- LFG Analyst: responsible for supporting the expansion of the LFG extraction system, reading LFG data in the LFG extraction pipelines and vents and adjusting the operation of the vents;
- Monitoring and Maintenance Staff: responsible for providing support for monitoring and general maintenance activities, draining leachate from the LFG capturing system and welding pipelines.

The following additional internal procedures and instructions were prepared by ATB to assure satisfactory monitoring of the project activity, compliant with the Project Design Document:

- Data download and backup
  - Instrument maintenance and calibration
  - Quality assurance and quality control
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**SECTION D. Data and parameters**
**D.1. Data and parameters determined at registration and not monitored during the monitoring period, including default values and factors**

<b>Data / Parameter:</b>	<b>AF</b>
Data unit:	-
Description:	Adjustment factor
Source of data used:	Registered Project Design Document
Value(s) :	0.2
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emissions calculation
Additional comment:	<p>A regulatory review was performed, based on the most recent Temporary Operation Permits nrs. 26001311 (issued in 25/03/2009), 26001321 (issued in 30/04/2009), 26001366 (issued in 26/08/2009), 26001412 (issued in 23/12/2009), 26001467 (issued in 21/06/2010).</p> <p>The regulatory review also included the evaluation of the State Law nr. 13,798 of 09/11/2009, which establishes the State Policy for Climate Change. This law foresees that the State of São Paulo has an overall goal of 20% reduction in carbon dioxide emissions until year 2020, in relation to the emission levels of year 2005. Nevertheless, the law does not provide details of how this goal will be achieved and does not establish specific sectoral goals. Therefore, no changes to the adjustment factor are applicable to the project activity.</p> <p>No changes to the adjustment factor or to the amount of methane that would have been destroyed/combusted during the monitoring period in the absence of the project, in tones of methane (MDreg,y) were identified.</p> <p>Regulatory reviews will be performed at least yearly and will be used to correct the adjustment factor at the renewal of the crediting period, if necessary.</p>

<b>Data / Parameter:</b>	<b>D CH4</b>
Data unit:	t CH4/m <sup>3</sup> CH4
Description:	Methane density
Source of data used:	Registered Project Design Document ; IPCC Guidelines, 1996
Value(s) :	0,0007168
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline and project emissions calculation
Additional comment:	-

<b>Data / Parameter:</b>	<b>GWP CH4</b>
Data unit:	<b>t CO<sub>2</sub>e / t CH<sub>4</sub></b>
Description:	Global warming potential of methane
Source of data used:	Registered Project Design Document
Value(s) :	21
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emissions calculation
Additional comment:	-

<b>Data / Parameter:</b>	<b>Ru</b>
Data unit:	<b>Pa.m<sup>3</sup>/kmol.K</b>
Description:	Universal ideal gas constant
Source of data used:	Methodological “Tool to determine project emissions from flaring gases containing methane”, EB28, Annex 13
Value(s) :	8,314
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emissions calculation
Additional comment:	-

<b>Data / Parameter:</b>	<b>MMi, where i=N<sub>2</sub>, CH<sub>4</sub>, O<sub>2</sub>, CO<sub>2</sub>, H<sub>2</sub>O</b>
Data unit:	<b>kg/kmol</b>
Description:	Molecular mass
Source of data used:	Methodological “Tool to determine project emissions from flaring gases containing methane”, EB28, Annex 13
Value(s) :	MM N <sub>2</sub> =28.02; MM CH <sub>4</sub> =16.04; MM O <sub>2</sub> =32.00; MM CO <sub>2</sub> =44.01; MM H <sub>2</sub> O=18.00
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emissions calculation
Additional comment:	-

<b>Data / Parameter:</b>	<b>AMi, where i=C, H, N, O</b>
Data unit:	Methodological “Tool to determine project emissions from flaring gases containing methane”, EB28, Annex 13
Description:	Atomic mass
Source of data used:	Methodological “Tool to determine project emissions from flaring gases containing methane”, EB28, Annex 13
Value(s) :	AM C=12.00; AM H=1.01; AM N=14.01; AM O=16.00
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emissions calculation
Additional comment:	-

<b>Data / Parameter:</b>	<b>MVn</b>
Data unit:	<b>m<sup>3</sup>/kmol</b>
Description:	Volume of one mole of an ideal gas at normal temperature and pressure
Source of data used:	Methodological “Tool to determine project emissions from flaring gases containing methane”, EB28, Annex 13
Value(s) :	22.414
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emissions calculation
Additional comment:	-

<b>Data / Parameter:</b>	<b>MFO2</b>
Data unit:	<b>Dimensionless</b>
Description:	O2 volumetric fraction of air
Source of data used:	Methodological “Tool to determine project emissions from flaring gases containing methane”, EB28, Annex 13
Value(s) :	0.21
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emissions calculation
Additional comment:	-

<b>D.2. Data and parameters monitored</b>	
<b>Data / Parameter:</b>	<b>LFG<sub>total,y</sub></b>
Data unit:	Nm <sup>3</sup>
Description:	Total amount of landfill gas captured from project wells
Measured /Calculated /Default:	Measured and Calculated
Source of data:	Field instrument
Value(s) of monitored parameter:	Refer to <b>Annex A</b>
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emissions calculation
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Flow meter FIT-01, Hirsu – serial number 288577, precision +/- 1%, annual calibration, last calibration in 12/05/2010, due in 12/05/2011. Complete calibration details are presented in <b>Annex B</b> .
Measuring/ Reading/ Recording frequency:	Instantaneous flow rate is measured and read continuously. Flow rates are recorded every minute. Totalized flow is calculated every minute.
Calculation method (if applicable):	Not applicable
QA/QC procedures applied:	Flow meters should be subject to a regular maintenance and testing regime to ensure accuracy

<b>Data / Parameter:</b>	<b>LFG<sub>flared,y</sub></b>
Data unit:	Nm <sup>3</sup>
Description:	Total amount of landfill gas flared

Measured /Calculated /Default:	Measured and Calculated
Source of data:	Field instrument
Value(s) of monitored parameter:	Refer to <b>Annex A</b>
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emissions calculation
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Flow meter FIT-01, Hirsä – serial number 288577, precision +/- 1%, annual calibration, last calibration in 12/05/2010, due in 12/05/2011. Complete calibration details are presented in <b>Annex B</b> .
Measuring/ Reading/ Recording frequency:	Instantaneous flow rate is measured and read continuously. Flow rates are recorded every minute. Totalized flow is calculated every minute.
Calculation method (if applicable):	Not applicable
QA/QC procedures applied:	Flow meters are subject to a regular maintenance and testing regime to ensure accuracy. Annual calibration is performed.

<b>Data / Parameter:</b>	<b>PE<sub>flare,y</sub></b>
Data unit:	tCO <sub>2e</sub>
Description:	Project emissions from flaring of the residual gas stream in year y
Measured /Calculated /Default:	Calculated
Source of data:	Not applicable
Value(s) of monitored parameter:	Refer to <b>Annex A</b> . As per EB 28 Annex 13, this parameter is calculated on an hourly basis. Actually, it is calculated every minute and the daily totals are displayed in the calculation spreadsheets.
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emissions calculation
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Not applicable. Calculated value.
Measuring/ Reading/ Recording frequency:	Data used in the calculation are measured and read continuously and recorded every minute. The parameter is calculated every minute.
Calculation method (if applicable):	Determined according to Annex 13 “Tool to determine project emissions from flaring gases containing methane”
QA/QC procedures applied:	Calibration of equipment as per manufacturer’s specifications to ensure validity of data which is measured and used in the calculations of this parameter.

<b>Data / Parameter:</b>	<b>WCH<sub>4,y</sub></b>
Data unit:	m <sup>3</sup> CH <sub>4</sub> / m <sup>3</sup> LFG
Description:	Methane fraction in the landfill gas, in wet basis
Measured /Calculated /Default:	Measured
Source of data:	Field instrument

Value(s) of monitored parameter:	Refer to <b>Annex A</b>
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emissions calculation
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Gas analyzer AG-01, Siemens – serial number N1-W1-961, precision +/- 1%, bi-annual external calibration, last external calibration in 19/04/2010, due in 19/10/2010, biweekly internal calibration. Complete calibration details are presented in <b>Annex B</b> .
Measuring/ Reading/ Recording frequency:	Instantaneous methane fraction in the landfill gas is measured and read continuously. Values are recorded every minute.
Calculation method (if applicable):	Not applicable
QA/QC procedures applied:	The gas analyser is subject to a regular maintenance and testing regime to ensure accuracy. Bi-annual external calibration is performed. Biweekly internal calibration is performed.

<b>Data / Parameter:</b>	<b><math>EL_{IMP}</math></b>
Data unit:	MWh/year
Description:	Total amount of electricity imported to meet project requirement
Measured /Calculated /Default:	Measured
Source of data:	Invoices from the utility company
Value(s) of monitored parameter:	Refer to table below
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emissions calculation
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Energy meter from the utility company, which is responsible for its maintenance and calibration
Measuring/ Reading/ Recording frequency:	Electricity consumption is measured and read continuously. The utility company verifies the readings once per month and the electricity consumption is recorded in the monthly bills that the Project Participant receives from the utility company.
Calculation method (if applicable):	Not applicable
QA/QC procedures applied:	Responsibility of the utility company

The energy consumption monitored by the energy bills provided by the utility company BANDEIRANTE ENERGIA S.A. is shown in the table below:

Period	Energy Consumption (MWh)
March 05 <sup>th</sup> 2009 to April 3 <sup>rd</sup> 2009	26.193
April 4 <sup>th</sup> 2009 to May 06 <sup>th</sup> 2009	31.412

May 07 <sup>th</sup> 2009 to June 05 <sup>th</sup> 2009	33.855
June 06 <sup>th</sup> 2009 to July 03 <sup>rd</sup> 2009	37.594
July 4 <sup>th</sup> 2009 to August 05 <sup>th</sup> 2009	48.864
August 06 <sup>th</sup> 2009 to September 03 <sup>rd</sup> 2009	44.442
September 04 <sup>th</sup> 2009 to October 05 <sup>th</sup> 2009	53.222
October 06 <sup>th</sup> 2009 to November 05 <sup>th</sup> 2009	42.602
November 06 <sup>th</sup> 2009 to December 04 <sup>th</sup> 2009	47.102
December 05 <sup>th</sup> 2009 to January 06 <sup>th</sup> 2010	45.309
January 07 <sup>th</sup> 2010 to February 03 <sup>rd</sup> 2010	45.852
February 04 <sup>th</sup> 2010 to March 05 <sup>th</sup> 2010	46.088
March 06 <sup>th</sup> 2010 to April 06 <sup>th</sup> 2010	34.602
April 07 <sup>th</sup> 2010 to May 05 <sup>th</sup> 2010	28.647
May 06 <sup>th</sup> 2010 to June 04 <sup>th</sup> 2010	36.446
<b>Total</b>	<b>602.230</b>

<b>Data / Parameter:</b>	CEF <sub>elec, BL,y(GRID)</sub>
Data unit:	Tonnes of CO <sub>2</sub> e/MWh
Description:	CO <sub>2</sub> e emissions conversion factor for electricity
Measured /Calculated /Default:	Default
Source of data:	Brazilian DNA, <a href="http://www.mct.gov.br/index.php/content/view/74689.html">http://www.mct.gov.br/index.php/content/view/74689.html</a> , emission factors 2009 and 2010
Value(s) of monitored parameter:	0.1647 tCO <sub>2</sub> e/MWh
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emissions calculation
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Not applicable
Measuring/ Reading/ Recording frequency:	Annual

Calculation method (if applicable):	The calculation of the emission factor took into consideration the monthly operation margins, from March 2009 to May 2010, and the 2009 construction margin, since the 2010 construction margin will only be issued in 2011
QA/QC procedures applied:	Not applicable

The emission factor was calculated as  $\left[ \frac{\text{average (Operation Margin - Mar/2009-May/2010) + Construction Margin 2009}}{2} \right]$ , using the figures provided in the table below.

Month / Year	Operation Margin	Construction Margin (2009)
Mar-09	0.2639	0.0794
Apr-09	0.2451	
May-09	0.4051	
Jun-09	0.3664	
Jul-09	0.2407	
Aug-09	0.1988	
Sep-09	0.1622	
Oct-09	0.1792	
Nov-09	0.1810	
Dec-09	0.1940	
Jan-10	0.2111	
Feb-10	0.2798	
Mar-10	0.2428	
Apr-10	0.2379	
May-10	0.3405	
CEFelec, BL,y(GRID)		0.1647

<b>Data / Parameter:</b>	<b>Landfill Waste</b>
Data unit:	Metric tonnes
Description:	Waste disposal during a year in <i>Alto-Tietê</i> Landfill
Measured /Calculated /Default:	Measured
Source of data:	Waste is measured at weight bridge at the landfill entrance
Value(s) of monitored parameter:	(#) The values are mentioned in below table.
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Not used in the calculation



Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Weight bridge from the landfill site, which is responsible for its maintenance. Accuracy = 10kg. Serial number 19964. The weight bridge is subject of regular inspections from INMETRO (Instituto Nacional de Metrologia, Normalização e Qualidade Industrial – National Institute of Metrology, Normalization and Industrial Quality). Last inspection was performed in 18/03/2009 and is valid until 31/12/2010.
Measuring/ Reading/ Recording frequency:	Each load of waste entering the landfill is measured and recorded.
Calculation method (if applicable):	Not applicable
QA/QC procedures applied:	Responsibility of the landfill site. The weight bridge is subject of regular inspections from INMETRO (Instituto Nacional de Metrologia, Normalização e Qualidade Industrial – National Institute of Metrology, Normalization and Industrial Quality). An inspection visit is regularly performed by INMETRO. The date of the visit is not pre-scheduled. After the visit, INMETRO issues a Certificate, which is valid until the end of the next year.

(#)The amount of waste received in the landfill was informed by Empreiteira Pajoan Ltda. as shown in the table below:

Month	Amount of waste (ton)
March 2009 (*)	61,667.45
April 2009	59,460.89
May 2009	60,384.28
June 2009	59,220.79
July 2009	63,262.16
August 2009	10,747.48
September 2009	0.00
October 2009	6,884.34
November 2009	30.441,65
December 2009	36,714.10
January 2010	34,019.78
February 2010	33,603.87
March 2010	37,445.54
April 2010	35,287.29
May 2010 (**)	35,622.90
<b>Total:</b>	<b>564,762.52</b>

(\*) Starting in March 05<sup>th</sup> 2009 ; (\*\*) Until May31<sup>st</sup> 2010

<b>Data / Parameter:</b>	<b>Regulatory requirements relating to landfill gas projects</b>
Data unit:	Not applicable
Description:	Regulatory requirements relating to landfill gas projects
Measured /Calculated /Default:	Not applicable
Source of data:	Environmental permits and Brazilian laws
Value(s) of monitored parameter:	Not applicable
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Not applicable
Measuring/ Reading/ Recording frequency:	The information though recorded annually, is used for changes to the adjustment factor suggested by the DNA (AF) or directly MD <sub>reg,y</sub> at renewal of the credit period. Data to be aggregated yearly and archived in electronic format during the crediting period and two years after. Refer to AF in Table D.1
Calculation method (if applicable):	Not applicable
QA/QC procedures applied:	All documentation will be available for revision for a verifier

<b>Data / Parameter:</b>	<b>FE</b>
Data unit:	%
Description:	Combustion efficiency
Measured /Calculated /Default:	Measured and calculated
Source of data:	Field instruments
Value(s) of monitored parameter:	Refer to <b>Annex A</b> . As per EB 28 Annex 13, this parameter is calculated on an hourly basis. Actually, it is calculated every minute and the daily totals are displayed in the calculation spreadsheets.
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emissions calculation
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Not applicable
Measuring/ Reading/ Recording frequency:	Data used in the calculation are measured and read continuously and recorded every minute. The parameter is calculated every minute.
Calculation method (if applicable):	Determined according to Annex 13 “Tool to determine project emissions from flaring gases containing methane”
QA/QC procedures applied:	The flare is monthly checked and the flare efficiency is calculated every minute to ensure optimal operation.
<b>Data / Parameter:</b>	<b>Flare h</b>
Data unit:	<b>Hours</b>

Description:	Flare working hours
Measured /Calculated /Default:	Measured
Source of data:	Data register
Value(s) of monitored parameter:	Refer to <b>Annex A</b>
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emissions calculation
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Operation of the system is recorded in the data register
Measuring/ Reading/ Recording frequency:	Records are stored minute by minute
Calculation method (if applicable):	Not applicable
QA/QC procedures applied:	Regular maintenance ensures optimal operation of flare. Flare activity is checked continuously, with daily checks if the efficiency shows significant deviations from previous values.

<b>Data / Parameter:</b>	<b>fvi,h</b>
Data unit:	-
Description:	Volumetric fraction of component i in the residual gas in the hour h where i = CH <sub>4</sub> , CO, CO <sub>2</sub> , O <sub>2</sub> ,H <sub>2</sub> , N <sub>2</sub>
Measured /Calculated /Default:	Measured
Source of data:	Field instrument
Value(s) of monitored parameter:	Refer to <b>Annex A</b>
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emissions calculation
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Gas analyzer AG-01, Siemens – serial number N1-W1-961, precision +/- 1%, bi-annual external calibration, last external calibration in 19/04/2010, due in 19/10/2010, biweekly internal calibration. Complete calibration details are presented in <b>Annex B</b> .
Measuring/ Reading/ Recording frequency:	Measures are performed continuously by the gas analyzer. Records are kept electronically, minute by minute in the spreadsheets. CO, H <sub>2</sub> and N <sub>2</sub> are not measured and are considered as N <sub>2</sub> .
Calculation method (if applicable):	Not applicable

QA/QC procedures applied:	Analyzers are periodically calibrated according to the manufacturer's recommendation. Bi-annual external calibration is performed. A zero check and a typical value check and internal calibration are performed biweekly by comparison with a standard certified gas.
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<b>Data / Parameter:</b>	<b>F<sub>VRG,h</sub></b>
Data unit:	m <sup>3</sup> /h
Description:	Volumetric flow rate of the residual gas in wet basis at normal conditions in the hour h.
Measured /Calculated /Default:	Measured
Source of data:	Field instrument
Value(s) of monitored parameter:	Refer to <b>Annex A</b>
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emissions calculation
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Flow meter FIT-01, Hirsä – serial number 288577, precision +/- 1%, annual calibration, last calibration in 12/05/2010, due in 12/05/2011. Complete calibration details are presented in <b>Annex B</b> .
Measuring/ Reading/ Recording frequency:	Measures are performed continuously by a flow meter. Records are kept electronically, minute by minute in the spreadsheets.
Calculation method (if applicable):	Not applicable
QA/QC procedures applied:	Flow meters are periodically calibrated according to the manufacturer's recommendation. Annual calibration is performed.

<b>Data / Parameter:</b>	<b>t<sub>o2,h</sub></b>
Data unit:	-
Description:	Volumetric fraction of O <sub>2</sub> in the exhaust gas of the flare in the hour h
Measured /Calculated /Default:	Measured
Source of data:	Field instrument
Value(s) of monitored parameter:	Refer to <b>Annex A</b>
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emissions calculation
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Gas analyzer AG-02, Siemens – serial number N1-W1-027, precision +/- 1%, bi-annual external calibration, last external calibration in 19/04/2010, due in 19/10/2010, biweekly internal calibration. Complete calibration details are presented in <b>Annex B</b> .
Measuring/ Reading/ Recording frequency:	Measures are performed continuously by a gas analyzer. Records are kept electronically, minute by minute in the spreadsheets.
Calculation method (if applicable):	Not applicable

QA/QC procedures applied:	Analyzers are properly calibrated according to the manufacturer's recommendation. Bi-annual external calibration is performed. A zero check and a typical value check are performed biweekly by comparison with a standard gas.
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<b>Data / Parameter:</b>	<b><math>f_{\text{CH}_4, \text{FG}, h}</math></b>
Data unit:	$\text{mg}/\text{m}^3$
Description:	Concentration of methane in the exhaust gas of the flare in wet basis at normal conditions in the hour h
Measured /Calculated /Default:	Measured
Source of data:	Field instrument
Value(s) of monitored parameter:	Refer to <b>Annex A</b>
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emissions calculation
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Gas analyzer AG-02, Siemens – serial number N1-W1-027, precision +/- 1%, bi-annual external calibration, last external calibration in 19/04/2010, due in 19/10/2010, biweekly internal calibration. Complete calibration details are presented in <b>Annex B</b> .
Measuring/ Reading/ Recording frequency:	Measures are performed continuously by a gas analyzer. Records are kept electronically, minute by minute in the spreadsheets.
Calculation method (if applicable):	Not applicable
QA/QC procedures applied:	Analyzers are properly calibrated according to the manufacturer's recommendation. Bi-annual calibration is performed. A zero check and a typical value check and internal calibration are performed biweekly by comparison with a standard gas. Methane composition profile is measured once a year in accordance with AM_CLA_0047, from 05/01/2009 on, data of the EB's request.

<b>Data / Parameter:</b>	<b><math>T_{\text{flare}}</math></b>
Data unit:	$^{\circ}\text{C}$
Description:	Temperature in the exhaust gas of the flare
Measured /Calculated /Default:	Measured
Source of data:	Field instrument
Value(s) of monitored parameter:	Refer to <b>Annex A</b>
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emissions calculation

Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Thermocouples TT-04 and TT-05, ECIL w/o serial number, precision 0.75%, annual calibration, last calibration in 12/05/2010, due in 12/05/2011.
Measuring/ Reading/ Recording frequency:	Measures are performed continuously. Records are kept electronically, minute by minute in the spreadsheets.
Calculation method (if applicable):	Not applicable
QA/QC procedures applied:	The temperature in the exhaust gas of the flare is automatically kept in the range specified by the flare manufacturer.

<b>Data / Parameter:</b>	Mass <sub>LPG</sub>
Data unit:	kg
Description:	Consumption of LPG by the project activity
Measured /Calculated /Default:	Calculated
Source of data:	Invoices from the LPG supplier
Value(s) of monitored parameter:	Refer to <b>Annex A</b>
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emissions calculation
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Not applicable
Measuring/ Reading/ Recording frequency:	Each invoice is accrued whenever a new LPG supply is delivered to the project activity. Invoices are kept in files.
Calculation method (if applicable):	Not applicable
QA/QC procedures applied:	Scope of the LPG supplier

The instruments used to monitor the project activity were kept calibrated, according to the established monitoring plan. A summary of the calibration control is shown in **Annex B**. Calibration certificates are kept in files and are available for the verification process.

Landfill gas flow is automatically measured and registered on a continuous basis and converted automatically to norm cubic meters (Nm<sup>3</sup>) by the flow meter, using continuous internal measurements of pressure and temperature. Therefore, the independent measurements of pressure and temperature, performed by other instruments, are not presented in the ER totalization spreadsheets in **Annex A** and are not included in the Monitoring Plan.

The following parameters were also automatically measured and registered: CH<sub>4</sub>, CO<sub>2</sub> and O<sub>2</sub> content in the residual gas; CH<sub>4</sub> and O<sub>2</sub> content in the exhaust gas; landfill gas pressure (after compression), landfill gas temperature (after compression), and exhaust gas temperature. All the above mentioned parameters and the following additional parameters are also manually registered by the operators: gas analyzer readings (landfill and exhaust gas contents), pressure indicator readings, temperature indicator readings. These registers are kept in files.

The amount of electricity imported to meet project requirement is measured monthly by the utility company BANDEIRANTE ENERGIA S.A. An energy meter was installed at ATB in October 15<sup>th</sup>, 2008, after the operation started (in September 25<sup>th</sup>, 2008).

Internal audits were performed in August 2009 and February 2010, as part of the Quality Control / Quality Assurance internal procedures.

## SECTION E. Emission reductions calculation

### E.1. Baseline emissions calculation

Refer to section E.2, since the baseline emissions are calculated together with the project emissions, using MD<sub>reg,y</sub>, which is calculated with the Adjustment Factor.

### E.2. Project emissions calculation

The project emissions calculation is as follows, according to ACM0001 Version 5:

$$ER_y = (MD_{project,y} - MD_{reg,y}) * GWP_{CH4} + (EL_{EX,LFG} - EL_{IMP}) * CEF_{electricity,y} - ET_y * CEF_{thermal,y} \quad (\text{Equation 1})$$

$$MD_{reg,y} = MD_{project,y} * AF$$

$$MD_{project,y} = MD_{flared,y} + MD_{electricity,y} + MD_{thermal,y}$$

$$MD_{project,y} = MD_{flared,y} = (LFG_{flared,y} * w_{CH4,y} * D_{CH4}) - (PE_{flare,y} / GWP_{CH4})$$

$$AF = 20\% ^1$$

$$GWP_{CH4} = 21 ^2$$

$$D_{CH4} = 0.0007168 \text{ tCH}_4/\text{m}^3_{CH4} ^2$$

$$EL_{EX,LFG} = 0 \text{ MWh}$$

PE<sub>flare,y</sub> is calculated according to the methodological “Tool to determine project emissions from flaring gases containing methane” – Annex 13 – EB28”.

The control system of the flaring unit automatically records the parameters described in Table D.2.

ER<sub>y</sub> is obtained using the recorded data, Equation 1 (above) and the methodological “Tool to determine project emissions from flaring gases containing methane” – Annex 13 – EB28”.

Monthly ER totalization spreadsheets are shown in **Annex A**.

<sup>1</sup> Source: Approved PDD Version 06 December 13<sup>th</sup> 2007

<sup>2</sup> ACM0001 Version 05



The flare efficiency is measured continuously, as described in the methodology ACM0001 Version 5 and the “Tool to determine project emissions from flaring gases containing methane” by measuring methane and oxygen content in the exhaust gas.

During the monitoring period, the gas analyzer AG-02 was continuously on-line during the operation of the landfill gas capturing and flaring system, over the entire monitoring period. This instrument was occasionally off-line during maintenance or calibration activities, but, in these situations, the flaring system was not operating and no ERs were claimed. AG-02 sometimes provided negative values. When the readings were lower than 0 and higher or equal to -13 ppmv, they were assumed to be zero and thus the efficiency was calculated as 100%. When the readings were lower than -13ppmv, and when all other monitored parameters were registered and the flaring system operated according to manufacturer’s specifications, although calibration and maintenance procedures in place suggest that the gas analyzer was in good conditions, a flare efficiency of 90% was assumed, according to STEP 6 of the “Tool to determine project emissions from flaring gases containing methane”.

The sum of ER<sub>y</sub>, without discounting electricity and LPG consumption is **280,365.68 tCO<sub>2</sub>e** as shown in **Annex A**.

Discounts due to electricity consumption are obtained from the utility company invoices and from the electricity emissions factor (refer to table D.2 above):

$$EL_{IMP} \times CEF_{electricity} = 0.1647 \times 602.230 = \mathbf{99.19 \text{ tCO}_2\text{e}}$$

Discounts from LPG consumption are also accrued. During the monitored period, 4 cylinders of 45kg of LPG were purchased, totalizing 180 kg. The discount for LPG consumption is calculated as follows:

$$\begin{aligned} \text{LPG emission} &= ET_y \times CEF_{thermal,y} \\ ET_y &= Mass_{LPG} \times PCI_{LPG} \end{aligned}$$

Where:

$$CEF_{thermal,y} = 63.1 \text{ tCO}_2\text{e/TJ}^3$$

$$\text{Lower Heating Value (LHV)}_{LPG} = 10,990 \text{ kcal/kg}^4$$

$$\text{LPG emission} = 180 \text{ kg} \times 10,990 \text{ kcal/kg} \times 4186.8 \times 10^{-12} \text{ TJ/kcal} \times 63.1 \text{ tCO}_2\text{e/TJ} = \mathbf{0.52 \text{ tCO}_2\text{e}}$$

The CER is finally calculated:

$$ER_y = (MD_{project,y} - MD_{reg,y}) \times GWP_{CH_4} + (EL_{EX, LGFG} - EL_{IMP}) \times CEF_{electricity,y} - ET_y \times CEF_{thermal,y}$$

Hence:

$$ER_y = 280,365.68 \text{ tCO}_2\text{e} - 99.19 \text{ tCO}_2\text{e} - 0.52 \text{ tCO}_2\text{e} = 280,265.97 \text{ tCO}_2\text{e}$$

Therefore, the net ERs are **280,265 tCO<sub>2</sub>e**.

### **E.3. Leakage calculation**

Not applicable.

<sup>3</sup> 2006 IPCC Guidelines for national Greenhouse Gas Inventories, Volume 2, section 2, P16

<sup>4</sup> [http://www.cetesb.sp.gov.br/Emergencia/produtos/ficha\\_completa1.asp?consulta=GÁS%20\(ES\)%20DE%20PETRÓLEO,%20LIQUÉFEITO%20\(S\)](http://www.cetesb.sp.gov.br/Emergencia/produtos/ficha_completa1.asp?consulta=GÁS%20(ES)%20DE%20PETRÓLEO,%20LIQUÉFEITO%20(S))

**E.4. Emission reductions calculation / table**

Refer to **Annexes A and C**.

**E.5. Comparison of actual emission reductions with estimates in the CDM-PDD**

The ERs accrued in 452 days, from 05/03/2009 to 31/05/2010 were 280,265 tCO<sub>2</sub>e.

The PDD forecasted ERs were 396,399 tCO<sub>2</sub>e for 2009 and 438,048 tCO<sub>2</sub>e for 2010. The adjusted forecasted ERs, considering the monitoring period from 05/03/2009 to 31/05/2010 are 509,199.30.

Item	Values applied in ex-ante calculation of the registered CDM-PDD	Actual values reached during the monitoring period
Emission reductions (tCO <sub>2</sub> e)	509,199.30 (adjusted for the monitoring period, from 05/03/2009 to 31/05/2010)	280,265

**E.6. Remarks on difference from estimated value in the PDD**

The underperformance is mainly justified by:

- i) interferences of the landfill operation in the LFG capturing and flaring system (e.g.: disposal areas larger than anticipated, disposal areas occupying areas where LFG extraction wells and branches were located),
- ii) down time due to electricity supply failures.

Better performances are expected in the near future, with the reduction of the waste disposal area. Medium term improvements are also expected, since the site closure is planned for year 2012.

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**Annex A****ER Calculation Spreadsheets**

Monitored Parameter	LFG Total,y = LFG flared,y		FV RG,h		wCH <sub>4</sub> ,y = fv CH <sub>4</sub> ,h	wCO <sub>2</sub> ,y	wO <sub>2</sub> ,y	fv CH <sub>4</sub> ,FG,h	t O <sub>2</sub> ,h	T flare		FE	PE flare,y	ERy	Flare h	
Date	Total captured landfill gas (Nm3)	Total captured landfill gas (m3)	Average gas flow to flare (Nm3/h)	Average gas flow to flare (m3/h)	Average methane content in the landfill gas (%)	Average carbon dioxide content in the landfill gas (%)	Average oxygen content in the landfill gas (%)	Average methane content in the exhaust gas (ppm)	Average oxygen content in the exhaust gas (%)	Average exhaust gas temperature (°C)		Average flare efficiency (%)	PEflare (tCO <sub>2</sub> e)	Total ERy (tCO <sub>2</sub> e)	Availability	
										TT-04	TT-05				Hr	%
05/03/2009	98,738	123,619	4,327	5,418	45.6	32.0	3.9	48.2	12.1	924.4	950.1	99.9%	0.70	541.79	22.8	95%
06/03/2009	36,808	122,035	4,207	5,151	44.7	31.9	3.9	9.7	11.6	922.6	956.0	100.0%	0.05	198.01	8.8	36%
07/03/2009	55,231	68,877	4,454	5,555	45.4	32.8	3.5	0.0	14.2	918.7	938.0	100.0%	0.03	301.76	12.4	52%
08/03/2009	103,121	129,827	4,297	5,409	44.5	32.3	3.6	0.0	12.8	922.5	951.1	100.0%	0.06	551.15	24.0	100%
09/03/2009	97,660	120,758	4,126	5,102	44.6	32.1	3.7	0.0	12.9	920.0	951.6	100.0%	0.05	523.10	23.7	99%
10/03/2009	93,792	116,067	3,908	4,836	44.4	31.7	3.9	3.3	5.8	922.4	952.0	94.1%	35.85	500.60	24.0	100%
11/03/2009	105,634	130,841	4,401	5,452	44.5	32.0	3.7	2.4	3.0	939.5	961.5	92.0%	56.62	564.83	24.0	100%
12/03/2009	103,245	129,072	4,302	5,378	45.0	32.3	3.7	6.5	9.4	929.1	950.3	96.7%	23.07	558.54	24.0	100%
13/03/2009	98,828	122,208	4,309	5,329	44.8	32.2	3.7	6.0	6.7	936.9	959.2	95.1%	33.41	532.77	22.9	96%
14/03/2009	105,439	132,015	4,393	5,501	43.9	31.5	3.9	1.2	1.4	932.7	955.1	91.0%	62.70	556.12	24.0	100%
15/03/2009	80,212	99,959	4,110	5,122	45.2	32.3	3.5	4.2	2.7	924.9	951.7	92.0%	43.68	435.86	19.5	81%
16/03/2009	96,881	121,794	4,224	5,311	44.8	32.5	3.5	11.3	7.5	921.5	948.1	95.3%	29.26	521.11	22.9	96%
17/03/2009	96,039	118,591	4,188	5,171	45.3	32.7	3.4	24.2	13.3	920.4	946.1	99.3%	4.45	522.85	22.9	96%
18/03/2009	93,201	115,663	3,883	4,819	47.8	34.2	2.8	30.9	13.0	920.4	950.8	99.9%	0.51	534.83	24.0	100%
19/03/2009	103,552	129,118	4,366	5,444	45.6	32.7	3.4	33.7	13.5	922.9	959.1	99.9%	0.62	567.90	23.7	99%
20/03/2009	97,319	120,750	4,437	5,505	45.7	32.9	3.4	38.4	14.3	919.5	957.9	99.9%	0.74	535.26	21.9	91%
21/03/2009	105,929	130,497	4,414	5,437	44.5	32.0	3.7	41.8	14.2	925.5	962.9	99.9%	0.84	566.53	24.0	100%
22/03/2009	100,936	124,240	4,209	5,180	46.1	33.0	3.3	45.8	13.3	917.8	955.0	99.9%	0.82	560.51	24.0	100%
23/03/2009	78,138	96,292	4,285	5,281	47.3	33.5	3.2	27.2	13.2	923.2	957.1	99.9%	0.56	444.47	18.2	76%
24/03/2009	109,437	136,489	4,560	5,687	45.3	31.8	8.6	8.6	13.0	924.9	953.7	100.0%	0.16	595.47	24.0	100%
25/03/2009	107,406	134,020	4,475	5,584	46.0	32.2	3.6	12.0	14.0	919.3	947.6	100.0%	0.25	594.16	24.0	100%
26/03/2009	104,274	130,307	4,345	5,429	45.9	32.1	3.7	16.3	12.8	922.6	961.6	100.0%	0.28	575.27	24.0	100%
27/03/2009	95,683	118,731	4,169	5,173	46.0	32.0	3.8	20.7	13.3	921.2	949.0	99.9%	0.34	527.90	22.9	96%
28/03/2009	95,744	118,513	4,246	5,256	46.5	32.3	3.7	24.1	14.2	921.1	942.2	99.9%	0.46	534.90	22.6	94%
29/03/2009	65,239	81,797	4,393	5,508	47.2	32.9	3.4	26.4	13.7	903.9	941.5	99.9%	0.32	370.76	14.9	62%
30/03/2009	40,054	49,946	3,508	4,375	45.4	32.1	3.7	0.1	13.7	895.0	933.0	100.0%	0.03	219.20	11.4	48%
31/03/2009	77,749	96,595	3,393	4,215	44.9	31.6	3.8	1.9	13.2	905.5	938.4	100.0%	0.03	419.67	22.9	95%
Average:	90,603	115,505	4,220	5,246	45.4	32.4	3.8	16.5	11.2	921.4	951.1	98.3%	10.96	494.64		
Total:	2,446,288	3,118,623											295.90	13,355.33	578.5	89%

Monitored Parameter	LFG Total,y = LFG flared,y		FV RG,h		wCH <sub>4</sub> ,y = fv CH <sub>4</sub> ,h	wCO <sub>2</sub> ,y	wO <sub>2</sub> ,y	fv CH <sub>4</sub> ,FG,h	t O <sub>2</sub> ,h	T flare		FE	PE flare,y	ERy	Flare h	
Date	Total captured landfill gas (Nm3)	Total captured landfill gas (m3)	Average gas flow to flare (Nm3/h)	Average gas flow to flare (m3/h)	Average methane content in the landfill gas (%)	Average carbon dioxide content in the landfill gas (%)	Average oxygen content in the landfill gas (%)	Average methane content in the exhaust gas (ppm)	Average oxygen content in the exhaust gas (%)	Average exhaust gas temperature (°C)		Average flare efficiency (%)	PEflare (tCO <sub>2</sub> e)	Total ERy (tCO <sub>2</sub> e)	Availability	
										TT-04	TT-05				Hr	%
01/04/2009	76,519	94,618	3,188	3,942	45.1	31.5	3.9	5.8	13.6	894.5	922.8	100.0%	0.08	414.87	24.0	100%
02/04/2009	73,001	89,668	3,078	3,781	46.1	32.1	3.8	9.3	13.3	907.9	932.8	100.0%	0.12	404.86	23.7	99%
03/04/2009	84,731	104,570	3,530	4,357	45.8	32.0	3.9	11.7	13.3	920.0	947.5	100.0%	0.17	465.77	24.0	100%
04/04/2009	83,970	104,019	3,499	4,334	46.0	32.1	3.8	15.7	13.1	919.7	945.5	100.0%	0.22	464.40	24.0	100%
05/04/2009	83,292	102,145	3,471	4,256	46.2	32.1	3.8	19.6	13.3	930.4	950.5	100.0%	0.28	463.31	24.0	100%
06/04/2009	82,795	101,017	3,508	4,280	46.4	32.3	3.9	17.4	13.2	923.6	944.1	100.0%	0.25	462.28	23.6	98%
07/04/2009	96,314	119,462	4,013	4,978	45.7	32.6	3.8	8.0	13.5	931.5	952.3	100.0%	0.14	528.99	24.0	100%
08/04/2009	95,632	118,454	3,985	4,936	45.6	32.3	3.9	11.0	13.6	920.3	941.9	100.0%	0.19	524.32	24.0	100%
09/04/2009	95,141	117,844	3,964	4,910	46.0	32.5	3.9	14.1	13.2	925.0	945.8	100.0%	0.23	525.98	24.0	100%
10/04/2009	95,369	117,407	3,974	4,892	46.6	32.9	3.7	18.5	13.4	922.4	945.5	99.9%	0.32	533.95	23.7	99%
11/04/2009	99,329	123,353	4,139	5,140	46.4	32.8	3.7	20.3	13.8	925.9	948.3	99.9%	0.38	553.75	24.0	100%
12/04/2009	96,646	119,401	4,027	4,975	47.0	33.2	3.6	24.1	13.4	924.4	947.2	99.9%	0.42	546.28	24.0	100%
13/04/2009	94,663	116,006	4,128	5,058	46.1	32.8	3.7	15.5	13.1	932.2	953.7	99.8%	1.46	521.93	22.9	96%
14/04/2009	100,125	123,731	4,172	5,155	45.5	32.4	3.7	0.7	13.6	928.5	950.2	100.0%	0.05	547.51	24.0	100%
15/04/2009	101,172	124,988	4,216	5,208	45.8	32.5	3.7	5.1	13.3	935.6	958.8	100.0%	0.09	557.53	24.0	100%
16/04/2009	71,394	86,670	4,187	5,083	46.4	33.0	3.5	2.4	13.7	935.8	959.5	100.0%	0.07	398.68	17.1	71%
17/04/2009	100,522	124,046	4,188	5,169	45.9	32.9	3.6	0.0	13.8	926.1	949.1	100.0%	0.06	554.96	24.0	100%
18/04/2009	99,013	122,407	4,126	5,100	46.0	32.9	3.6	0.0	14.0	915.9	937.5	100.0%	0.05	547.29	24.0	100%
19/04/2009	90,170	112,142	3,935	4,893	47.4	33.8	3.2	2.8	13.2	931.5	958.3	100.0%	0.05	513.60	22.9	95%
20/04/2009	92,624	114,384	4,039	4,988	46.3	32.9	3.6	5.5	13.0	927.0	961.7	100.0%	0.09	514.42	22.9	96%
21/04/2009	96,168	117,163	4,049	4,933	46.3	32.9	3.6	8.1	13.5	907.8	939.8	100.0%	0.14	535.73	23.8	99%
22/04/2009	100,008	123,241	4,167	5,135	46.2	32.8	3.7	12.7	13.2	930.3	959.0	100.0%	0.22	556.11	24.0	100%
23/04/2009	100,204	122,805	4,216	5,167	46.9	33.2	3.5	15.6	13.3	925.6	954.0	100.0%	0.28	564.79	23.8	99%
24/04/2009	99,972	122,711	4,166	5,113	46.4	32.9	3.7	19.9	13.3	917.3	947.5	99.9%	0.35	558.16	24.0	100%
25/04/2009	98,672	121,934	4,163	5,145	47.0	33.3	3.6	24.5	13.4	926.3	956.7	99.9%	0.44	557.31	23.7	99%
26/04/2009	98,379	121,970	4,099	5,082	46.3	32.9	3.8	25.0	12.8	910.5	942.1	99.9%	0.41	547.11	24.0	100%
27/04/2009	92,645	114,570	3,860	4,774	46.8	33.1	3.7	27.8	13.0	919.7	954.7	99.9%	0.44	520.89	24.0	100%
28/04/2009	91,363	112,908	3,852	4,761	46.3	32.9	3.8	31.3	13.3	922.1	952.7	99.9%	0.50	509.23	23.7	99%
29/04/2009	88,164	108,213	4,202	5,157	45.7	33.3	3.8	26.2	13.8	914.9	942.8	99.9%	0.43	484.41	21.0	88%
30/04/2009	99,578	122,747	4,149	5,114	44.2	32.4	3.9	8.8	14.1	912.4	941.9	100.0%	0.16	529.51	24.0	100%
<b>Average:</b>	<b>92,586</b>	<b>114,153</b>	<b>3,943</b>	<b>4,861</b>	<b>46.2</b>	<b>32.7</b>	<b>3.7</b>	<b>13.6</b>	<b>13.4</b>	<b>922.2</b>	<b>948.1</b>	<b>100.0%</b>	<b>0.27</b>	<b>513.60</b>		
<b>Total:</b>	<b>2,777,576</b>	<b>3,424,595</b>											<b>8.08</b>	<b>15,407.91</b>	<b>704.9</b>	<b>98%</b>

Monitored Parameter	LFG Total,y = LFG flared,y		FV RG,h		wCH <sub>4</sub> ,y = fv CH <sub>4</sub> ,h	wCO <sub>2</sub> ,y	wO <sub>2</sub> ,y	fv CH <sub>4</sub> ,FG,h	t O <sub>2</sub> ,h	T flare		FE	PE flare,y	ERy	Flare h	
Date	Total captured landfill gas (Nm3)	Total captured landfill gas (m3)	Average gas flow to flare (Nm3/h)	Average gas flow to flare (m3/h)	Average methane content in the landfill gas (%)	Average carbon dioxide content in the landfill gas (%)	Average oxygen content in the landfill gas (%)	Average methane content in the exhaust gas (ppm)	Average oxygen content in the exhaust gas (%)	Average exhaust gas temperature (°C)		Average flare efficiency (%)	PE flare (tCO <sub>2</sub> e)	Total ERy (tCO <sub>2</sub> e)	Availability	
										TT-04	TT-05				Hr	%
01/05/2009	94,000	115,494	3,966	4,873	45.0	32.7	3.8	11.1	13.7	908.8	933.3	100.0%	0.19	508.44	23.7	99%
02/05/2009	94,387	116,610	3,977	4,913	45.1	32.5	3.8	13.3	13.5	917.7	941.5	100.0%	0.26	511.48	23.7	99%
03/05/2009	92,903	115,035	3,871	4,793	45.0	32.4	3.9	13.8	13.2	920.1	944.0	100.0%	0.22	502.93	24.0	100%
04/05/2009	87,839	106,825	3,709	4,511	45.5	32.7	3.8	17.9	13.2	913.3	938.7	100.0%	0.27	480.14	23.7	99%
05/05/2009	65,545	79,195	2,731	3,300	44.1	31.5	4.3	19.8	13.6	901.7	931.9	99.9%	0.22	348.26	24.0	100%
06/05/2009	72,797	88,131	3,069	3,716	45.6	32.7	3.8	24.3	14.3	899.1	920.7	99.9%	0.90	401.38	23.7	99%
07/05/2009	105,131	128,968	4,433	5,438	45.2	32.6	3.9	29.4	13.5	918.8	950.7	99.9%	0.92	570.94	23.7	99%
08/05/2009	104,781	127,650	4,430	5,397	44.9	32.2	4.0	29.9	13.1	920.9	957.7	99.9%	0.60	566.10	23.7	99%
09/05/2009	103,926	127,285	4,391	5,378	45.8	32.7	3.8	35.9	13.2	912.4	948.6	99.9%	0.68	571.70	23.7	99%
10/05/2009	84,168	103,352	4,418	5,425	45.2	32.4	3.9	35.7	13.0	914.0	947.0	99.9%	0.55	457.60	19.1	79%
11/05/2009	104,031	128,076	4,335	5,337	44.4	32.4	3.8	7.8	12.7	924.0	960.9	100.0%	0.27	555.35	24.0	100%
12/05/2009	100,242	123,508	4,465	5,501	44.4	32.5	3.8	67.1	13.2	909.9	939.7	99.8%	1.47	548.88	23.0	96%
13/05/2009	111,351	137,935	4,640	5,747	44.4	32.7	3.7	3.1	12.8	924.8	946.4	100.0%	0.06	594.84	24.0	100%
14/05/2009	108,267	133,270	4,565	5,619	44.4	32.5	3.8	6.5	13.2	922.1	945.7	100.0%	0.21	578.34	23.7	99%
15/05/2009	40,567	48,930	4,240	5,115	46.2	33.8	3.2	8.7	14.1	896.3	930.5	100.0%	0.07	225.24	9.6	40%
16/05/2009	74,195	90,678	4,776	5,838	45.4	33.1	3.7	19.3	13.7	904.8	948.0	99.9%	0.27	405.48	15.5	65%
17/05/2009	105,912	129,333	4,413	5,389	45.9	33.3	3.4	20.1	14.2	900.8	938.6	99.9%	0.42	585.11	24.0	100%
18/05/2009	101,872	124,745	4,271	5,230	45.2	32.8	3.7	13.6	13.3	908.8	943.5	100.0%	0.29	554.11	23.9	99%
19/05/2009	93,461	113,452	4,075	4,947	44.5	32.2	3.9	6.3	9.5	910.7	946.4	97.1%	18.74	499.63	23.6	98%
20/05/2009	99,269	120,502	4,136	5,021	45.3	32.7	3.7	11.6	13.0	909.4	950.1	100.0%	0.21	540.43	24.0	100%
21/05/2009	102,893	126,389	4,287	5,266	46.0	33.0	3.6	8.6	13.0	915.2	951.4	100.0%	0.15	568.91	24.0	100%
22/05/2009	104,785	128,438	4,434	5,435	46.4	32.5	3.5	13.0	13.0	912.6	949.3	100.0%	2.04	583.21	23.6	98%
23/05/2009	102,749	125,498	4,480	5,472	46.6	33.5	3.4	19.4	13.9	910.9	944.3	99.9%	0.49	574.69	22.9	96%
24/05/2009	101,141	123,464	4,214	5,144	47.0	33.5	3.4	18.7	14.2	901.8	936.0	99.9%	0.39	571.12	24.0	100%
25/05/2009	107,087	131,839	4,512	5,555	46.1	32.7	3.8	28.8	13.5	913.0	952.9	99.9%	0.71	592.98	23.7	99%
26/05/2009	114,871	141,802	4,786	5,908	45.6	32.4	3.9	25.1	13.8	914.0	950.1	99.9%	0.53	629.91	24.0	100%
27/05/2009	111,918	136,914	4,729	5,785	46.5	32.9	3.7	43.3	14.0	921.8	954.0	99.9%	1.12	625.73	23.7	99%
28/05/2009	115,922	142,230	4,830	5,926	46.7	33.0	3.6	37.4	14.3	919.5	949.9	99.9%	0.89	650.78	24.0	100%
29/05/2009	114,583	138,946	4,838	5,867	47.1	33.2	3.5	46.5	14.1	928.4	960.9	99.9%	1.09	648.96	23.7	99%
30/05/2009	117,172	143,010	4,944	6,034	47.6	33.5	3.4	38.0	14.1	921.4	955.9	99.9%	0.96	670.52	23.7	99%
31/05/2009	115,605	141,091	4,817	5,879	48.4	34.0	3.1	38.6	14.0	915.8	950.4	99.9%	0.90	673.34	24.0	100%
<b>Average:</b>	<b>98,496</b>	<b>120,600</b>	<b>4,316</b>	<b>5,283</b>	<b>45.7</b>	<b>32.8</b>	<b>3.7</b>	<b>23.0</b>	<b>13.4</b>	<b>913.3</b>	<b>945.8</b>	<b>99.8%</b>	<b>1.16</b>	<b>541.82</b>		
<b>Total:</b>	<b>3,053,368</b>	<b>3,738,596</b>											<b>36.10</b>	<b>16,796.53</b>	<b>709.4</b>	<b>95%</b>

Monitored Parameter	LFG Total, y = LFG flared, y		FV RG, h		wCH <sub>4</sub> , y = fv CH <sub>4</sub> , h	wCO <sub>2</sub> , y	wO <sub>2</sub> , y	fv CH <sub>4</sub> , FG, h	t O <sub>2</sub> , h	T flare		FE	PE flare, y	ERy	Flare h	
Date	Total captured landfill gas (Nm3)	Total captured landfill gas (m3)	Average gas flow to flare (Nm3/h)	Average gas flow to flare (m3/h)	Average methane content in the landfill gas (%)	Average carbon dioxide content in the landfill gas (%)	Average oxygen content in the landfill gas (%)	Average methane content in the exhaust gas (ppm)	Average oxygen content in the exhaust gas (%)	Average exhaust gas temperature (°C)		Average flare efficiency (%)	PE flare (tCO <sub>2</sub> e)	Total ERy (tCO <sub>2</sub> e)	Availability	
										TT-04	TT-05				Hr	%
01/06/2009	110,632	133,814	4,824	5,835	48.7	34.1	3.1	46.8	14.2	917.9	950.8	99.9%	1.09	633.57	22.7	95%
02/06/2009	112,728	134,328	4,697	5,597	47.0	32.8	3.7	49.3	13.4	921.6	958.4	99.9%	1.01	637.30	24.0	100%
03/06/2009	112,932	135,536	4,706	5,647	46.6	32.4	3.9	54.7	13.4	919.7	957.4	99.9%	1.15	633.33	24.0	100%
04/06/2009	107,300	129,312	4,679	5,639	46.7	33.2	3.5	24.4	14.2	919.2	949.0	99.9%	0.57	602.01	22.9	96%
05/06/2009	114,321	139,564	4,763	5,815	45.5	33.1	3.6	22.4	14.0	920.4	951.9	99.9%	0.55	625.29	24.0	100%
06/06/2009	104,914	128,146	4,439	5,422	47.3	34.2	3.0	5.3	14.1	912.8	949.6	100.0%	0.11	596.81	23.6	98%
07/06/2009	101,855	123,220	4,244	5,134	47.1	34.0	3.1	9.0	14.5	913.9	953.1	100.0%	0.19	576.98	24.0	100%
08/06/2009	109,398	133,473	4,558	5,561	45.2	32.7	3.7	11.8	14.1	920.4	951.4	100.0%	0.25	593.97	24.0	100%
09/06/2009	114,115	140,050	4,755	5,835	45.9	33.2	3.4	27.6	14.4	924.6	953.5	99.9%	0.65	629.25	24.0	100%
10/06/2009	113,079	136,124	4,712	5,672	46.2	33.4	3.4	20.2	14.2	920.7	953.0	99.9%	0.45	627.50	24.0	100%
11/06/2009	113,998	138,604	4,827	5,869	46.6	33.6	3.3	17.9	13.8	918.3	945.4	100.0%	0.39	639.03	23.6	98%
12/06/2009	114,433	137,485	4,768	5,729	46.2	33.2	3.5	22.8	13.9	911.6	954.2	99.7%	0.50	636.50	24.0	100%
13/06/2009	114,089	137,256	4,821	5,800	47.1	33.7	3.3	27.5	13.9	920.1	963.4	99.9%	0.63	645.90	23.7	99%
14/06/2009	113,931	137,850	4,747	5,744	47.8	34.1	3.1	29.8	14.7	914.6	953.2	99.9%	0.75	654.54	24.0	100%
15/06/2009	114,700	138,222	4,779	5,759	46.8	33.3	3.5	35.2	14.5	911.4	950.3	99.9%	0.86	645.36	24.0	100%
16/06/2009	113,169	136,691	4,715	5,695	47.2	33.6	3.4	32.3	13.4	919.6	958.1	99.9%	0.67	642.12	24.0	100%
17/06/2009	117,804	143,557	4,909	5,982	46.8	33.2	3.5	35.4	13.6	926.3	962.6	99.9%	0.78	662.12	24.0	100%
18/06/2009	118,738	144,229	4,947	6,010	46.3	32.9	3.7	39.9	14.1	921.2	958.2	99.9%	0.93	662.08	24.0	100%
19/06/2009	109,343	132,202	4,768	5,765	46.7	33.2	3.5	27.0	14.0	915.3	951.3	99.9%	0.56	614.09	22.9	96%
20/06/2009	115,465	140,652	4,811	5,861	46.0	33.0	3.7	3.7	13.6	919.5	957.4	100.0%	0.08	638.66	24.0	100%
21/06/2009	114,933	140,295	4,789	5,846	46.1	33.0	3.5	5.0	12.4	923.2	960.8	100.0%	0.09	636.62	24.0	100%
22/06/2009	117,229	142,630	4,885	5,943	46.2	33.1	3.5	14.1	14.1	920.3	955.3	100.0%	0.34	651.10	24.0	100%
23/06/2009	120,462	146,386	5,019	6,099	45.9	32.8	3.7	18.7	14.6	920.8	955.4	99.9%	0.48	664.01	24.0	100%
24/06/2009	123,120	149,585	5,130	6,233	44.8	32.0	4.0	28.3	14.2	927.1	963.0	99.9%	0.70	663.75	24.0	100%
25/06/2009	122,554	147,613	5,106	6,151	45.2	32.2	3.9	51.5	14.3	927.1	960.4	99.8%	1.29	666.14	24.0	100%
26/06/2009	125,547	151,852	5,231	6,327	45.3	32.3	3.9	72.9	14.3	931.5	966.2	99.8%	1.89	683.47	24.0	100%
27/06/2009	123,215	148,944	5,134	6,206	46.1	32.8	3.8	114.8	13.8	932.4	964.7	99.7%	3.02	682.94	24.0	100%
28/06/2009	120,888	146,467	5,037	6,103	46.3	32.8	3.8	28.1	14.4	927.3	962.4	99.9%	0.69	673.29	24.0	100%
29/06/2009	123,348	150,539	5,140	6,272	47.2	33.4	3.5	31.8	14.1	930.2	959.0	99.9%	0.79	700.15	24.0	100%
30/06/2009	124,267	151,506	5,178	6,313	47.2	33.4	3.5	82.2	14.0	927.1	954.4	99.8%	2.20	705.93	24.0	100%
<b>Average:</b>	<b>115,417</b>	<b>139,871</b>	<b>4,837</b>	<b>5,862</b>	<b>46.5</b>	<b>33.2</b>	<b>3.5</b>	<b>33.0</b>	<b>14.0</b>	<b>921.2</b>	<b>956.1</b>	<b>99.9%</b>	<b>0.79</b>	<b>644.13</b>		
<b>Total:</b>	<b>3,462,510</b>	<b>4,196,130</b>											<b>23.64</b>	<b>19,323.84</b>	<b>715.5</b>	<b>99%</b>

Monitored Parameter	LFG Total,y = LFG flared,y		FV RG,h		wCH <sub>4</sub> ,y = fv CH <sub>4</sub> ,h	wCO <sub>2</sub> ,y	wO <sub>2</sub> ,y	fv CH <sub>4</sub> ,FG,h	t O <sub>2</sub> ,h	T flare		FE	PE flare,y	ERy	Flare h	
Date	Total captured landfill gas (Nm <sup>3</sup> )	Total captured landfill gas (m <sup>3</sup> )	Average gas flow to flare (Nm <sup>3</sup> /h)	Average gas flow to flare (m <sup>3</sup> /h)	Average methane content in the landfill gas (%)	Average carbon dioxide content in the landfill gas (%)	Average oxygen content in the landfill gas (%)	Average methane content in the exhaust gas (ppm)	Average oxygen content in the exhaust gas (%)	Average exhaust gas temperature (°C)		Average flare efficiency (%)	PE flare (tCO <sub>2</sub> e)	Total ERy (tCO <sub>2</sub> e)	Availability	
										TT-04	TT-05				Hr	%
01/07/2009	125,145	153,426	5,214	6,393	47.1	33.2	3.5	52.7	14.1	937.6	968.2	99.9%	1.32	709.42	24.0	100%
02/07/2009	125,088	150,042	5,212	6,252	46.4	32.6	3.9	39.0	14.0	920.6	959.5	99.9%	0.95	697.26	24.0	100%
03/07/2009	117,126	141,268	5,111	6,164	46.8	33.3	3.5	25.9	13.9	899.1	947.0	99.9%	0.72	659.79	22.9	95%
04/07/2009	120,300	146,669	5,013	6,111	45.6	32.9	3.7	0.1	13.8	905.3	952.4	100.0%	0.40	659.10	24.0	100%
05/07/2009	117,868	143,431	4,911	5,976	47.4	33.1	3.7	37.2	13.6	920.4	951.5	99.9%	0.97	652.43	24.0	100%
06/07/2009	84,302	101,568	4,983	6,004	46.9	33.7	3.4	4.1	13.8	920.4	950.8	100.0%	0.18	476.30	16.9	70%
07/07/2009	125,606	153,367	5,234	6,390	46.0	33.3	3.5	6.5	13.9	923.0	953.8	100.0%	0.16	694.94	24.0	100%
08/07/2009	126,314	154,686	5,263	6,445	46.5	33.8	3.4	24.6	14.4	930.5	962.3	99.9%	0.66	706.36	24.0	100%
09/07/2009	125,526	154,299	5,230	6,429	47.6	34.4	3.2	19.5	14.4	930.9	965.1	99.9%	0.53	717.84	24.0	100%
10/07/2009	126,903	153,938	5,288	6,414	46.8	33.8	3.4	27.7	14.3	932.7	965.6	99.9%	0.73	714.74	24.0	100%
11/07/2009	123,319	148,232	5,138	6,176	46.4	33.4	3.7	28.8	14.2	914.9	948.7	99.9%	0.72	687.81	24.0	100%
12/07/2009	122,753	148,007	5,115	6,167	46.9	33.6	3.5	22.3	13.7	925.1	963.5	99.9%	0.52	692.24	24.0	100%
13/07/2009	115,209	138,429	5,178	6,222	47.7	34.1	3.3	30.0	14.0	920.2	956.3	99.9%	0.70	662.12	22.3	93%
14/07/2009	124,779	151,296	5,199	6,304	48.0	34.2	3.3	30.7	14.4	921.0	960.0	99.9%	0.81	720.01	24.0	100%
15/07/2009	126,928	154,059	5,289	6,419	47.0	33.5	3.6	34.6	14.1	928.5	962.0	99.9%	0.88	717.90	24.0	100%
16/07/2009	127,768	156,255	5,324	6,511	47.4	33.6	3.5	49.4	14.0	931.2	963.6	99.9%	1.31	727.84	24.0	100%
17/07/2009	124,049	151,990	5,409	6,627	46.6	33.5	3.6	41.6	13.9	933.2	966.0	99.9%	1.10	695.62	22.9	96%
18/07/2009	129,527	158,381	5,397	6,599	45.6	33.3	3.7	39.6	14.1	927.3	961.5	99.9%	1.07	710.37	24.0	100%
19/07/2009	128,640	155,180	5,360	6,466	45.5	33.1	3.7	13.8	14.2	918.7	956.3	100.0%	0.35	704.02	24.0	100%
20/07/2009	102,647	123,343	5,305	6,374	45.9	33.6	3.6	6.8	14.2	921.7	964.2	99.9%	0.47	566.63	19.4	81%
21/07/2009	127,118	154,374	5,297	6,432	45.5	33.6	3.5	0.0	14.0	917.2	962.1	99.9%	0.66	696.01	24.0	100%
22/07/2009	127,387	155,930	5,308	6,497	45.4	33.5	3.5	0.0	13.1	926.4	966.4	99.9%	0.44	696.27	24.0	100%
23/07/2009	129,050	156,600	5,377	6,525	45.2	33.4	3.7	3.2	13.3	927.9	972.0	100.0%	0.24	702.23	24.0	100%
24/07/2009	126,160	150,511	5,501	6,563	46.0	34.1	3.5	5.3	13.7	915.4	967.8	100.0%	0.13	698.11	22.9	96%
25/07/2009	131,892	157,729	5,496	6,572	47.7	35.3	3.0	9.3	14.0	918.5	969.7	100.0%	0.25	757.36	24.0	100%
26/07/2009	134,567	163,219	5,607	6,801	47.3	34.9	3.1	12.7	14.0	913.6	966.5	100.0%	0.34	766.01	24.0	100%
27/07/2009	133,022	161,727	5,543	6,739	47.6	35.0	3.1	13.9	13.9	909.8	961.6	100.0%	0.36	761.85	24.0	100%
28/07/2009	134,107	163,132	5,588	6,797	47.8	35.1	3.1	18.8	13.7	921.4	974.5	99.9%	0.49	771.45	24.0	100%
29/07/2009	133,664	161,387	5,569	6,724	47.7	35.0	3.2	23.5	13.8	915.4	965.7	99.9%	0.61	767.46	24.0	100%
30/07/2009	130,979	157,971	5,457	6,582	47.7	34.8	3.2	26.4	13.8	909.8	951.2	99.9%	0.67	750.19	24.0	100%
31/07/2009	133,916	161,691	5,580	6,737	47.2	34.4	3.4	28.2	13.5	926.7	964.3	99.9%	0.69	759.67	24.0	100%
<b>Average:</b>	<b>124,570</b>	<b>151,037</b>	<b>5,306</b>	<b>6,433</b>	<b>46.8</b>	<b>33.8</b>	<b>3.4</b>	<b>21.8</b>	<b>13.9</b>	<b>921.4</b>	<b>961.3</b>	<b>99.9%</b>	<b>0.63</b>	<b>699.98</b>		
<b>Total:</b>	<b>3,861,658</b>	<b>4,682,138</b>											<b>19.42</b>	<b>21,699.35</b>	<b>727.3</b>	<b>98%</b>



Monitored Parameter	LFG Total,y = LFG flared,y		FV RG,h		wCH <sub>4</sub> ,y = fv CH <sub>4</sub> ,h	wCO <sub>2</sub> ,y	wO <sub>2</sub> ,y	fv CH <sub>4</sub> ,FG,h	t O <sub>2</sub> ,h	T flare		FE	PE flare,y	ERy	Flare h	
Date	Total captured landfill gas (Nm3)	Total captured landfill gas (m3)	Average gas flow to flare (Nm3/h)	Average gas flow to flare (m3/h)	Average methane content in the landfill gas (%)	Average carbon dioxide content in the landfill gas (%)	Average oxygen content in the landfill gas (%)	Average methane content in the exhaust gas (ppm)	Average oxygen content in the exhaust gas (%)	Average exhaust gas temperature (°C)		Average flare efficiency (%)	PEflare (tCO <sub>2</sub> e)	Total ERy (tCO <sub>2</sub> e)	Availability	
										TT-04	TT-05				Hr	%
01/08/2009	100,818	123,476	5,504	6,741	47.4	34.4	3.4	46.1	14.5	920.8	963.2	99.9%	1.04	574.82	18.3	76%
02/08/2009	125,925	153,800	5,531	6,756	47.0	35.0	2.9	0.0	14.3	890.7	942.5	99.3%	6.49	716.48	22.9	96%
03/08/2009	121,499	147,563	5,582	6,779	46.0	34.0	3.4	0.0	14.0	904.6	954.5	100.0%	0.07	672.25	21.8	91%
04/08/2009	133,082	162,010	5,545	6,750	45.8	33.5	3.8	5.5	13.4	922.9	961.2	100.0%	0.23	734.01	24.0	100%
05/08/2009	133,174	163,726	5,549	6,822	46.2	33.7	3.7	13.8	13.9	922.7	962.0	100.0%	0.38	741.13	24.0	100%
06/08/2009	134,986	166,461	5,624	6,936	46.5	33.8	3.6	6.7	13.3	927.4	969.4	100.0%	0.15	754.66	24.0	100%
07/08/2009	134,068	164,450	5,586	6,852	46.5	33.6	3.7	11.1	13.6	917.7	963.5	100.0%	0.27	749.29	24.0	100%
08/08/2009	120,623	148,910	5,619	6,937	46.7	34.0	3.2	13.4	13.6	918.0	965.3	100.0%	0.30	677.46	21.5	89%
09/08/2009	105,462	130,570	5,546	6,866	47.0	34.1	3.2	17.3	14.1	909.3	957.4	100.0%	0.37	596.23	19.0	79%
10/08/2009	134,799	163,432	5,617	6,810	46.8	34.2	3.2	0.0	13.9	906.0	956.7	100.0%	0.08	758.05	24.0	100%
11/08/2009	132,421	159,709	5,587	6,739	45.8	33.4	3.5	0.0	13.7	910.0	954.2	100.0%	0.08	729.19	23.7	99%
12/08/2009	132,130	160,960	5,579	6,796	45.8	33.4	3.5	0.0	13.6	905.0	949.4	100.0%	0.07	727.60	23.7	99%
13/08/2009	132,228	161,016	5,510	6,709	45.7	33.3	3.6	1.8	13.7	916.5	949.8	100.0%	0.11	726.80	24.0	100%
14/08/2009	132,242	161,469	5,572	6,803	46.1	33.5	3.5	7.5	13.4	911.6	953.6	100.0%	0.17	733.75	23.7	99%
15/08/2009	132,840	162,619	5,535	6,776	45.9	33.2	3.6	9.7	13.2	915.0	958.5	100.0%	0.22	733.19	24.0	100%
16/08/2009	132,531	162,704	5,522	6,779	45.9	33.2	3.6	12.7	13.5	916.3	964.2	100.0%	0.30	732.14	24.0	100%
17/08/2009	131,801	162,170	5,492	6,757	46.3	33.4	3.6	16.1	13.5	914.1	961.4	100.0%	0.38	734.89	24.0	100%
18/08/2009	128,126	155,334	5,339	6,472	47.4	34.0	3.3	20.7	13.7	905.6	952.2	99.9%	0.51	728.31	24.0	100%
19/08/2009	130,010	158,063	5,509	6,698	46.7	34.1	3.2	7.6	14.1	915.2	960.9	100.0%	0.24	730.15	23.6	98%
20/08/2009	131,693	160,195	5,487	6,675	45.1	33.4	3.5	0.0	14.3	914.2	960.3	100.0%	0.07	714.69	24.0	100%
21/08/2009	130,247	155,333	5,427	6,472	45.0	33.1	3.7	3.6	13.2	919.3	964.4	100.0%	0.09	704.02	24.0	100%
22/08/2009	127,966	154,016	5,332	6,417	45.0	32.9	3.8	10.5	13.1	922.8	963.5	100.0%	0.22	692.58	24.0	100%
23/08/2009	125,756	150,785	5,240	6,283	45.5	33.2	3.7	12.3	13.1	920.7	960.1	100.0%	0.26	687.26	24.0	100%
24/08/2009	126,536	153,810	5,272	6,409	46.0	33.6	3.5	15.9	13.6	917.1	955.3	100.0%	0.37	699.91	24.0	100%
25/08/2009	128,778	155,547	5,366	6,481	46.3	33.7	3.5	17.5	13.8	909.6	960.1	100.0%	0.42	716.70	24.0	100%
26/08/2009	126,493	154,478	5,271	6,437	47.2	34.3	3.2	22.8	14.0	901.5	947.4	99.9%	0.59	716.71	24.0	100%
27/08/2009	132,686	162,318	5,529	6,763	46.3	33.5	3.5	22.5	13.7	914.5	959.4	99.9%	0.55	739.11	24.0	100%
28/08/2009	127,602	156,366	5,544	6,794	47.0	33.9	3.3	26.6	14.1	909.4	958.5	99.9%	0.69	720.85	23.0	96%
29/08/2009	120,312	147,458	5,383	6,598	47.2	33.9	3.3	32.4	14.2	897.2	944.3	99.9%	0.85	682.47	22.4	93%
30/08/2009	128,299	157,291	5,346	6,554	47.1	33.7	3.4	35.0	12.8	898.8	945.8	99.9%	0.88	725.77	24.0	100%
31/08/2009	129,998	159,627	5,417	6,651	47.7	34.2	3.2	38.4	13.5	911.1	954.1	99.9%	0.94	745.26	24.0	100%
<b>Average:</b>	<b>127,907</b>	<b>155,989</b>	<b>5,483</b>	<b>6,687</b>	<b>46.3</b>	<b>33.7</b>	<b>3.5</b>	<b>13.8</b>	<b>13.7</b>	<b>912.4</b>	<b>957.2</b>	<b>99.9%</b>	<b>0.56</b>	<b>712.77</b>		
<b>Total:</b>	<b>3,965,130</b>	<b>4,835,667</b>											<b>17.41</b>	<b>22,095.73</b>	<b>723.6</b>	<b>97%</b>

Monitored Parameter	LFG Total,y = LFG flared,y		FV RG,h		wCH <sub>4</sub> ,y = fv CH <sub>4</sub> ,h	wCO <sub>2</sub> ,y	wO <sub>2</sub> ,y	fv CH <sub>4</sub> ,FG,h	t O <sub>2</sub> ,h	T flare		FE	PE flare,y	ERy	Flare h	
Date	Total captured landfill gas (Nm3)	Total captured landfill gas (m3)	Average gas flow to flare (Nm3/h)	Average gas flow to flare (m3/h)	Average methane content in the landfill gas (%)	Average carbon dioxide content in the landfill gas (%)	Average oxygen content in the landfill gas (%)	Average methane content in the exhaust gas (ppm)	Average oxygen content in the exhaust gas (%)	Average exhaust gas temperature (°C)		Average flare efficiency (%)	PEflare (tCO <sub>2</sub> e)	Total I ERy (tCO <sub>2</sub> e)	Availability	
										TT-04	TT-05				Hr	%
01/09/2009	130,737	161,273	5,447	6,720	46.8	33.5	3.5	41.4	13.6	916.6	960.3	99.9%	1.00	735.32	24.0	100%
02/09/2009	120,637	149,218	5,027	6,217	48.2	34.4	3.0	47.0	14.2	894.6	938.9	99.9%	1.18	696.89	24.0	100%
03/09/2009	117,925	144,999	5,142	6,323	48.1	34.6	3.0	39.7	14.1	905.5	949.8	99.9%	0.96	680.36	22.9	96%
04/09/2009	128,439	155,885	5,408	6,564	47.1	34.6	3.1	12.6	14.0	920.6	964.9	100.0%	0.32	727.58	23.8	99%
05/09/2009	130,159	159,748	5,423	6,656	46.2	33.8	3.5	15.8	13.9	910.6	958.0	100.0%	0.40	722.42	24.0	100%
06/09/2009	125,805	152,324	5,242	6,347	46.9	34.3	3.3	18.8	13.6	919.6	966.5	99.9%	0.44	709.34	24.0	100%
07/09/2009	128,751	159,597	5,365	6,650	47.2	34.4	3.2	21.1	13.6	922.0	962.9	99.9%	0.51	730.51	24.0	100%
08/09/2009	122,571	147,711	5,349	6,446	46.7	33.9	3.5	25.6	14.0	919.1	966.0	99.9%	0.61	688.72	22.9	95%
09/09/2009	128,551	156,801	5,356	6,533	47.6	34.4	3.3	28.7	13.7	926.9	968.1	99.9%	0.70	735.86	24.0	100%
10/09/2009	129,560	158,919	5,398	6,622	47.1	34.1	3.4	30.0	13.7	918.2	965.9	99.9%	0.73	734.39	24.0	100%
11/09/2009	129,835	159,738	5,410	6,656	47.9	34.5	3.2	35.3	14.1	917.4	965.0	99.9%	0.92	747.95	24.0	100%
12/09/2009	131,359	162,739	5,473	6,781	48.4	34.8	3.0	38.7	14.3	913.8	960.7	99.9%	1.09	765.02	24.0	100%
13/09/2009	132,200	163,549	5,508	6,815	48.0	34.4	3.2	41.1	13.9	919.7	965.5	99.9%	1.07	763.22	24.0	100%
14/09/2009	129,900	157,016	5,413	6,542	47.9	34.2	3.4	50.0	14.0	916.2	961.5	99.9%	1.29	747.71	24.0	100%
15/09/2009	131,664	160,681	5,486	6,695	49.0	34.9	3.0	51.4	13.8	926.6	970.1	99.9%	1.34	776.70	24.0	100%
16/09/2009	131,784	162,213	5,491	6,759	49.6	35.3	2.9	53.8	13.8	917.5	956.8	99.9%	1.42	786.94	24.0	100%
17/09/2009	131,055	160,042	5,461	6,668	50.0	35.5	2.8	55.9	13.4	931.6	970.9	99.9%	1.42	787.41	24.0	100%
18/09/2009	117,254	144,523	5,475	6,748	47.8	35.2	2.9	29.3	14.1	913.8	964.0	99.9%	0.83	673.46	21.4	89%
19/09/2009	116,742	143,353	5,577	6,848	45.0	34.8	3.1	0.0	14.0	904.2	954.9	100.0%	0.07	631.41	20.9	87%
20/09/2009	125,880	153,866	5,473	6,690	44.4	34.2	3.3	5.3	14.4	914.2	956.6	100.0%	0.21	671.61	23.0	96%
21/09/2009	130,771	158,159	5,449	6,590	44.6	34.4	3.2	10.6	14.2	919.0	959.5	100.0%	0.31	701.78	24.0	100%
22/09/2009	129,303	156,998	5,388	6,542	45.6	34.9	3.0	8.5	14.2	926.5	963.1	100.0%	0.22	709.06	24.0	100%
23/09/2009	128,502	156,130	5,354	6,505	46.4	35.5	2.7	11.2	14.2	919.5	958.3	100.0%	0.29	717.57	24.0	100%
24/09/2009	128,457	155,232	5,352	6,468	46.1	35.2	2.8	12.3	14.1	920.7	965.0	100.0%	0.31	711.89	24.0	100%
25/09/2009	127,920	156,331	5,330	6,514	46.2	35.1	2.9	16.2	14.1	922.6	959.9	100.0%	0.41	709.90	24.0	100%
26/09/2009	123,402	152,227	5,381	6,638	46.1	35.0	2.9	21.1	14.5	915.2	959.3	99.9%	0.56	684.57	22.9	96%
27/09/2009	130,689	162,670	5,445	6,778	45.2	34.2	3.3	19.5	14.0	913.1	961.0	99.9%	0.48	710.38	24.0	100%
28/09/2009	124,523	153,543	5,414	6,676	45.6	34.5	3.2	23.5	13.9	920.2	964.2	99.9%	0.56	682.43	23.0	96%
29/09/2009	127,883	155,055	5,328	6,461	46.3	35.0	2.9	29.0	14.2	923.4	964.3	99.9%	0.75	712.31	24.0	100%
30/09/2009	124,892	150,841	5,204	6,285	46.5	35.0	2.9	32.0	14.5	918.6	952.1	99.9%	0.84	698.27	24.0	100%
<b>Average:</b>	<b>127,238</b>	<b>155,713</b>	<b>5,386</b>	<b>6,591</b>	<b>47.0</b>	<b>34.6</b>	<b>3.1</b>	<b>27.5</b>	<b>14.0</b>	<b>917.6</b>	<b>961.1</b>	<b>99.9%</b>	<b>0.71</b>	<b>718.37</b>		
<b>Total:</b>	<b>3,817,149</b>	<b>4,671,381</b>											<b>21.26</b>	<b>21,550.96</b>	<b>708.9</b>	<b>98%</b>

Monitored Parameter	LFG Total,y = LFG flared,y		FV RG,h		wCH <sub>4</sub> ,y = fv CH <sub>4</sub> ,h	wCO <sub>2</sub> ,y	wO <sub>2</sub> ,y	fv CH <sub>4</sub> ,FG,h	t O <sub>2</sub> ,h	T flare		FE	PE flare,y	ERy	Flare h	
Date	Total captured landfill gas (Nm3)	Total captured landfill gas (m3)	Average gas flow to flare (Nm3/h)	Average gas flow to flare (m3/h)	Average methane content in the landfill gas (%)	Average carbon dioxide content in the landfill gas (%)	Average oxygen content in the landfill gas (%)	Average methane content in the exhaust gas (ppm)	Average oxygen content in the exhaust gas (%)	Average exhaust gas temperature (°C)		Average flare efficiency (%)	PE flare (tCO <sub>2</sub> e)	Total ERy (tCO <sub>2</sub> e)	Availability	
										TT-04	TT-05				Hr	%
01/10/2009	124,531	153,002	5,189	6,375	47.3	35.4	2.8	35.9	14.4	918.8	954.2	99.9%	0.02	11.79	24.0	100%
02/10/2009	122,101	151,318	5,328	6,603	47.0	35.1	2.8	27.5	14.9	919.2	966.9	99.9%	0.74	690.53	22.9	95%
03/10/2009	129,863	159,332	5,411	6,639	45.4	33.5	3.3	3.4	14.3	916.2	970.1	100.0%	0.12	709.01	24.0	100%
04/10/2009	123,646	151,941	5,228	6,425	45.8	33.7	3.2	6.5	14.3	917.6	971.7	100.0%	0.18	681.60	23.7	99%
05/10/2009	124,416	155,340	5,184	6,472	47.1	34.6	2.8	10.0	14.5	920.6	971.9	100.0%	0.28	705.68	24.0	100%
06/10/2009	121,773	151,074	5,314	6,592	46.5	34.1	3.1	13.7	14.5	915.8	963.4	100.0%	0.36	680.64	22.9	95%
07/10/2009	128,440	157,823	5,352	6,576	45.9	33.6	3.3	17.5	15.2	923.8	976.1	99.9%	0.85	709.72	24.0	100%
08/10/2009	126,733	152,678	5,281	6,362	45.8	33.4	3.4	23.4	14.0	920.3	968.6	99.9%	0.61	698.21	24.0	100%
09/10/2009	124,833	150,901	5,201	6,288	46.8	34.0	3.1	27.4	14.2	914.9	966.7	99.9%	0.72	702.95	24.0	100%
10/10/2009	125,831	153,038	5,243	6,377	46.2	33.5	3.3	29.5	14.3	914.1	971.4	99.9%	0.78	699.09	24.0	100%
11/10/2009	83,132	101,694	5,245	6,416	46.5	34.3	34.3	23.9	14.8	912.9	966.3	99.9%	0.45	465.02	15.9	66%
12/10/2009	84,185	103,732	5,262	6,483	46.6	35.1	2.8	7.9	14.6	918.9	971.7	99.0%	6.43	472.41	16.0	67%
13/10/2009	122,679	149,379	5,326	6,485	45.7	34.5	3.0	0.0	14.9	915.8	971.6	91.6%	70.41	674.13	24.0	100%
14/10/2009	124,105	153,901	5,244	6,503	46.6	35.0	2.8	0.0	14.8	914.7	968.9	90.8%	79.67	694.07	23.7	99%
15/10/2009	129,087	157,238	5,379	6,552	45.2	33.9	3.3	0.0	14.7	916.4	968.9	90.5%	83.52	700.73	24.0	100%
16/10/2009	127,921	156,314	5,330	6,513	44.7	33.4	3.5	0.0	14.5	911.0	964.5	91.0%	77.59	686.57	24.0	100%
17/10/2009	130,224	158,170	5,426	6,590	45.6	33.9	3.3	4.5	14.8	907.9	960.3	91.5%	75.51	712.70	24.0	100%
18/10/2009	134,869	167,358	5,620	6,973	45.9	34.2	3.2	0.0	14.7	915.7	963.0	91.8%	76.59	743.01	24.0	100%
19/10/2009	128,061	157,438	5,580	6,860	45.9	34.1	3.2	6.3	14.7	910.3	956.4	92.7%	64.64	705.15	24.0	100%
20/10/2009	136,563	169,364	5,690	7,057	45.2	33.6	3.5	0.0	14.8	919.1	971.2	95.1%	45.76	742.18	24.0	100%
21/10/2009	135,049	168,134	5,627	7,006	44.9	33.2	3.6	0.0	14.7	919.2	970.8	98.3%	15.61	728.10	24.0	100%
22/10/2009	99,460	122,636	5,480	6,757	47.3	34.9	3.0	14.1	14.5	901.2	948.8	97.9%	14.20	563.42	18.6	78%
23/10/2009	126,519	157,664	5,272	6,569	45.9	33.7	3.5	13.3	14.7	905.5	953.8	99.9%	0.45	698.75	24.0	100%
24/10/2009	132,231	165,579	5,510	6,899	45.1	33.1	3.7	11.8	14.5	909.4	956.6	100.0%	0.34	716.66	24.0	100%
25/10/2009	128,769	159,269	5,365	6,636	45.3	33.1	3.8	19.2	14.3	908.2	952.5	99.9%	0.54	700.74	24.0	100%
26/10/2009	82,237	103,251	5,489	6,891	46.2	33.7	3.5	15.8	14.2	913.4	959.3	100.0%	0.26	457.02	15.0	62%
27/10/2009	87,208	106,372	5,681	6,930	46.1	33.8	3.6	28.9	14.6	913.9	969.4	99.9%	0.60	483.63	15.4	64%
28/10/2009	132,710	163,079	5,530	6,795	45.9	33.5	3.6	26.2	14.8	911.6	966.3	99.9%	0.76	731.83	24.0	100%
29/10/2009	135,102	166,819	5,629	6,951	45.7	33.3	3.6	29.4	14.8	914.8	968.6	99.9%	0.87	741.74	24.0	100%
30/10/2009	134,498	167,575	5,604	6,982	45.9	33.4	3.6	31.5	14.6	920.8	960.2	99.9%	0.89	741.82	24.0	100%
31/10/2009	133,721	167,616	5,572	6,984	45.9	33.4	3.5	51.1	14.7	910.6	959.2	99.8%	1.51	738.32	24.0	100%
<b>Average:</b>	<b>121,951</b>	<b>150,291</b>	<b>5,406</b>	<b>6,663</b>	<b>46.0</b>	<b>33.9</b>	<b>4.3</b>	<b>15.4</b>	<b>14.6</b>	<b>914.6</b>	<b>964.8</b>	<b>97.7%</b>	<b>20.04</b>	<b>651.20</b>		
<b>Total:</b>	<b>3,780,495</b>	<b>4,659,028</b>											<b>621.24</b>	<b>20,187.22</b>	<b>701.9</b>	<b>94%</b>

Monitored Parameter	LFG Total, y = LFG flared, y		FV RG, h		wCH <sub>4</sub> , y = fv CH <sub>4</sub> , h	wCO <sub>2</sub> , y	wO <sub>2</sub> , y	fv CH <sub>4</sub> , FG, h	t O <sub>2</sub> , h	T flare		FE	PE flare, y	ERy	Flare h	
Date	Total captured landfill gas (Nm3)	Total captured landfill gas (m3)	Average gas flow to flare (Nm3/h)	Average gas flow to flare (m3/h)	Average methane content in the landfill gas (%)	Average carbon dioxide content in the landfill gas (%)	Average oxygen content in the landfill gas (%)	Average methane content in the exhaust gas (ppm)	Average oxygen content in the exhaust gas (%)	Average exhaust gas temperature (°C)		Average flare efficiency (%)	PE flare (tCO <sub>2</sub> e)	Total ERy (tCO <sub>2</sub> e)	Availability	
										TT-04	TT-05				Hr	%
01/11/2009	125,726	157,479	5,466	6,847	46.7	33.8	3.4	65.4	14.8	906.3	947.9	99.8%	1.87	704.22	23.0	96%
02/11/2009	131,084	164,993	5,462	6,875	45.8	33.1	3.7	55.5	14.7	911.8	948.6	99.8%	1.56	721.48	24.0	100%
03/11/2009	119,934	150,515	5,291	6,640	47.4	34.2	3.3	55.3	14.7	900.6	938.4	99.8%	1.47	680.43	22.6	94%
04/11/2009	128,041	160,932	5,335	6,706	45.7	32.9	3.9	65.3	14.7	915.5	953.6	99.8%	1.87	704.20	24.0	100%
05/11/2009	123,123	154,972	5,373	6,762	46.1	33.2	3.8	81.3	14.6	913.1	957.3	99.7%	2.29	683.08	22.9	95%
06/11/2009	129,829	162,623	5,490	6,876	45.1	33.0	3.7	41.2	14.5	912.1	962.2	99.9%	1.18	704.06	23.7	99%
07/11/2009	129,321	162,221	5,388	6,759	43.6	32.6	3.8	30.2	14.6	902.2	949.3	99.9%	0.92	677.52	24.0	100%
08/11/2009	127,123	157,259	5,297	6,552	44.2	32.9	3.8	29.2	14.6	904.1	955.2	99.9%	0.88	675.78	24.0	100%
09/11/2009	127,790	158,298	5,325	6,596	47.0	34.6	3.1	44.3	14.2	913.2	961.8	99.8%	1.41	720.96	24.0	100%
10/11/2009	91,938	114,843	5,340	6,670	46.9	35.0	3.0	24.4	14.7	900.5	952.2	99.9%	0.61	519.10	17.2	72%
11/11/2009	119,997	150,409	5,509	6,905	45.7	34.6	3.2	0.0	14.1	904.7	950.9	91.2%	72.62	659.40	21.8	91%
12/11/2009	129,837	163,358	5,410	6,807	45.4	34.3	3.2	0.0	13.4	915.7	955.2	92.2%	68.71	708.00	24.0	100%
13/11/2009	129,400	163,199	5,392	6,800	45.3	34.1	3.3	0.0	13.7	912.0	955.7	94.3%	50.23	704.17	24.0	100%
14/11/2009	127,068	159,704	5,295	6,654	45.0	33.8	3.5	0.0	13.5	912.5	955.7	98.1%	15.78	685.52	24.0	100%
15/11/2009	129,432	161,715	5,393	6,738	44.7	33.6	3.6	0.0	13.8	904.3	950.9	100.0%	0.10	695.12	24.0	100%
16/11/2009	126,676	157,749	5,278	6,573	46.1	34.6	3.2	2.4	13.6	908.6	954.3	100.0%	0.12	701.34	24.0	100%
17/11/2009	129,468	162,296	5,394	6,762	45.6	34.1	3.4	4.7	13.9	909.0	956.1	100.0%	0.12	709.45	24.0	100%
18/11/2009	120,440	151,342	5,154	6,477	47.3	35.4	2.7	29.8	14.8	892.7	941.5	99.9%	0.99	684.27	23.4	97%
19/11/2009	128,580	162,771	5,357	6,782	45.2	33.9	3.3	28.5	14.4	902.9	945.5	99.9%	0.87	697.57	24.0	100%
20/11/2009	112,694	140,180	5,295	6,586	45.1	33.5	3.4	42.1	14.4	904.1	954.5	99.8%	1.13	610.99	21.3	89%
21/11/2009	121,390	151,416	5,221	6,513	46.6	34.0	3.3	15.4	14.2	913.6	961.6	100.0%	0.41	679.45	23.3	97%
22/11/2009	121,291	150,932	5,054	6,289	46.6	33.9	3.3	24.7	14.5	907.3	956.9	99.9%	0.76	678.71	24.0	100%
23/11/2009	119,143	148,502	5,195	6,475	47.3	34.3	3.1	44.6	14.5	915.6	962.3	99.8%	1.51	676.27	22.9	96%
24/11/2009	114,908	142,359	5,243	6,495	47.4	34.4	3.1	97.4	14.4	906.1	956.3	99.6%	3.21	654.71	21.9	91%
25/11/2009	122,525	153,010	5,339	6,667	47.3	34.2	3.2	33.3	14.4	913.7	960.6	99.9%	0.90	696.59	22.9	96%
26/11/2009	128,517	161,259	5,355	6,719	46.7	33.8	3.4	53.6	14.2	908.6	949.7	99.8%	1.69	720.15	24.0	100%
27/11/2009	131,937	165,178	5,497	6,882	46.5	33.6	3.4	59.6	14.5	907.7	955.3	99.8%	1.81	736.54	24.0	100%
28/11/2009	130,998	162,233	5,458	6,760	47.5	34.2	3.3	60.9	14.9	910.3	960.5	99.8%	1.96	747.72	24.0	100%
29/11/2009	126,911	156,330	5,288	6,514	48.0	34.5	3.2	43.0	14.7	912.0	959.0	99.9%	1.24	732.05	24.0	100%
30/11/2009	120,678	151,830	5,481	6,896	47.2	33.9	3.3	68.1	14.4	915.9	956.6	99.8%	1.89	684.28	22.0	92%
<b>Average:</b>	<b>124,193</b>	<b>155,330</b>	<b>5,346</b>	<b>6,686</b>	<b>46.2</b>	<b>33.9</b>	<b>3.4</b>	<b>36.7</b>	<b>14.3</b>	<b>908.6</b>	<b>954.2</b>	<b>99.1%</b>	<b>8.00</b>	<b>688.44</b>		
<b>Total:</b>	<b>3,725,798</b>	<b>4,659,906</b>											<b>240.10</b>	<b>20,653.12</b>	<b>696.9</b>	<b>97%</b>

Monitored Parameter	LFG Total,y = LFG flared,y		FV RG,h		wCH <sub>4</sub> ,y = fv CH <sub>4</sub> ,h	wCO <sub>2</sub> ,y	wO <sub>2</sub> ,y	fv CH <sub>4</sub> ,FG,h	t O <sub>2</sub> ,h	T flare		FE	PE flare,y	ERy	Flare h	
Date	Total captured landfill gas (Nm3)	Total captured landfill gas (m3)	Average gas flow to flare (Nm3/h)	Average gas flow to flare (m3/h)	Average methane content in the landfill gas (%)	Average carbon dioxide content in the landfill gas (%)	Average oxygen content in the landfill gas (%)	Average methane content in the exhaust gas (ppm)	Average oxygen content in the exhaust gas (%)	Average exhaust gas temperature (°C)		Average flare efficiency (%)	PE flare (tCO <sub>2</sub> e)	Total ERy (tCO <sub>2</sub> e)	Availability	
										TT-04	TT-05				Hr	%
01/12/2009	128,871	159,938	5,603	6,954	46.4	33.3	3.8	67.9	14.8	916.9	960.8	99.8%	2.12	718.92	23.0	96%
02/12/2009	131,495	164,372	5,541	6,926	48.9	35.0	2.9	85.6	14.7	909.7	959.1	99.7%	2.88	772.60	23.7	99%
03/12/2009	135,198	168,521	5,633	7,022	48.6	34.7	3.1	56.5	14.4	912.8	966.9	99.8%	1.66	789.06	24.0	100%
04/12/2009	132,934	161,844	5,539	6,744	49.1	35.0	3.0	60.5	14.2	906.7	962.3	99.8%	1.72	784.79	24.0	100%
05/12/2009	132,086	162,012	5,504	6,750	48.6	34.6	3.1	104.7	14.8	906.2	961.2	99.6%	3.76	771.97	24.0	100%
06/12/2009	134,237	166,654	5,593	6,944	48.2	34.3	3.2	71.6	14.5	910.4	963.1	99.8%	2.20	778.41	24.0	100%
07/12/2009	134,206	165,502	5,592	6,896	49.1	34.9	3.0	94.1	14.4	909.1	953.0	99.7%	2.75	791.52	24.0	100%
08/12/2009	132,213	161,443	5,509	6,727	50.3	35.6	2.8	89.3	14.5	911.9	956.6	99.7%	2.72	798.07	24.0	100%
09/12/2009	125,339	154,591	5,550	6,845	48.5	35.1	3.0	75.8	14.8	908.7	962.6	99.7%	2.57	729.71	22.6	94%
10/12/2009	128,103	159,638	5,586	6,961	46.1	34.9	3.0	10.1	14.9	917.1	967.3	100.0%	0.42	709.05	22.9	96%
11/12/2009	135,670	169,206	5,653	7,050	46.7	35.2	3.0	30.0	14.4	914.0	955.1	99.9%	1.01	761.14	24.0	100%
12/12/2009	135,703	168,557	5,654	7,023	46.1	34.7	3.3	38.4	14.9	921.6	969.4	99.9%	1.24	752.12	24.0	100%
13/12/2009	131,517	160,134	5,480	6,672	45.8	34.4	3.4	55.1	14.7	908.7	954.6	99.8%	1.79	725.09	24.0	100%
14/12/2009	133,540	164,946	5,564	6,873	45.5	34.1	3.5	107.8	14.7	908.8	950.3	99.6%	3.30	729.67	24.0	100%
15/12/2009	134,218	167,758	5,592	6,990	45.5	34.2	3.4	84.4	14.9	911.9	954.9	99.7%	2.73	734.73	24.0	100%
16/12/2009	121,877	151,658	5,625	7,000	45.3	34.0	3.6	58.7	14.8	919.7	967.7	99.8%	1.79	663.78	21.7	90%
17/12/2009	126,342	157,364	5,586	6,958	46.1	34.5	3.4	64.5	15.0	908.5	960.1	99.8%	2.07	700.88	22.6	94%
18/12/2009	124,175	155,311	5,683	7,108	46.7	34.9	3.2	37.2	14.4	909.7	960.7	99.9%	1.08	697.90	21.9	91%
19/12/2009	135,496	169,823	5,646	7,076	46.3	34.5	3.3	35.9	14.9	906.5	960.2	99.9%	1.10	753.97	24.0	100%
20/12/2009	104,362	130,070	5,561	6,931	46.3	34.7	3.4	28.1	14.6	904.8	953.5	99.9%	0.71	580.52	18.8	78%
21/12/2009	131,658	166,288	5,486	6,929	45.2	34.5	3.4	0.0	13.0	913.4	942.0	100.0%	0.07	715.43	24.0	100%
22/12/2009	129,782	163,936	5,408	6,831	45.1	34.4	3.4	113.5	14.4	918.7	951.9	99.6%	3.69	703.85	24.0	100%
23/12/2009	117,699	147,426	5,387	6,747	45.5	34.6	3.4	92.6	13.8	915.6	945.3	99.7%	2.75	643.24	21.9	91%
24/12/2009	131,965	165,439	5,499	6,893	45.6	33.6	3.4	12.2	13.6	924.3	950.4	99.9%	0.55	723.46	24.0	100%
25/12/2009	127,028	158,600	5,293	6,608	46.7	34.3	3.1	0.0	12.8	907.1	924.6	100.0%	0.06	711.52	24.0	100%
26/12/2009	130,707	164,014	5,446	6,834	47.3	34.8	2.9	15.7	12.5	915.6	946.1	100.0%	0.38	743.17	24.0	100%
27/12/2009	98,535	124,792	5,414	6,857	47.6	35.0	2.8	30.9	14.0	908.5	951.3	99.9%	0.76	563.91	18.4	76%
28/12/2009	81,889	102,583	5,667	7,099	47.6	34.8	3.0	10.7	11.5	917.5	942.8	100.0%	0.15	467.66	14.4	60%
29/12/2009	130,641	163,025	5,443	6,793	48.2	35.2	2.8	11.5	12.2	916.0	943.5	100.0%	0.25	756.92	24.0	100%
30/12/2009	130,918	164,174	5,455	6,841	47.3	34.5	3.0	14.6	13.1	922.6	958.9	100.0%	0.34	743.90	24.0	100%
31/12/2009	131,235	164,664	5,468	6,861	46.5	33.8	3.3	23.2	13.2	914.7	952.5	99.9%	0.55	734.03	24.0	100%
<b>Average:</b>	<b>127,085</b>	<b>158,203</b>	<b>5,537</b>	<b>6,895</b>	<b>47.0</b>	<b>34.6</b>	<b>3.2</b>	<b>51.0</b>	<b>14.1</b>	<b>912.8</b>	<b>955.1</b>	<b>99.8%</b>	<b>1.59</b>	<b>717.77</b>		
<b>Total:</b>	<b>3,939,642</b>	<b>4,904,280</b>											<b>49.17</b>	<b>22,250.97</b>	<b>711.8</b>	<b>96%</b>

Monitored Parameter	LFG Total,y = LFG flared,y		FV RG,h		wCH <sub>4</sub> ,y = fv CH <sub>4</sub> ,h	wCO <sub>2</sub> ,y	wO <sub>2</sub> ,y	fv CH <sub>4</sub> ,FG,h	t O <sub>2</sub> ,h	T flare		FE	PE flare,y	ERy	Flare h	
Date	Total captured landfill gas (Nm <sup>3</sup> )	Total captured landfill gas (m <sup>3</sup> )	Average gas flow to flare (Nm <sup>3</sup> /h)	Average gas flow to flare (m <sup>3</sup> /h)	Average methane content in the landfill gas (%)	Average carbon dioxide content in the landfill gas (%)	Average oxygen content in the landfill gas (%)	Average methane content in the exhaust gas (ppm)	Average oxygen content in the exhaust gas (%)	Average exhaust gas temperature (°C)		Average flare efficiency (%)	PE flare (tCO <sub>2</sub> e)	Total ERy (tCO <sub>2</sub> e)	Availability	
										TT-04	TT-05				Hr	%
01/01/2010	118,684	145,343	5,175	6,338	49.7	36.0	2.5	25.5	13.1	911.4	950.5	99.9%	0.56	708.83	22.9	96%
02/01/2010	128,723	161,346	5,363	6,723	48.0	34.7	3.0	25.2	13.4	913.1	949.7	99.9%	0.59	740.87	24.0	100%
03/01/2010	130,917	165,877	5,455	6,912	47.1	34.0	3.3	29.3	13.5	915.4	951.8	99.9%	0.70	740.27	24.0	100%
04/01/2010	115,242	144,288	5,505	6,893	46.9	34.0	3.3	35.4	13.6	910.2	949.4	99.9%	0.75	649.53	20.9	87%
05/01/2010	124,875	155,734	5,525	6,891	47.3	34.9	2.9	37.2	13.4	914.1	953.6	99.9%	0.85	711.06	22.6	94%
06/01/2010	130,050	162,961	5,419	6,790	47.1	34.6	3.0	42.2	13.3	916.7	951.7	99.9%	0.97	735.78	24.0	100%
07/01/2010	108,919	136,398	5,207	6,521	47.8	35.0	2.9	46.5	12.8	909.0	935.2	99.9%	0.88	625.50	20.9	87%
08/01/2010	88,098	110,454	4,963	6,223	49.0	35.8	2.6	22.6	12.6	914.7	933.1	99.9%	0.37	519.24	17.8	74%
09/01/2010	114,134	143,317	4,756	5,972	49.2	35.9	2.6	1.2	12.9	926.1	941.3	100.0%	0.06	675.81	24.0	100%
10/01/2010	111,870	141,650	4,878	6,177	49.9	36.3	2.3	4.5	12.5	924.0	936.0	100.0%	0.09	671.20	22.9	96%
11/01/2010	112,438	141,304	4,899	6,157	50.5	36.9	1.9	8.6	12.6	912.5	932.0	100.0%	0.17	682.26	23.0	96%
12/01/2010	53,558	65,708	4,513	5,537	53.2	38.7	1.2	15.5	13.4	913.4	933.8	100.0%	0.19	342.68	11.9	49%
13/01/2010	113,397	143,801	4,725	5,992	50.1	36.9	1.9	20.1	14.9	913.0	950.2	99.9%	0.57	682.69	24.0	100%
14/01/2010	111,695	140,369	4,654	5,849	50.4	36.9	2.1	47.1	15.5	907.7	947.7	99.8%	1.45	675.24	24.0	100%
15/01/2010	110,344	138,163	4,598	5,757	50.1	36.7	2.2	31.4	15.2	932.2	978.5	99.9%	0.91	664.37	24.0	100%
16/01/2010	108,909	136,708	4,538	5,696	50.2	36.8	2.1	30.1	14.8	918.1	961.3	99.9%	0.80	657.42	24.0	100%
17/01/2010	105,611	132,048	4,605	5,758	50.5	37.0	2.0	31.7	14.8	919.1	964.5	99.9%	0.82	641.55	22.9	96%
18/01/2010	111,281	139,481	4,637	5,812	49.4	36.1	2.4	36.3	14.5	918.1	962.3	99.9%	0.91	660.92	24.0	100%
19/01/2010	108,830	137,426	4,746	5,992	49.4	36.1	2.4	40.2	14.6	906.0	946.8	99.9%	1.00	645.06	22.9	96%
20/01/2010	115,170	146,186	4,799	6,091	48.4	35.5	2.6	42.5	14.8	910.6	952.4	99.9%	1.12	670.79	24.0	100%
21/01/2010	105,439	131,417	4,509	5,620	51.3	37.4	1.9	50.8	14.6	903.2	934.8	99.8%	1.28	650.32	23.4	97%
22/01/2010	97,517	120,300	4,309	5,315	51.8	37.9	1.6	32.8	14.5	906.6	939.9	99.9%	0.88	607.63	22.6	94%
23/01/2010	96,182	119,891	4,449	5,546	49.3	36.5	2.1	0.0	14.5	908.2	948.0	100.0%	0.09	568.85	21.6	90%
24/01/2010	106,034	130,875	4,418	5,453	49.8	36.8	2.1	1.4	14.4	924.1	964.1	100.0%	0.10	635.26	24.0	100%
25/01/2010	106,288	131,611	4,625	5,726	48.9	36.1	2.4	1.8	14.6	917.7	955.7	99.9%	0.08	624.96	23.0	96%
26/01/2010	31,475	38,652	4,282	5,259	51.6	37.9	1.5	3.1	14.7	916.4	954.8	100.0%	0.02	195.54	7.4	31%
27/01/2010	26,698	33,899	4,630	5,878	49.9	36.7	2.8	0.0	15.2	892.1	935.0	100.0%	0.03	159.68	16.2	67%
28/01/2010	107,056	132,825	4,517	5,604	51.7	37.4	2.1	10.5	15.5	906.2	954.5	100.0%	0.32	663.99	23.7	99%
29/01/2010	114,393	141,179	4,766	5,882	51.8	37.4	2.1	18.5	15.9	918.0	964.6	99.9%	0.66	712.75	24.0	100%
30/01/2010	114,947	143,575	4,789	5,982	51.8	37.3	2.1	20.1	15.4	925.3	971.2	99.9%	0.65	715.92	24.0	100%
31/01/2010	116,415	146,118	4,851	6,088	51.1	36.8	2.3	20.6	15.4	911.2	957.8	99.9%	0.64	714.28	24.0	100%
<b>Average:</b>	<b>104,683</b>	<b>130,932</b>	<b>4,810</b>	<b>6,014</b>	<b>49.8</b>	<b>36.4</b>	<b>2.3</b>	<b>23.6</b>	<b>14.2</b>	<b>914.0</b>	<b>950.4</b>	<b>99.9%</b>	<b>0.60</b>	<b>624.20</b>		
<b>Total:</b>	<b>3,245,188</b>	<b>4,058,903</b>											<b>18.53</b>	<b>19,350.24</b>	<b>682.5</b>	<b>92%</b>

Monitored Parameter	LFG Total,y = LFG flared,y		FV RG,h		wCH <sub>4</sub> ,y = fv CH <sub>4</sub> ,h	wCO <sub>2</sub> ,y	wO <sub>2</sub> ,y	fv CH <sub>4</sub> ,FG,h	t O <sub>2</sub> ,h	T flare		FE	PE flare,y	ERy	Flare h	
Date	Total captured landfill gas (Nm <sup>3</sup> )	Total captured landfill gas (m <sup>3</sup> )	Average gas flow to flare (Nm <sup>3</sup> /h)	Average gas flow to flare (m <sup>3</sup> /h)	Average methane content in the landfill gas (%)	Average carbon dioxide content in the landfill gas (%)	Average oxygen content in the landfill gas (%)	Average methane content in the exhaust gas (ppm)	Average oxygen content in the exhaust gas (%)	Average exhaust gas temperature (°C)		Average flare efficiency (%)	PEflare (tCO <sub>2</sub> e)	Total ERy (tCO <sub>2</sub> e)	Availability	
										TT-04	TT-05				Hr	%
01/02/2010	107,882	135,293	4,915	6,164	51.1	36.9	2.3	22.1	15.1	924.8	973.0	99.9%	0.61	663.40	22.0	91%
02/02/2010	91,449	114,028	4,934	6,153	51.4	37.0	2.3	29.9	15.4	913.5	959.5	99.9%	0.93	565.78	18.5	77%
03/02/2010	115,667	145,168	4,819	6,049	50.4	36.2	2.6	34.9	14.7	914.5	960.2	99.9%	1.18	700.40	24.0	100%
04/02/2010	75,255	95,915	4,728	6,026	50.6	36.3	2.6	32.3	13.8	914.8	947.1	99.9%	0.50	457.67	15.9	66%
05/02/2010	19,447	24,134	4,762	5,910	48.7	35.9	3.1	0.0	13.5	926.7	958.3	99.0%	1.51	114.01	4.1	17%
06/02/2010	113,976	143,837	4,749	5,993	48.3	35.5	3.1	0.0	13.9	913.5	945.6	95.3%	40.44	661.32	24.0	100%
07/02/2010	107,814	136,841	4,492	5,702	49.7	36.6	2.6	0.0	14.5	895.2	932.1	97.0%	24.77	643.37	24.0	100%
08/02/2010	113,098	144,034	4,712	6,001	48.1	35.6	3.0	0.0	14.2	913.2	944.4	96.5%	28.74	652.28	24.0	100%
09/02/2010	110,202	138,203	4,592	5,758	48.8	36.1	2.8	0.0	14.2	911.8	948.8	100.0%	0.08	646.69	24.0	100%
10/02/2010	98,529	123,003	4,492	5,608	49.6	36.4	2.4	0.0	14.3	899.2	941.0	100.0%	0.07	587.73	21.9	91%
11/02/2010	104,410	131,644	4,500	5,674	49.7	36.3	2.1	3.7	14.1	912.5	956.7	100.0%	0.11	624.51	23.2	97%
12/02/2010	109,463	138,801	4,609	5,844	49.8	36.4	2.1	8.2	14.4	893.6	936.2	100.0%	0.20	655.20	23.8	99%
13/02/2010	106,589	135,088	4,668	5,916	49.8	36.4	2.1	13.7	14.5	882.9	921.9	100.0%	0.33	637.38	22.8	95%
14/02/2010	112,144	143,191	4,673	5,966	48.5	35.5	2.5	15.3	14.4	901.1	944.2	100.0%	0.37	654.69	24.0	100%
15/02/2010	109,056	139,376	4,544	5,807	49.7	36.3	2.1	18.5	14.4	900.2	941.2	99.9%	0.45	651.58	24.0	100%
16/02/2010	109,088	138,742	4,545	5,781	49.8	36.3	2.1	21.9	14.6	896.5	936.8	99.9%	0.55	652.37	24.0	100%
17/02/2010	109,090	137,205	4,750	5,974	47.6	34.6	3.0	25.0	14.6	912.2	956.9	99.9%	0.59	623.46	23.0	96%
18/02/2010	113,055	140,944	4,711	5,873	48.7	35.3	2.7	28.7	14.3	911.7	958.4	99.9%	0.69	662.17	24.0	100%
19/02/2010	111,369	139,797	4,640	5,825	49.7	36.0	2.3	32.7	14.0	907.7	952.4	99.9%	0.76	665.07	24.0	100%
20/02/2010	111,230	141,072	4,635	5,878	50.0	36.2	2.2	35.0	14.0	899.0	941.5	99.9%	0.81	667.63	24.0	100%
21/02/2010	111,440	141,897	4,643	5,912	50.1	36.4	2.1	38.8	14.1	907.5	947.6	99.9%	0.91	670.79	24.0	100%
22/02/2010	94,373	119,152	4,738	5,983	49.8	36.2	2.3	42.3	14.4	896.2	945.1	99.9%	0.87	563.24	19.9	83%
23/02/2010	118,389	150,473	4,933	6,270	48.7	35.3	2.7	47.0	14.5	887.1	934.4	99.9%	1.22	692.92	24.0	100%
24/02/2010	118,203	148,898	4,925	6,204	48.4	35.0	2.9	51.5	14.5	902.2	950.7	99.8%	1.33	686.65	24.0	100%
25/02/2010	115,498	142,839	4,884	6,040	48.7	35.1	2.9	55.4	13.6	910.0	954.5	99.9%	1.24	676.17	23.7	99%
26/02/2010	108,589	134,816	4,728	5,870	49.0	35.7	2.5	36.7	13.7	914.6	965.9	99.9%	0.85	639.02	23.0	96%
27/02/2010	111,539	139,630	4,647	5,818	47.9	35.7	2.5	2.7	13.8	902.6	953.4	100.0%	0.08	641.44	24.0	100%
28/02/2010	105,054	129,799	4,377	5,408	48.9	36.4	2.2	3.8	14.0	901.1	947.9	100.0%	0.09	618.17	24.0	100%
<b>Average:</b>	<b>104,711</b>	<b>131,922</b>	<b>4,691</b>	<b>5,907</b>	<b>49.3</b>	<b>36.0</b>	<b>2.5</b>	<b>21.4</b>	<b>14.3</b>	<b>905.9</b>	<b>948.4</b>	<b>99.5%</b>	<b>3.94</b>	<b>620.54</b>		
<b>Total:</b>	<b>2,931,895</b>	<b>3,693,821</b>											<b>110.27</b>	<b>17,375.09</b>	<b>625.7</b>	<b>93%</b>

Monitored Parameter	LFG Total,y = LFG flared,y		FV RG,h		wCH <sub>4</sub> ,y = fv CH <sub>4</sub> ,h	wCO <sub>2</sub> ,y	wO <sub>2</sub> ,y	fv CH <sub>4</sub> ,FG,h	t O <sub>2</sub> ,h	T flare		FE	PE flare,y	ERy	Flare h	
Date	Total captured landfill gas (Nm3)	Total captured landfill gas (m3)	Average gas flow to flare (Nm3/h)	Average gas flow to flare (m3/h)	Average methane content in the landfill gas (%)	Average carbon dioxide content in the landfill gas (%)	Average oxygen content in the landfill gas (%)	Average methane content in the exhaust gas (ppm)	Average oxygen content in the exhaust gas (%)	Average exhaust gas temperature (°C)		Average flare efficiency (%)	PEflare (tCO <sub>2</sub> e)	Total ERy (tCO <sub>2</sub> e)	Availability	
										TT-04	TT-05				Hr	%
01/03/2010	99,706	121,613	4,154	5,067	51.2	37.9	1.5	6.5	14.6	898.6	948.3	100.0%	0.15	613.79	24.0	100%
02/03/2010	107,348	132,458	4,473	5,519	49.3	36.4	2.2	13.0	13.9	905.1	948.7	100.0%	0.29	633.65	24.0	100%
03/03/2010	112,513	139,808	4,688	5,825	47.7	35.3	2.8	13.9	13.9	900.0	949.4	100.0%	0.31	645.75	24.0	100%
04/03/2010	110,473	138,556	4,603	5,773	49.2	36.4	2.3	16.6	13.6	909.2	958.6	100.0%	0.36	652.64	24.0	100%
05/03/2010	110,163	138,377	4,590	5,766	49.5	36.7	2.1	18.6	13.7	910.9	960.6	99.9%	0.41	654.42	24.0	100%
06/03/2010	99,726	122,316	4,155	5,096	51.6	38.1	1.4	21.2	14.1	892.3	939.7	99.9%	0.46	618.34	24.0	100%
07/03/2010	102,026	127,734	4,251	5,322	51.6	38.1	1.5	27.9	14.1	895.7	941.2	99.9%	0.63	632.67	24.0	100%
08/03/2010	109,807	137,894	4,575	5,746	50.0	37.1	2.0	27.6	14.3	901.9	948.9	99.9%	0.66	655.92	24.0	100%
09/03/2010	114,313	143,861	4,763	5,994	48.3	36.2	2.5	31.1	14.4	909.4	959.2	99.9%	0.76	663.54	24.0	100%
10/03/2010	85,320	106,785	4,798	6,005	46.7	35.2	3.0	16.6	14.4	897.5	945.2	99.9%	0.30	479.10	18.0	75%
11/03/2010	116,949	148,242	4,873	6,177	45.4	34.5	3.2	2.6	14.4	902.1	946.5	100.0%	0.11	638.26	24.0	100%
12/03/2010	85,640	108,996	4,789	6,095	45.8	34.5	3.2	4.6	14.2	894.8	938.6	100.0%	0.08	471.77	17.9	75%
13/03/2010	116,912	148,395	4,871	6,183	45.7	33.5	3.6	2.1	13.6	919.8	957.8	100.0%	0.08	642.19	24.0	100%
14/03/2010	110,058	137,903	4,586	5,746	46.7	34.2	3.2	5.5	13.6	906.3	947.2	100.0%	0.11	617.41	24.0	100%
15/03/2010	105,552	131,494	4,398	5,479	48.0	35.1	2.8	12.0	13.0	909.4	940.0	100.0%	0.23	608.98	24.0	100%
16/03/2010	75,414	94,159	4,449	5,555	47.6	34.8	2.9	6.7	13.7	903.1	944.3	100.0%	0.10	431.76	17.0	71%
17/03/2010	106,666	132,655	4,444	5,527	47.4	34.7	2.9	4.2	13.9	914.8	952.5	100.0%	0.09	607.88	24.0	100%
18/03/2010	103,841	130,443	4,327	5,435	48.5	35.3	2.6	6.8	14.3	914.3	951.4	100.0%	0.15	605.12	24.0	100%
19/03/2010	84,020	104,197	4,434	5,499	48.6	35.5	2.5	1.6	14.2	910.5	944.9	100.0%	0.09	491.17	19.0	79%
20/03/2010	111,928	141,106	4,664	5,879	48.6	35.5	2.5	0.0	14.1	910.3	940.6	100.0%	0.06	653.95	24.0	100%
21/03/2010	106,844	133,411	4,452	5,559	49.2	35.9	2.4	0.0	14.1	918.4	948.6	100.0%	0.05	632.65	24.0	100%
22/03/2010	114,007	143,690	4,750	5,987	47.1	34.4	3.0	2.9	13.8	919.2	950.5	100.0%	0.07	645.10	24.0	100%
23/03/2010	97,281	121,746	4,688	5,867	46.8	34.3	3.1	4.5	13.8	911.4	946.0	100.0%	0.10	547.87	20.8	86%
24/03/2010	114,170	144,935	4,757	6,039	45.7	33.7	3.2	0.0	13.6	911.6	950.0	100.0%	0.06	627.81	24.0	100%
25/03/2010	112,309	140,639	4,680	5,860	46.9	34.4	3.0	1.7	13.5	903.2	942.4	100.0%	0.06	632.77	24.0	100%
26/03/2010	80,970	101,632	4,853	6,092	46.6	34.1	3.2	0.0	13.5	902.7	939.2	97.7%	0.00	453.74	16.7	70%
27/03/2010	90,893	114,639	4,775	6,023	46.7	34.2	3.1	0.0	14.0	900.9	942.5	91.8%	52.18	510.62	19.0	79%
28/03/2010	109,683	138,195	4,570	5,758	47.6	34.6	2.9	0.0	13.9	903.0	945.1	99.4%	5.02	627.51	24.0	100%
29/03/2010	92,986	116,396	4,529	5,669	49.6	36.2	2.2	0.0	13.6	913.5	953.6	100.0%	0.06	553.18	20.5	85%
30/03/2010	98,711	122,979	4,675	5,824	49.2	35.7	2.5	0.0	13.9	911.2	954.9	100.0%	0.05	583.01	21.1	88%
31/03/2010	105,189	131,351	4,573	5,711	49.1	35.5	2.5	1.8	13.9	898.5	940.2	100.0%	0.06	620.22	23.0	96%
<b>Average:</b>	<b>102,949</b>	<b>128,923</b>	<b>4,587</b>	<b>5,744</b>	<b>48.1</b>	<b>35.4</b>	<b>2.6</b>	<b>8.1</b>	<b>13.9</b>	<b>906.4</b>	<b>947.6</b>	<b>99.6%</b>	<b>2.04</b>	<b>595.25</b>		
<b>Total:</b>	<b>3,191,417</b>	<b>3,996,603</b>											<b>63.16</b>	<b>18,452.75</b>	<b>696.8</b>	<b>94%</b>



Monitored Parameter	LFG Total,y = LFG flared,y		FV RG,h		wCH <sub>4</sub> ,y = fv CH <sub>4</sub> ,h	wCO <sub>2</sub> ,y	wO <sub>2</sub> ,y	fv CH <sub>4</sub> ,FG,h	t O <sub>2</sub> ,h	T flare		FE	PE flare,y	ERy	Flare h	
Date	Total captured landfill gas (Nm3)	Total captured landfill gas (m3)	Average gas flow to flare (Nm3/h)	Average gas flow to flare (m3/h)	Average methane content in the landfill gas (%)	Average carbon dioxide content in the landfill gas (%)	Average oxygen content in the landfill gas (%)	Average methane content in the exhaust gas (ppm)	Average oxygen content in the exhaust gas (%)	Average exhaust gas temperature (°C)		Average flare efficiency (%)	PEflare (tCO <sub>2</sub> e)	Total ERy (tCO <sub>2</sub> e)	Availability	
										TT-04	TT-05				Hr	%
01/04/2010	111,901	139,820	4,663	5,826	49.5	35.8	2.3	3.8	13.8	912.2	955.8	100.0%	0.09	663.88	24.0	100%
02/04/2010	112,993	142,045	4,708	5,919	49.0	35.5	2.5	5.5	14.0	910.7	953.1	100.0%	0.13	665.44	24.0	100%
03/04/2010	108,888	135,052	4,537	5,627	50.0	36.1	2.3	11.3	13.9	916.6	957.9	100.0%	0.26	653.80	24.0	100%
04/04/2010	110,644	138,354	4,610	5,765	50.1	36.2	2.2	12.9	13.9	909.6	949.5	100.0%	0.29	665.86	24.0	100%
05/04/2010	105,984	130,433	4,621	5,687	49.9	36.1	2.3	17.2	13.9	908.5	953.7	100.0%	0.37	635.48	22.9	96%
06/04/2010	105,894	128,008	4,412	5,334	50.9	36.6	2.1	20.0	13.9	903.3	948.8	99.9%	0.44	646.44	24.0	100%
07/04/2010	78,810	95,585	4,659	5,650	48.6	35.2	2.8	5.0	13.9	917.8	964.5	96.7%	19.83	460.25	16.9	70%
08/04/2010	100,173	123,217	4,174	5,134	49.5	36.0	2.4	0.0	13.9	897.3	939.0	100.0%	0.09	595.23	24.0	100%
09/04/2010	89,182	109,695	3,716	4,571	48.6	35.2	2.9	0.0	13.1	901.0	941.0	100.0%	0.07	520.84	24.0	100%
10/04/2010	86,063	106,303	3,586	4,429	48.1	34.8	3.1	0.0	13.3	897.3	936.3	100.0%	0.07	497.84	24.0	100%
11/04/2010	85,286	105,978	3,554	4,416	50.1	36.3	2.3	7.8	14.1	888.9	924.7	100.0%	0.25	514.37	24.0	100%
12/04/2010	83,691	104,278	3,647	4,544	52.3	37.7	1.4	0.0	13.3	900.1	927.4	100.0%	0.04	525.78	23.0	96%
13/04/2010	87,819	109,948	3,659	4,581	50.9	36.5	1.9	0.7	13.3	905.9	926.7	100.0%	0.04	537.17	24.0	100%
14/04/2010	78,435	98,305	3,587	4,496	50.1	35.9	2.2	2.6	13.3	902.4	925.2	100.0%	0.05	471.38	21.9	91%
15/04/2010	80,786	101,029	3,790	4,739	51.2	36.7	1.8	5.5	13.0	915.5	936.0	100.0%	0.08	496.94	21.3	89%
16/04/2010	58,215	71,828	3,780	4,664	50.0	36.9	1.8	0.0	13.3	904.4	922.8	98.5%	6.08	349.22	15.4	64%
17/04/2010	90,755	111,642	3,954	4,865	48.6	36.4	2.0	0.0	14.3	900.6	918.8	90.0%	66.65	533.17	23.0	96%
18/04/2010	94,655	117,094	3,988	4,934	57.5	35.8	2.3	0.0	14.2	909.8	929.1	90.0%	81.68	653.33	23.7	99%
19/04/2010	89,783	111,382	4,087	5,070	53.0	35.9	2.3	0.0	14.1	890.2	921.6	95.3%	32.96	565.52	22.0	91%
20/04/2010	102,923	128,213	4,337	5,402	47.3	34.9	2.9	1.3	13.5	903.3	941.2	100.0%	0.08	581.73	23.8	99%
21/04/2010	101,944	126,770	4,442	5,524	46.6	34.4	3.2	5.1	13.8	884.4	924.8	100.0%	0.12	568.97	23.0	96%
22/04/2010	100,994	125,543	4,397	5,466	46.9	34.5	3.2	5.5	13.5	903.0	938.4	100.0%	0.10	568.34	23.0	96%
23/04/2010	75,407	91,993	4,213	5,139	48.9	36.1	2.5	0.0	13.5	910.0	948.2	100.0%	0.08	443.01	17.9	75%
24/04/2010	97,618	120,446	4,250	5,244	48.4	35.8	2.6	0.0	13.8	914.5	953.2	100.0%	0.06	568.07	23.0	96%
25/04/2010	103,440	129,300	4,310	5,388	48.7	36.0	2.5	0.0	14.2	901.9	941.8	100.0%	0.07	605.99	24.0	100%
26/04/2010	99,457	124,359	4,334	5,419	47.6	35.2	2.8	2.6	13.5	905.8	944.7	100.0%	0.15	566.60	23.0	96%
27/04/2010	92,278	113,668	4,210	5,186	47.4	34.9	3.0	3.9	13.9	894.0	938.4	100.0%	0.07	525.42	21.9	91%
28/04/2010	101,969	126,002	4,249	5,250	46.8	34.4	3.2	6.2	13.8	901.7	943.4	100.0%	0.12	572.96	24.0	100%
29/04/2010	99,380	122,479	4,141	5,103	48.0	35.2	2.9	8.3	13.5	900.1	939.9	100.0%	0.16	572.76	24.0	100%
30/04/2010	99,575	123,117	4,149	5,130	48.2	35.3	2.8	10.2	13.1	919.5	960.1	100.0%	0.18	575.40	24.0	100%
<b>Average:</b>	<b>94,498</b>	<b>117,063</b>	<b>4,159</b>	<b>5,150</b>	<b>49.4</b>	<b>35.7</b>	<b>2.5</b>	<b>4.5</b>	<b>13.7</b>	<b>904.3</b>	<b>940.2</b>	<b>99.0%</b>	<b>7.02</b>	<b>560.04</b>		
<b>Total:</b>	<b>2,834,944</b>	<b>3,511,889</b>											<b>210.67</b>	<b>16,801.18</b>	<b>681.4</b>	<b>95%</b>

Monitored Parameter	LFG Total,y = LFG flared,y		FV RG,h		wCH <sub>4</sub> ,y = fv CH <sub>4</sub> ,h	wCO <sub>2</sub> ,y	wO <sub>2</sub> ,y	fv CH <sub>4</sub> ,FG,h	t O <sub>2</sub> ,h	T flare		FE	PE flare,y	ERy	Flare h		
Date	Total captured landfill gas (Nm3)	Total captured landfill gas (m3)	Average gas flow to flare (Nm3/h)	Average gas flow to flare (m3/h)	Average methane content in the landfill gas (%)	Average carbon dioxide content in the landfill gas (%)	Average oxygen content in the landfill gas (%)	Average methane content in the exhaust gas (ppm)	Average oxygen content in the exhaust gas (%)	Average exhaust gas temperature (°C)		Average flare efficiency (%)	PE flare (tCO <sub>2</sub> e)	Total ERy (tCO <sub>2</sub> e)	Availability		
										TT-04	TT-05				Min	Hr	%
01/05/2010	99,391	123,001	4,141	5,125	47.6	34.8	3.1	13.9	13.4	904.7	944.4	100%	0.25	567.07	1,440	24.0	100%
02/05/2010	90,376	111,912	3,938	4,876	48.1	35.1	3.0	22.0	12.9	905.8	943.9	100%	0.38	522.68	1,377	23.0	96%
03/05/2010	91,944	114,084	4,006	4,971	48.3	35.3	2.9	17.8	13.3	903.7	938.8	100%	0.30	531.82	1,377	23.0	96%
04/05/2010	98,189	121,894	4,091	5,079	48.0	35.1	3.0	24.8	13.5	893.7	922.2	100%	0.46	565.09	1,440	24.0	100%
05/05/2010	99,429	123,422	4,143	5,143	47.7	34.9	3.1	26.3	13.6	895.7	918.1	100%	0.50	568.16	1,440	24.0	100%
06/05/2010	93,409	115,527	4,070	5,034	47.8	35.0	3.0	18.4	13.5	904.5	933.7	100%	0.33	534.44	1,377	23.0	96%
07/05/2010	95,681	118,823	3,987	4,951	47.0	34.5	3.2	3.9	13.3	886.6	920.4	100%	0.09	539.47	1,440	24.0	100%
08/05/2010	88,726	108,588	3,866	4,731	47.8	34.9	3.1	6.6	13.0	901.3	932.3	100%	0.10	510.28	1,377	23.0	96%
09/05/2010	90,374	109,424	3,766	4,559	47.9	34.9	3.1	10.4	12.5	900.5	937.5	100%	0.00	520.78	1,440	24.0	100%
10/05/2010	75,617	91,827	3,803	4,618	47.1	34.5	3.3	0.0	13.2	913.4	938.3	94%	31.20	427.66	1,193	19.9	83%
11/05/2010	89,483	109,094	3,728	4,546	47.2	34.9	3.1	0.0	13.3	897.6	914.3	91%	57.03	505.24	1,440	24.0	100%
12/05/2010	52,209	62,192	3,743	4,458	47.2	34.9	3.1	0.0	13.3	896.8	914.5	93%	23.30	295.69	837	14.0	58%
13/05/2010	93,108	112,470	3,880	4,686	46.3	34.3	3.4	0.0	13.4	893.5	915.1	96%	25.53	518.12	1,440	24.0	100%
14/05/2010	63,221	75,942	3,733	4,485	46.0	34.1	3.5	0.0	13.3	902.9	920.0	100%	0.04	349.93	1,016	16.9	71%
15/05/2010	87,867	107,480	3,661	4,478	46.8	34.7	3.2	0.0	13.9	885.2	905.8	100%	0.06	494.44	1,440	24.0	100%
16/05/2010	56,826	69,720	3,674	4,508	47.2	34.9	3.1	0.7	13.5	908.7	929.0	100%	0.00	322.95	928	15.5	64%
17/05/2010	62,726	77,104	4,056	4,985	46.5	34.5	3.3	9.1	11.6	910.6	932.1	100%	0.09	350.46	928	15.5	64%
18/05/2010	89,073	108,972	3,711	4,541	47.3	35.0	3.1	10.3	12.0	899.6	923.9	100%	0.14	506.65	1,440	24.0	100%
19/05/2010	92,104	112,229	3,838	4,676	46.8	34.6	3.3	11.1	12.3	894.9	925.6	100%	0.16	517.63	1,440	24.0	100%
20/05/2010	91,295	110,316	3,804	4,597	46.9	34.7	3.2	14.4	12.9	877.3	908.9	100%	0.23	514.34	1,440	24.0	100%
21/05/2010	82,165	99,461	3,583	4,337	49.3	36.5	2.4	14.8	13.1	861.7	888.9	100%	0.23	485.98	1,376	22.9	96%
22/05/2010	91,361	112,627	3,807	4,693	47.8	35.3	3.0	0.1	12.0	898.9	930.0	100%	0.06	523.29	1,440	24.0	100%
23/05/2010	88,339	107,508	3,681	4,479	47.5	35.1	3.2	4.3	12.3	885.7	917.4	100%	0.08	504.83	1,440	24.0	100%
24/05/2010	87,390	106,976	3,641	4,457	48.5	35.8	2.8	2.3	13.2	888.9	910.2	100%	0.03	508.89	1,440	24.0	100%
25/05/2010	86,546	106,622	3,774	4,649	47.7	35.3	3.1	3.7	12.7	898.7	915.7	100%	0.05	495.72	1,376	22.9	96%
26/05/2010	88,408	108,338	3,684	4,514	48.2	35.6	2.9	6.6	13.5	899.8	917.4	100%	0.11	511.20	1,440	24.0	100%
27/05/2010	86,238	105,301	3,593	4,388	47.9	35.3	3.0	7.5	13.2	890.7	914.2	100%	0.11	494.25	1,440	24.0	100%
28/05/2010	67,297	81,599	3,554	4,310	48.6	35.7	2.7	2.0	12.8	899.9	936.1	100%	0.06	392.47	1,136	18.9	79%
29/05/2010	87,997	108,074	3,667	4,503	46.8	34.3	3.3	0.0	13.1	898.4	922.4	100%	0.03	495.49	1,440	24.0	100%
30/05/2010	88,086	108,597	3,670	4,525	47.2	34.7	3.1	1.3	13.3	886.1	905.4	100%	0.06	499.48	1,440	24.0	100%
31/05/2010	85,970	104,951	3,582	4,373	47.6	34.8	3.0	1.3	13.2	880.7	901.3	100%	0.03	490.93	1,440	24.0	100%
<b>Average:</b>	<b>85,189</b>	<b>104,325</b>	<b>3,802</b>	<b>4,654</b>	<b>47.5</b>	<b>35.0</b>	<b>3.1</b>	<b>7.5</b>	<b>13.0</b>	<b>895.7</b>	<b>921.9</b>	<b>99.2%</b>	<b>4.55</b>	<b>485.98</b>			
<b>Total:</b>	<b>2,640,845</b>	<b>3,234,074</b>											<b>141.04</b>	<b>15,065.46</b>	<b>41,658</b>	<b>694.3</b>	<b>93%</b>

Calculation Summary		
Month	ERy (t CO <sub>2</sub> e)	
March 2009 (*)	13,355.33	
April 2009	15,407.91	
May 2009	16,796.53	
June 2009	19,323.84	
July 2009	21,699.35	
August 2009	22,095.73	
September 2009	21,550.96	
October 2009	20,187.22	
November 2009	20,653.12	
December 2009	22,250.97	
January 2010	19,350.24	
February 2010	17,375.09	
March 2010	18,452.75	
April 2010	16,801.18	
May 2010	15,065.46	
<b>TOTAL</b>	<b>280,365.68</b>	
(*) Starting in 05/03/2009		
Electricity consumption (t CO <sub>2</sub> e):	<b>99.19</b>	t CO <sub>2</sub> e
$EL_{IMP} \times CEF_{electricity} = 0.1647 \times 602.230 = 99.19 \text{ tCO}_2\text{e}$		
$EL_{IMP} =$	602.230	MWh
$CEF_{electricity} =$	0.1647	t CO <sub>2</sub> e/MWh
LPG consumption (t CO <sub>2</sub> e):	<b>0.52</b>	t CO <sub>2</sub> e
$LPG \text{ emission} = 180 \text{ kg} \times 10,990 \text{ kcal/kg} \times 4186.8 \times 10^{-12} \text{ TJ/kcal} \times 63.1 \text{ tCO}_2\text{e/TJ} = 0.52 \text{ tCO}_2\text{e}$		
Mass of LPG =	180.00	kg
Lower Heating Value of LPG =	10,990.00	kcal/kg
Conversion factor =	4.1868E-09	TJ/kcal
CEF Thermal =	63.10	t CO <sub>2</sub> e/TJ
<b>Net ERy =</b>	<b>280,265</b>	t CO <sub>2</sub> e

**Annex B**  
**Calibration Control**

Item	Equipment/Instrument	Manufacturer/ serial number	Monitored Parameter	Certificate number	Precision	External calibration frequency	Certificate issued by	Certificate date (DD/MM/YYYY)	Certificate due in (DD/MM/YYYY)
1	Flow meter FIT-01	HIRSA - 288577	Volumetric flow rate of residual gas (FVRG,h)	RCBG 001/09	1%	Annual	GDD Montengel	18/02/2009	18/02/2010
				001			HC Service	06/03/2009	06/03/2010
				RCBG 002/09			GDD Montengel	06/07/2009	06/07/2010
				RCBG 003/09			GDD Montengel	22/10/2009	22/10/2010
				RCBG 001/10			GDD Montengel	12/01/2010	12/01/2011
				Tech 0179			Technoflow	08/02/2010	08/02/2011
				RCBG 003/10			GDD Montengel	12/05/2010	12/05/2011
2	Thermocouple TT-05	ECIL - X-X-X-	Temperature of the exhaust gas (T flare)	6075/08	0,75%	Annual	ECIL	03/09/2008	03/09/2009
				ATBG 007/09			GDD Montengel	18/02/2009	18/02/2010
				ATBG 015/09			GDD Montengel	06/07/2009	06/07/2010
				ATBG 019/09			GDD Montengel	22/10/2009	22/10/2010
				ATBG 001/10			GDD Montengel	12/01/2010	12/01/2011
				ATBG 013/10			GDD Montengel	12/05/2010	12/05/2011
3	Thermocouple TT-04	ECIL - X-X-X-	Temperature of the exhaust gas (T flare)	6074/08	0,75%	Annual	ECIL	03/09/2008	03/09/2009
				ATBG 008/09			GDD Montengel	18/02/2009	18/02/2010
				ATBG 016/09			GDD Montengel	06/07/2009	06/07/2010
				ATBG 020/09			GDD Montengel	22/10/2009	22/10/2010
				ATBG 002/10			GDD Montengel	12/01/2010	12/01/2011
				ATBG 012/10			GDD Montengel	12/05/2010	12/05/2011
4	Weight bridge	19964	Landfill waste	819693	10 kg	(+)	INMETRO	28/05/2008	31/12/2009
				823638			INMETRO	18/03/2009	31/12/2010

(+) A regular inspection visit is performed by INMETRO. The date of the visit is not pre-scheduled. After the visit, INMETRO issues a Certificate, which is valid until the end of the next year.

Example: if INMETRO visits the facility on 03/04/2011, the certificate will be valid until 31/12/2012.

Item	Equipment/Instrument	Manufacturer/ serial number	Monitored Parameter	Certificate number	Precision	External calibration frequency	Certificate issued by	Certificate date (DD/MM/YYYY)	Certificate due in (DD/MM/YYYY)
5	Gas Analyzer AG-01	Siemens - N1-W1- 961		010/2008	1%	Bi-annual (*)	Arquipélago	22/09/2008	22/03/2009
				012/2008			Arquipélago	24/09/2008	24/03/2009
				n/i			Siemens	24/11/2008	24/05/2009
				n/i			Siemens	13/04/2009	13/10/2009 (#)
				n/i			Siemens	22/10/2009 (#)	22/04/2010
				n/i			Siemens	19/04/2010	19/10/2010
6	Gas Analyzer AG-02	Siemens - N1-W1- 027		011/2008	1%	Bi-annual (*)	Arquipélago	22/09/2008	22/03/2009
				013/2008			Arquipélago	24/09/2008	24/03/2009
				n/i			Siemens	24/11/2008	24/05/2009
				n/i			Siemens	13/04/2009	13/10/2009 (#)
				n/i			Siemens	22/10/2009 (#)	22/04/2010
				n/i			Siemens	19/04/2010	19/10/2010

(\*) As stated in Section C of the MR, the gas analyzer manufacturer (SIEMENS) has trained all operators to handle and calibrate the equipments AG-01 (residual gas analyzer) and AG-02 (exhaust gas analyzer).

Internal bi-weekly calibrations are performed by the trained operators and have the same validity of the external calibrations.

(#) The period from 13/10/2009 to 22/10/2009, when there is no valid external calibration, is covered by the internal calibrations.

Siemens, the manufacturer of the gas analyzer issued a letter on 11/01/2011 certifying that the external calibrations are valid for one year, that the gas analyzers AG-01 and AG-02 were in perfect conditions during their visit to the site in 22/10/2009 and that the measured values from 13/10/2009 to 22/10/2009 were not compromised.

## Annex C

### Calculation Details

The CERs are calculated according to the “Consolidated baseline methodology for landfill gas project activities” – ACM0001 / Version 05 and the “Tool to determine project emissions from flaring gases containing Methane” – Annex 13

There is one calculation spreadsheet for each month.

Each spreadsheet has two tabs. One of the tabs is named “min by min” and one is named “Daily”.

#### “min by min” tab

The “min a min” tab contains hourly records of the measurements performed by the system and the corresponding calculations.

Instrumentation reads the parameters below:

Table 1 – Measured Parameters		
Parameter	Unit	Description
Date	-	Date of record (Column A)
Hour	-	Hour of record (Column A)
w,CH <sub>4</sub>	%	Methane fraction in the Landfill (residual) gas (Column C)
w, CO <sub>2</sub>	%	Carbon dioxide fraction in the Landfill (residual) gas (Column D)
w,O <sub>2</sub>	%	Oxygen fraction in the Landfill (residual) gas (Column E)
fv,CH <sub>4</sub>	ppm	Methane fraction in the exhaust gas (Column F)
tO <sub>2</sub>	%	Oxygen fraction in the exhaust gas (Column H)
LFGtotal = LFGflared	Nm <sup>3</sup> /h	Landfill gas flow (Column I)
P	mbar	Landfill (residual) gas pressure (Column J)
T	°C	Landfill (residual) gas temperature (Column L)
Tflare	°C	Exhaust gas temperature (Columns N and P)

For the calculations, some parameter units are changed, as follows:

Methane fraction in the exhaust gas:

$$fv,CH_4 \text{ (mg/m}^3\text{)} = fv,CH_4 \text{ (ppm)} * \rho_{CH_4} \text{ [Column G]}$$

$$\rho_{CH_4} = 0,716 \text{ mg/m}^3$$

Measured temperatures, in the residual and in the exhaust gas:

$$T \text{ or } T_{\text{flare}} \text{ (K)} = T \text{ or } T_{\text{flare}} \text{ (}^{\circ}\text{C)} + 273,15 \text{ [Columns M, O and Q, respectively]}$$

The Landfill Pressure:

$$P \text{ (Pa)} = P \text{ (mBar)} * 10^3 + P_{\text{atm}} * \text{Height correction [Column K]}$$

$$P_{\text{atm}} = 101325 \text{ Pa}$$

$$\text{Height correction} = 0.92 \text{ [Cell D19]}$$

#### Determination of the mass flow rate of the residual gas that is flared

Volume flow:

$$FV_{RG,h} \text{ (m}^3\text{/h)} = LFG_{\text{total}} \text{ (Nm}^3\text{/h)} * (T/T_n) * (P/P_n) \text{ [Column R]}$$

Where  $T_n = 273.25 \text{ K}$  and  $P_n = 101325 \text{ Pa}$ , in normal conditions.

The molar mass of the residual gas is calculated according to Equation 3 – “Tool”:

$$MM_{RG,h} = fv_{CH_4,h} * MM_{CH_4} + fv_{O_2,h} * MM_{O_2} + fv_{CO_2} * MM_{CO_2} + (1 - fv_{CH_4,h} - fv_{O_2,h} - fv_{CO_2}) * MM_{N_2}$$

(Equation 3 – “Tool”) [Column S]

$$MM_{CH_4} = 16.04 \text{ [Cell C8]}$$

$$MM_{O_2} = 32.00 \text{ [Cell C9]}$$

$$MM_{CO_2} = 44.01 \text{ [Cell C10]}$$

$$MM_{N_2} = 28.02 \text{ [Cell C7]}$$

The residual gas density is calculated using SI base units: pressure in Pascal (Pa) and T in Kelvin (K):  
The residual gas mass flow rate is calculated:

$$FM_{RG,h} = \rho_{RG,n,h} * FV_{RG,h} \text{ (Equation 1 – “Tool”) [Column V]}$$

Density in normal conditions:

$$\rho_{RG,n,h} = P_n / ((R_u/MM_{RG,h}) * T_n) \text{ (Equation 2 – “Tool”) [Column U]}$$

Where  $R_u = 8314 \text{ Pa.m}^3/\text{kmol.K}$  [Cell C6].

The equation above is equivalent to the equation below, using  $\rho_{RG,n,h}$  and  $FV_{RG,h}$  in actual conditions:

$$\rho_{RG,h} = P / ((R_u/MM_{RG,h}) * T) \text{ [Column T]}$$

$$FM_{RG,h} = \rho_{RG,h} * FV_{RG,h} (\text{m}^3/\text{h}) \text{ [Column W]}$$

### **Determination of the mass fraction of carbon, hydrogen, oxygen and nitrogen in the residual gas**

Mass fraction of carbon (C):

$$fm_{C,h} = (fv_{CH_4} * AM_C * NA_{C,CH_4} + fv_{CO_2} * AM_C * NA_{C,CO_2}) / MM_{RG,h} \text{ (Equation 4 – “Tool”) [Column X]}$$

$$AM_C = 12.00 \text{ (Atomic mass of C) [Cell C12]}$$

$$NA_{C,CH_4} = 1 \text{ (Number of atoms of C in CH}_4\text{)}$$

$$NA_{C,CO_2} = 1 \text{ (Number of atoms of C in CO}_2\text{)}$$

$$MM_{RG,h} \text{ calculated in Equation 3 – “Tool” [Column S]}$$

Mass fraction of hydrogen (H):

$$fm_{H,h} = fv_{CH_4} * AM_H * NA_{H,CH_4} / MM_{RG,h} \text{ (Equation 4 – “Tool”) [Column Y]}$$

$$AM_H = 1.01 \text{ (Atomic mass of H) [Cell C13]}$$

$$NA_{H,CH_4} = 4 \text{ (Number of atoms of H in CH}_4\text{)}$$

$$MM_{RG,h} \text{ calculated in Equation 3 – “Tool” [Column S]}$$

Mass fraction of nitrogen (N)

$$fm_{N,h} = (1 - fv_{CH_4} - fv_{CO_2} - fv_{O_2}) * AM_N * NA_{N,N_2} / MM_{RG,h} \text{ (Equation 4 – “Tool”) [Column Z]}$$

$$AM_N = 14.01 \text{ (Atomic mass of N) [Cell C14]}$$

$$NA_{N,N_2} = 2 \text{ (Number of atoms of N in N}_2\text{)}$$

$$MM_{RG,h} \text{ calculated in Equation 3 – “Tool” [Column S]}$$

Mass fraction of Oxygen (O)

$$fm_{O,h} = (fv_{O_2} * AM_O * NA_{O,O_2} + fv_{CO_2} * AM_O * NA_{O,CO_2}) / MM_{RG,h} \text{ (Equation 4 – “Tool”) [Column AA]}$$

$$AM_O = 16.00 \text{ (Atomic mass of O) [Cell C15]}$$

$$NA_{O,O_2} = 2 \text{ (Number of atoms of O in O}_2\text{)}$$

$$NA_{O,CO_2} = 2 \text{ (Number of atoms of O in CO}_2\text{)}$$

$$MM_{RG,h} \text{ calculated in Equation 3 – “Tool” [Column S]}$$

### **Determination of the volumetric flow rate of the exhaust gas on a wet basis**

First, the stoichiometric quantity of moles of  $O_2$  required for a complete oxidation of one kg of residual gas ( $F_h$  expressed in  $\text{kmolO}_2/\text{kg}$  residual gas) is calculated.

$$F_h = fm_{C,h}/AM_C + fm_{H,h}/4AM_H - fm_{O,h}/2AM_O \text{ (Equation 11 – “Tool”) [Column AB]}$$

Then, the quantity of moles of  $O_2$  in the exhaust gas of the flare per kg residual gas flared ( $n_{O_2,h}$  in  $\text{kmol/kg}$  residual gas) is calculated.

$$n_{O_2,h} = t_{O_2,h} / (1 - (t_{O_2,h}/MF_{O_2})) * [fm_{C,h}/AM_C + fm_{N,h}/2AM_N + (1 - MF_{O_2}/MF_{O_2}) * F_h] \text{ (Equation 10 – “Tool”) [Column AC]}$$

Where  $MF_{O_2}$  is the volumetric fraction of  $O_2$  in the air, assumed as 0.21 (Cell C17) in the “Tool”.

The quantity of  $O_2$ ,  $N_2$  and  $CO_2$  in the exhaust gas of the flare at normal conditions per kg of residual gas ( $V_{n,O_2,h}$ ,  $V_{n,N_2,h}$  and  $V_{n,CO_2,h}$  respectively) is calculated, so that the volume of the exhaust gas of the flare in wet basis at normal conditions per kg of residual gas ( $V_{n,FG,h}$ ) is obtained.

$$V_{n,O_2,h} = n_{O_2,h} * MV_n \text{ (Equation 7 – “Tool”) [Column AD]}$$

$$V_{n,N_2,h} = MV_n * \{fm_{N,h}/200AM_N + [(1 - MF_{O_2})/MF_{O_2}] * (F_h + n_{O_2,h})\} \text{ (Equation 8 – “Tool”) [Column AE]}$$

$$V_{n,CO_2,h} = fm_{C,h}/AM_C * MV_n \text{ (Equation 9 – “Tool”) [Column AF]}$$

Where  $MV_n = 22.4$  L/mol (Cell C16) is the volume of one mole of any ideal gas at normal temperature and pressure.

$$V_{n,FG,h} = V_{n,CO2,h} + V_{n,O2,h} + V_{n,N2,h} \quad (\text{Equation 6 – “Tool”}) \quad [\text{Column AG}]$$

The volumetric flow rate of the exhaust gas is calculated:

$$TV_{n,FG,h} = V_{n,FG,h} * FM_{RG,h} \quad (\text{Equation 5 – “Tool”}) \quad [\text{Column AH}]$$

#### **Determination of methane mass flow rate in the exhaust gas on a wet basis**

Mass flow rate of methane in the exhaust gas ( $TM_{FG,h}$ ) is calculated as follows:

$$TM_{FG,h} = TV_{n,FG,h} * fv_{CH4,FG,h} / 1,000,000 \quad (\text{Equation 12 – “Tool”}) \quad [\text{Column AI}]$$

#### **Determination of methane mass flow rate in the residual gas on a wet basis**

Mass flow rate of methane in the residual gas ( $TM_{RG,h}$ ) is calculated as follows:

$$TM_{FG,h} = FV_{RG,h} * fv_{CH4,RG,h} * \rho_{CH4,n} \quad (\text{Equation 13 – “Tool”}) \quad [15 – \text{Column AJ}]$$

Where  $\rho_{CH4,n} = 0.716$  kg/m<sup>3</sup> (Cell C18) is the density of methane in normal conditions.

#### **Determination of the hourly flare efficiency**

The flare efficiency is 0% if temperature of the exhaust gas is below 500°C. Otherwise it is calculated according to:

$$\eta_{flare,h} = 1 - TM_{FG,h} / TM_{RG,h} \quad (\text{Equation 14 – “Tool”}) \quad [\text{Column AK}]$$

In case of use of the default value for the flare efficiency, it is assumed that  $\eta_{flare,h} = 90\%$  if the exhaust gas is above 500°C and the manufacturer’s specifications on proper operation of the flare are met, and 50% if the specifications are not met but the exhaust gas temperature remains above 500°C.

#### **Calculation of annual project emissions from flaring**

Project emission ( $PE_{flare,y}$  in tCO<sub>2</sub>e) is calculated as follows:

$$PE_{flare,y} = TM_{RG,h} * (1 - \eta_{flare,h}) * GWP_{CH4} / 1000 \quad (\text{Equation 15 – “Tool”}) \quad [\text{Column AL}]$$

Where the Global Warming Potential of methane ( $GWP_{CH4}$ ) is 21 (Cell C5).

#### **Calculation of emission reduction**

The amount of methane that would have been destroyed/combusted during the year ( $MD_{project,y}$  in tCH<sub>4</sub>) and the amount of methane that would have been destroyed/combusted during the year in the absence of the project ( $MD_{reg,y}$  in tCH<sub>4</sub>) are calculated, as defined in the consolidated methodology ACM 0001 / Version 5:

$$MD_{project,y} = MD_{flared,y} = (LFG_{flare,y} * w_{CH4,y} * r_{OCH4}) - (PE_{flare,y} / GWP_{CH4}) \quad [\text{Column AM}]$$

$$MD_{reg,y} = MD_{project,y} * AF \quad [\text{Column AN}]$$

Where the adjustment factor (AF) is 0.2 as defined in approved the Project Design Document (PDD).

Emission Reduction without energy and diesel consumption discount is calculated:

$$ER_y = (MD_{project,y} - MD_{reg,y}) * GWP_{CH4} \quad [\text{Column AO}]$$



**“Daily” tab**

The “Daily” tab presents averaged and totalized data for each day, considering only valid hours (availability = 1 [Column AP]).

**Averaged data:**

- Average captured landfill gas (Nm<sup>3</sup> and m<sup>3</sup>)
- Average gas flow to flare (Nm<sup>3</sup>/h and m<sup>3</sup>/h)
- Average methane content in the landfill gas (%)
- Average carbon dioxide content in the landfill gas (%)
- Average oxygen content in the landfill gas (%)
- Average methane content in the exhaust gas (ppm)
- Average oxygen content in the exhaust gas (%)
- Average exhaust gas temperature (°C)
- Average flare efficiency (%)
- Project emissions from flaring of the residual gas stream (t CO<sub>2</sub>e)
- E<sub>Ry</sub> (tCO<sub>2</sub>e)

**Totalized data:**

- Total captured landfill gas (Nm<sup>3</sup>)
- Project emissions from flaring of the residual gas stream (t CO<sub>2</sub>e)
- Total E<sub>Ry</sub> (tCO<sub>2</sub>e)
- Availability (hours)