
VERIFICATION AND CERTIFICATION REPORT

**Alto Tietê Biogás, Redução de
Emissões e Geração de Energia
Ltda.**

**Alto-Tietê landfill gas capture
project**

25/09/2008-04/03/2009

PA 1636

Date of Issue:		Project Number:		
12-07-2011		CDM.VER0752 MP1		
Project Title:				
Alto-Tietê landfill gas capture project				
Organisation:		Client:		
SGS United Kingdom Limited		Alto Tietê Biogás, Redução de Emissões e Geração de Energia Ltda.		
Publication of Monitoring Report:				
Monitoring Period:		25/09/2008 – 04/03/2009		
First Monitoring Version and Date:		Version 1, 16/03/2009		
Final Monitoring Version and Date:		Version 6, 16/06/2011		
Summary:				
<p>SGS United Kingdom Ltd has performed the first periodic verification of the CDM project Alto-Tietê landfill gas capture project, UNFCCC Reference Number 1636. The verification includes confirming the implementation of the monitoring plan of the registered PDD number 1636 (revised monitoring plan approved 23/12/2009) and the application of the monitoring methodology as per ACM0001, version 05, EB 28. A site visit was conducted to verify the data submitted in the monitoring report. SGS confirms the following has been reviewed:</p> <ul style="list-style-type: none"> (a) The registered PDD, including the monitoring plan and the corresponding validation report; (b) Monitoring report, requests for revision of monitoring plan; (c) The applied monitoring methodology; (d) Relevant decisions, clarifications and guidance from the CMP and the CDM Executive Board; (e) All information and references relevant to the project activity's resulting in emission reductions. <p>The project activity consists of extracting the landfill gas (LFG) produced at the Itaquaquecetuba landfill using a gas collection and gas flaring system. The project activity does not consider the energy (electricity and/or thermal) generation. The project only claims CERs from flaring the captured landfill gas.</p> <p>SGS confirms that the project is implemented in accordance with the validated and registered Project Design Document and the revised monitoring plan approved 23/12/2009. The monitoring system is in place and the emission reductions are calculated without material misstatements. Our opinion relates to the projects GHG emissions and the resulting GHG emission reductions reported and related to the valid and registered project baseline and monitoring and its associated documents. Based on the information seen and evaluated we confirm that the implementation of the project has resulted in 67,295 tCO₂e emission reductions during period 25/09/2008 up to 04/03/2009.</p>				
Subject:				
CDM Verification				
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Abbreviations

ACM	Approved Consolidated Methodology
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CL	Clarification
CER	Certified Emission Reduction
DNA	Designated National Authority
EF	Emission Factor
GHG	Greenhouse Gas(es)
LFG	Landfill Gas
LPG	Liquefied Petroleum Gas
MP	Monitoring Plan
PDD	Project Design Document
PLC	Power Line Communications
PP	Project Participants
SGS	Société Générale de Surveillance
UNFCCC	United Nations Framework Convention on Climate Change

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1. Introduction

1.1 Objective

SGS United Kingdom Ltd has been contracted by Alto Tietê Biogás, Redução de Emissões e Geração de Energia Ltda. to perform an independent verification of its CDM project “Alto-Tietê landfill gas capture project”. CDM projects must undergo periodic audits and verification of emission reductions as the basis for issuance of Certified Emission Reductions (CERs).

The objectives of this verification exercise are, by review of objective evidence, to establish that:

- The emissions report conforms with the requirements of the monitoring plan in the registered PDD and the approved methodology; and
- The data reported are complete and transparent.

1.2 Scope

The scope of the verification is the independent and objective review and ex post determination of the monitored reductions in GHG emission by the project activity. The verification is based on the validated and registered project design document and the monitoring report. The project is assessed against the requirements of the Kyoto Protocol, the CDM Modalities and Procedures and related rules and guidance.

SGS has, based on the recommendations in the Validation and Verification Manual, employed a risk-based approach in the verification, focusing on the identification of significant reporting risks and the reliability of project monitoring.

The verification is not meant to provide any consulting towards the Client. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the project design.

1.3 Project Activity and Period Covered

This engagement covers emissions and emission reductions from anthropogenic sources of greenhouse gases included within the project boundary of the following project and period.

Title of Project Activity:	Alto -Tietê landfill gas capture project
UNFCCC Registration Number:	1636
Monitoring Period Covered in this Report	25/09/2008 to 04/03/2009
Project Participants	Alto Tietê Biogás, Redução de Emissões e Geração de Energia Ltda. (Brazil-Host) Carbon Capital Markets Ltd. ; Trading Emissions PLC. (UK)
Location of the Project Activity:	Itaquaquecetuba, São Paulo state, Brazil

The project activity consists of extracting the landfill gas (LFG) produced at the Alto Tietê landfill located in Itaquaquecetuba, São Paulo, Brazil, using a gas collection and gas flaring system. The project activity does not consider the energy (electricity and/or thermal) generation. The project results in greenhouse gas emission reductions by combusting of the recovered methane contained in the landfill gas. The whole process is managed by an electrical control system. This control system is provided with a PLC. The system relies on a system allowing process visualization on a personal computer.

The project activity consists in capturing and flaring the landfill gas involving the following components: pipeline to collect the LFG, manifolds, dryer, blower, one flare and meters. The project activity is in operation since 25th September 2008.

2. Methodology

2.1 General Approach

SGS' approach to the verification is a two-stage process.

In the first stage, SGS completed a strategic review and risk assessment of the projects activities and processes in order to gain a full understanding of:

- Activities associated with all the sources contributing to the project emissions and emission reductions, including leakage if relevant;
- Protocols used to estimate or measure GHG emissions from these sources;
- Collection and handling of data;
- Controls on the collection and handling of data;
- Means of verifying reported data; and
- Compilation of the monitoring report.

At the end of this stage, SGS produced a Periodic Verification Checklist which, based on the risk assessment of the parameters and data collection and handling processes for each of those parameters, describes the verification approach and the sampling plan.

Using the Periodic Verification Checklist, SGS verified the implementation of the monitoring plan and the data presented in the Monitoring Report for the period in question. This involved a site visit and a desk review of the monitoring report. This verification report describes the findings of this assessment.

2.2 Verification Team for this Assessment

Verification Team	Role
Fabian Gonçalves	Lead Assessor
Lucas Engelbrecht	Local Assessor
Lorna Guerreo	Sectoral Expert

Technical Review Team	Role
Alicia Fernandez	Technical Reviewer
Jett Zhang	Sectoral Expert

2.3 Means of Verification

2.3.1 Review of Documentation

The validated PDD, the monitoring report submitted by the client and additional background documents related to the project performance were reviewed. A complete list of all documents reviewed is attached in section 8 of this report.

2.3.2 Site Visits

As part of the verification, the following on-site inspections have been performed by members of the assessment team:

Location: Itaquaquetuba, São Paulo state, Brazil	
Date: 25/03/2009	
Coverage:	Source of Information / Persons Interviewed
This included a review of performance records, interviews with project participants and local stakeholders, collection of measurements, observations of established practices and testing of the accuracy of monitoring equipment	Roberto Kish (General Coordinator - Alto Tietê Biogás) Rodrigo Almeida (Operational Coordinator - Alto Tietê Biogás) Livia M. Moraes (Consultant - Arquipélago Engenharia Ambiental) Amauri R. Junior (Consultant - Arquipélago Engenharia Ambiental)

2.4 Reporting of Findings

As an outcome of the verification process, the team can raise different types of findings

In general, where insufficient or inaccurate information is available and clarification or new information is required the team shall raise a Clarification Request (CL) specifying what additional information is required.

Where a non-conformance arises the team shall raise a Corrective Action Request (CAR). A CAR is issued, where:

- I. Non-conformities with the monitoring plan or methodology are found in monitoring and reporting, or if the evidence provided to prove conformity is insufficient;
- II. Mistakes have been made in applying assumptions, data or calculations of emission reductions which will impair the estimate of emission reductions;
- III. Issues identified in a FAR during validation to be verified during verification have not been resolved by the project participants.

The verification process may be halted until this information has been made available to comply with the requirements of the CDM Executive Board. Failure to address a CL may result in a CAR. Information or clarifications provided as a result of a CL may also lead to a CAR.

A clarification request (CL) will be raised if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met. All CARs and CLs raised during verification shall be resolved prior to submitting a request for issuance.

Corrective Action Requests and Clarification requests are raised in the Periodic Verification Checklist. The Project Developer is given the opportunity to “close” outstanding CARs and respond to CLs and Observations.

Forward Action Requests (FARs) may be raised during verification for actions where the monitoring and reporting require attention and/or adjustment for the next verification period. Observations may be raised which are for the benefit of future projects and future verification actors. These have no impact upon the completion of the verification activity.

All CARs, CLs and FARs for this verification period are included in this report.

2.5 Internal Quality Control

Following the completion of the assessment process and a recommendation by the Assessment Team, all documentation will be forwarded to a Technical Reviewer. The task of the Technical Reviewer is to check that all procedures have been followed and all conclusions are justified. The Technical Reviewer will either accept or reject the recommendation made by the assessment team.

3. Verification Findings

3.1 Project Implementation - General

A revision of the monitoring plan (ref. 1) was performed by SGS and it has been approved on 23rd December 2009 according to the UNFCCC webpage (ref. 26). In this way, no mistakes related to the crediting period were found. This is the first periodic verification. The crediting period starts on 25/09/2008. The verification refers to the period 25/09/2008 – 04/03/2009.

The project boundaries are in compliance with the approved PDD. It involves landfill gas capturing and on-site destruction and the electricity consumption due the project activity. The LPG consumption used to start up the flare is not included in the monitoring plan (refer to **CAR #9**, for more details).

The project is already implemented and operational, the team verified that the equipment was installed as described in the sections bellow. The project was registered on 29th May 2008 and started its operation in September 2008 (the crediting period is 25/09/2008 – 24/09/2015 -Renewable).

CAR #7 was raised as there were parameters required by the methodology and defined in the registered PDD that had not been included in the monitoring report. The following issues were identified: the values for the parameter “landfill waste” were not presented in the monitoring report version 1; a summary data for the monitored parameters, as presented during site visit, was required to be included in the monitoring report and the parameter LFG_{total} was not presented in the correct unit (m³) as required by the monitoring plan. **To close out CAR #7**, the monitoring report and spreadsheets were revised and were found in compliance with the methodology requirements. Please refer to Annex 9 – Findings overview CAR #7, of this document for more information.

After revision, all the parameters required by the methodology and the methodological tool were presented in the monitoring report version 2 (ref. 3).

The audit team verified that the monitoring procedures were consistent with the registered PDD. The following documents were provided by the PP and checked by the audit team:

- Monitoring Protocol, version 1, 28/11/2008 (roles and responsibilities; process summary; instrumentations schematic; calibration and maintenance of instruments; data stored management, data management; monitoring checklists; QA/QC Procedures; training requirements) (ref. 4)
- P459/R04/V01/08- Maintenance Manual, version 1, 02/10/2008, with the description of equipments, instruments, lines accessories. Describes also the periodicity of preventive maintenance, among other things (ref. 5a).
- P459/R05/V01/08- Monitoring Manual, version 1, 02/10/2008. Technical description, monitoring variables, monitoring localization, frequency, result's interpretation and monitoring registers (ref. 5b).
- P459/R03/V01/08- Operation Manual, version 1, 06/10/2008. Technical description and operation of the biogas plant (ref. 5c).

During the verification site visit, the PP explained that internal audits are carried out by the consultant company Arquipélago to check if data in the spreadsheet, which is generated automatically, are consistent and correct. However, no evidence of data conference was available. **CAR #3 was raised**.

To close out CAR #3, the PP provided calculation spreadsheets with formulas that were checked by the auditors. It was verified that Arquipélago checked all the abnormalities as failure of AG-02, flare temperature, no LFG flow, among others. The spreadsheets audited were used in the monitoring report. **CAR #3 was closed out**. Please refer to Annex 9 – Findings overview CAR #3, of this document for more information.

Certificates of training occurred during the monitoring period were provided to the DOE assessment team (ref. 8a, ref. 8b). Managers and operators were interviewed and observed performing their activities (monitoring, recording and inputting data). It was confirmed that the personnel were adequately trained for their tasks.

3.2 Remaining Issues, CAR's, FAR's from Previous Validation or Verification

There is no pending issue from the validation process. This is the first verification.

3.3 Compliance of the monitoring plan with the monitoring methodology.

During the verification, it was found that the monitoring plan was not in accordance with the applied methodology.

CAR #9 was raised to request the PP to revise the monitoring plan during the first verification in order to be in compliance as required by the methodology and tool, regarding the parameters T_{flare} (temperature in the exhaust gas of the flare) and T_{flaring} (flaring temperature). Registered Monitoring Plan requires both to be measured as different parameters. However both the temperature of the flare and the temperature of the exhaust gas are the same. Moreover the PP are requested to include in the revised monitoring plan the monitoring of the LPG used to the ignition of the flare and to revise the monitoring of the electricity consumed by the project activity as being monitored by a third party company.

The revision of the monitoring plan (ref. 1) was approved in 23rd December 2009 in accordance with what it was raised in CAR #9. The details of the approved monitoring plan are available at the UNFCCC website (<http://cdm.unfccc.int/Projects/DB/RWTUV1204280292.23/view>) or at reference 26.

Thus, the **CAR #9 was closed out**. Please refer to Annex 9 – Findings overview CAR #9, of this document for more information.

3.4 Completeness of Monitoring

Monitoring of reductions in GHG emissions to result from the registered project have been implemented in accordance with the registered PDD and the revised monitoring plan, approved on 23rd December 2009. The monitoring mechanism is effective and reliable.

The project consists of the installation of a landfill gas capture system (wells, pipelines, manifolds, dryer and blower) and destruction through a flare equipment to reduce the greenhouse gases emission (methane). The project was installed by the company Arquipélago and it is in operation since 25th September 2008.

It was verified that data of the parameters measured at the landfill are transferred automatically to the internal system (register) that has restricted access. Data is downloaded in the computer and inserted automatically into the spreadsheet (atb_queima_ch4 – ref. 11c). Also, all calculations, including the emission reductions, are done automatically in the spreadsheet. As the system and the computer program have restricted access, during the verification site visit, it was not possible to verify if formulas are correctly applied in the internal system according to the required by the methodology and tool. **CL #1 was raised**.

To close out CL #1, the PP provided the Monitoring Report and open spreadsheets with all calculations in a transparent way. Spreadsheets with formulas were checked. Data used in the calculations are downloaded from the system and calculations are done as required by the methodology and applicable tool. Data from the open spreadsheets (ref. 11a) are consolidated daily to be presented in the monitoring report (ref. 11b). **CL #1 was closed out**. Please refer to Annex 9 – Findings overview CL #1, of this document for more information.

The emission reductions are being calculated minute by minute which is an appropriate method and inline to methodology. The minute by minute emission reductions are summarized on daily basis in the same raw data sheet and values are correctly linked following the formulas. These daily emission reductions data are extracted into the new 'summary sheet' for daily values corresponding to all month data. The extracted values in the summary sheet can be cross checked from the raw minute by minute data.

CAR #10 was raised: The Monitoring Report version 3 (ref. 3) was not in compliance with the "Guidelines on Completeness Check of Requests for Issuance" in the EB 48 Annex 68 Section C paragraph 10 (ref. 20). The Project Participant was requested to review the Monitoring Report version 3 (ref. 3), in order to attend the requirements of the EB 48 Annex 68 (ref. 20).

The PP provided the Monitoring Report version 4 (ref. 3) in compliance with EB48 Annex 68 section C paragraph 10i – viii (ref. 20).

The DOE assessment team checked the Monitoring Report version 4 and verified that is in compliance with the EB 48 Annex 68 Section C paragraph 10 (ref. 20). **CAR #10 was closed out.** Please refer to Annex 9 – Findings overview CAR #10, of this document for more information.

A summary of the monitored parameters is provided below:

$LFG_{total,y} // LFG_{flared,y}$	<p>Total amount of landfill gas captured from project wells/Total amount of landfill gas flared- Nm^3</p>	<p>As all gas collected is flared, the parameters $LFG_{total,y}$ and $LFG_{flared,y}$ are the same. There is a flow meter located before the flare. Equipment is identified as FIT-01. Data is continuously measured and transferred automatically to the inviolable register and downloaded in the computer for emission reductions calculation. Data is registered every minute and can be aggregated daily, monthly and yearly. The parameter is presented in Nm^3.</p> <p>Regarding the calibration, according to CDM VMM V. 1.2 para 184 a) and as per EB 52 Annex 60 para 8, in cases where neither the monitoring methodology, nor the monitoring plan specify any requirements for calibration frequency for measuring equipments, the DOE shall ensure that the equipments are calibrated either in accordance with the specifications of the local/national standards, or as per the manufacturer specification. If local/national standards or the manufacturer specification is not available, international standards may be used.</p> <p>In this way, the monitoring methodology (ref. 2.a) sets out that the flow meters should be subject to a regular maintenance and testing regime to ensure accuracy. Continuous with the analysis in accordance with the EB 52 Annex 60 para 8 the assessment team checked that the same information was presented in the revised monitoring plan (ref. 1b), which does not refer to a specific period of calibration.</p> <p>In accordance with the EB 52 Annex 60 para 8, the assessment team checked that the PP internal procedure P459/R04/V01/08 (ref. 5a) defines a calibration periodicity as annual, which is more conservative than the manufacturer specification which refers to a calibration period of 18 months (ref. 37 – Flow Meter Manufacturer Manual).</p> <p>In this way, it was verified the calibration certificate issued by:</p> <ul style="list-style-type: none"> FCI- Fluid Components Intl, on 26/02/2008, certificate number C040066 (ref. 6a); GDD, certificate number RCBG001/09 on 18/02/2009 (ref. 6.2.a) HC Service, certificate number 001, 06/03/2009 (ref. 6.3.a). (Note that the calibration from HC Service was conducted because the track standard from the calibration of GDD was not provided). <p>Also, preventive maintenance was conducted by GDD on 19/12/2008, report number RSATB 001/08 (ref. 9).</p> <p>Data reported in the spreadsheet were checked against the data from the supervisory system and were found consistent. Data presented in the monitoring report is the consolidation of the minutes of the day.</p>
$PE_{flare,y}$	<p>Project emission from residual gas stream in year y- tCO_2e</p>	<p>This parameter is calculated according to the tool to determine project emissions from flaring gases containing methane. Formulas are inserted directly into the spreadsheet.</p> <p>CL #1 was raised regarding to the parameters measured at the landfill and transferred automatically to the internal system (register) that has restricted access. Data is downloaded in the computer and inserted automatically into the spreadsheet (atb_queima_ch4). Also, all calculations, including the emission reduction calculus, are done automatically in the spreadsheet. As</p>

		<p>the system and the computer program have restricted access, during verification site visit, it was not possible to verify if formulas are correctly applied in the internal system according to the required by the methodology and tool.</p> <p>The PP provided to the assessment team the spreadsheet with the formulas (ref. 11a) and it was checked by the DOE assessment team. The data used in the calculus are downloaded from the inviolable system and calculations are done according to the required by the methodology and the tool.</p> <p>In this way, the CL #1 were closed out. Please refer to Annex 9 – Findings overview CL #1, of this document for more information.</p> <p>Data is calculated automatically into the spreadsheet. The spreadsheet with the formulas (ref. 11a) were checked and found in compliance with the applicable methodology and the tool.</p> <p>The equipments used to measure the parameters (refer to parameters $f_{vi,h}$; $FV_{RG,h}$; $t_{O_2,h}$; $f_{V_{CH_4,FG,h}}$; T_{flare}) used in the calculation are calibrated (refer to the calibration details provided for this meters in other sections of this report).</p> <p>Data reported in the spreadsheet were checked against the data from the supervisory system and were found consistent. Data presented in the monitoring report is the consolidation of the minutes of the day.</p>
$W_{CH_4,y}$ // $f_{vi,h}$	<p>Methane fraction in the landfill gas)- m^3CH_4/m^3 LFG</p> <p>//</p> <p>Volumetric fraction of component i in the residual gas in the hour h where i= CH₄, CO, CO₂, O₂, H₂, N₂</p>	<p>Both parameters are measured continuously using a gas analyser on a wet basis. The assessment team has verified during the site visit that no dry treatment was performed in the landfill gas, being in this way the LFG going to the flare on a wet basis.</p> <ul style="list-style-type: none"> Gas analyser, ULTRAMAT Siemens, AG01, Serial Number N1-W1-961. <p>Data recorded continuously by the gas analyser is transferred automatically to the inviolable register and downloaded in the computer for calculation of emission reductions. Data is registered every minute and can be aggregated daily, monthly and yearly. The internal system has restricted access. There is no manual data transference.</p> <p>Regarding the calibration, according to CDM VMM V. 1.2 para 184 a) and as per EB 52 Annex 60 para 8, in cases where neither the monitoring methodology, nor the monitoring plan specify any requirements for calibration frequency for measuring equipments, the DOE shall ensure that the equipments are calibrated either in accordance with the specifications of the local/national standards, or as per the manufacturer specification. If local/national standards or the manufacturer specification is not available, international standards may be used.</p> <p>In this way, the monitoring methodology (ref. 2.a) sets out that the gas analyser should be subject to a regular maintenance and testing regime to ensure accuracy. Continuous with the analysis in accordance with the EB 52 Annex 60 para 8 the assessment team checked that the same information was presented in the revised monitoring plan (ref. 1b), which does not refer to a specific period of calibration.</p> <p>In accordance with EB 52 Annex 60 para 8, the assessment team checked that the manufactures manual (ref. 7, page 4-4), which establish that the equipment has to be calibrated every six months to twelve months depending on the ambient conditions.</p> <p>In this way, it was verified the external calibration certificates:</p> <ul style="list-style-type: none"> Certificate issued by Siemens on 20/04/2008 (ref. 6e)

		<ul style="list-style-type: none"> ▪ Certificate issued by Arquipélago, N° 10/2008 on 22/09/2008 (ref. 6eiii) ▪ Certificate issued by Arquipélago on 24/09/2008, number 12/2008 (ref. 6ei) (calibration carried out in the commissioning of the plant operation) ▪ Certificate issued by Siemens on 24/11/2008 (ref. 6f) <p>Also, in accordance with the manufactures manual (ref. 7, Gas Analyser Fabrication Manual AG-01 & AG-02 -20081013) the gas analyser can be internally calibrated using standard gas.</p> <p>Verified that a zero check and typical value check are performed by comparison with a standard gas are done every 15 days (ref. 6g, records done by the operators of the internal calibration). The calibration was carried out with a gas containing a sufficient concentration of the measured component using calibrated standard gases and the certificates were provided (ref. 6h).</p> <p>Data reported in the spreadsheet were checked against the data from the supervisory system and were found consistent. Data presented in the monitoring report is the average of the minutes of the day.</p>
EL-IMP	Total amount of electricity imported to meet project requirement - MWh/year	<p>The electricity used in the project activity is imported from the grid and is measured and controlled by a third party company called Bandeirante Energias do Brasil (electricity supplier).</p> <p>With regards to the calibration, according to CDM VMM V. 1.2 para 184 a) and as per EB 52 Annex 60 para 8, in cases where neither the monitoring methodology, nor the monitoring plan specify any requirements for calibration frequency for measuring equipments, the DOE shall ensure that the equipments are calibrated either in accordance with the specifications of the local/national standards, or as per the manufacturer specification. If local/national standards or the manufacturer specification is not available, international standards may be used.</p> <p>In this way, the monitoring methodology (ref. 2a) presents the following information regarding to this parameter <i>“required to determine CO₂ emissions from use of electricity or other energy carries to operate the project activity. The records of any electricity imported in the baseline too should be recorded at the start of project”</i>.</p> <p>According to the revised monitoring plan the QA/QC procedures for this parameter is determined as <i>“Scope of the Utility Company”</i> and the description of the measurement methods and procedures to be applied are <i>“Measured and invoiced monthly by the utility company. Hard copies of the monthly invoices will be kept in files during the crediting period and two years after”</i>. Please also refer to CAR#09 for additional information.</p> <p>Furthermore, according to the National Electricity System Operator (ONS – ref. 40), the Brazilian Electric Sector (BES) operates under concession, authorization or permission of the State providing public services on electricity to the population. While public service performed under concession, authorization or permission of the State, the operation of the BES is highly regulated, the regulatory framework extensively defining the powers, rights and duties of the Granting Authority, the Regulatory Agency, Sector Entities and Agents, all with the fundamental goal of ensuring management's commitment to safety of supply and low tariffs in the short, medium and long terms.</p> <p>In this matter the National Operator of the System (ONS – ref. 41) is</p>

generation and transmission of electricity in the Brazilian Interconnected Power System (BIPS), under the supervision and regulation of the Brazilian Energy Agency (ANEEL).

In this way, the third party company which provide electricity energy for the project activity Bandeirante Energias do Brasil is regulated by ONS which in its turn has the procedure N° 12.3 – Measurement system maintenance for invoicing (ref. 42), which establishes the rules and the electricity meters maintenance procedures which Bandeirante Energias do Brasil shall report to ONS. Therefore, the energy utility company (Bandeirante Energias do Brasil) and not the project is responsible for calibration and maintenance of the energy meter.

Furthermore, considering that the sales invoice is an official and fiscal document and also that the approved monitoring plan (ref. 1b) considered that the energy measurement is scope of the utility company (in this case Bandeirantes Energias do Brasil), which shall measure and invoice monthly the project activity the assessment team checked the energy consumed by the project activity reported at the monitoring report against the invoices issued by the utility company – Bandeirante Energias do Brasil.

In addition to all information presented above the PP provided a statement issued by the electricity company N° DCME 04210 dated 10th December 2010 (ref. 46), which confirms that the electricity meter installed at the installation N° 150261814 were calibrated at the date of installation on 14/10/2008. Also, according with the Calibration Certificated N° DCME – 42/10 – Installation N° 150261814 (ref. 47), which provides the procedures and tests performed in the electricity meter. The result presents that the electricity meter is under the accuracy class specified.

In this way, the calibration of the electricity meter was under the precision class during the monitoring period as per the National Operator of the System (ONS – ref. 41), Annex 1 – Item (B), which establishes that the frequency for preventive maintenance of the agent responsible for the SMF(System of Measurement for Invoicing) is a maximum of 2 (two) years. This schedule may be changed based on the historical occurrence observed in all plants, considering the schedule of shutdowns.

For the period of 25/09/2008 - 14/10/2008 the meter was not installed, and the energy was estimated in a conservative way, based on the total power installed capacity of the equipments.

This conservative calculation approach was performed assuming that all the existing devices of the landfill gas capturing and flaring system, the total power of 160 kW (as presented bellow) has worked 100% of the time.

Item	Power	Unit
Blower 01	75	cv
Blower 02	75	cv
Leachate pump	2	cv
Compressor	5	cv
Total	157	cv
Total	117	kW

The assessment team considered that the calculations and values applied were extremely conservative as there are two electric panels which supply electricity for all devices of the system. The total power of the 220V panel is 40kW and the total power of the 440V panel is 120kW. Thus, the project activity adopted that the total installed power of 160 kW was applied for the calculations with 100% of the time, although the total of kW of the installed

		<p>equipments are 117 kW.</p> <p>To the data presented for the period from 15/10/2008 to 04/03/2009, the energy consumed by the project activity was monitored by an electricity meter controlled by the utility company.</p> <p>The assessment team verified the below sales invoices:</p> <ul style="list-style-type: none"> ▪ Fiscal Invoice N° 001132655, Issued by Bandeirante Energias do Brasil, for the period from 15/10/2008 to 05/11/2008, regarding to the consumption of 6.731 MWh (ref. 23); ▪ Fiscal Invoice N° 001249599, Issued by Bandeirante Energias do Brasil, for the period from 05/11/2008 to 03/12/2008, regarding to the consumption of 14.653 MWh (ref. 23); ▪ Fiscal Invoice N° 002630429, Issued by Bandeirante Energias do Brasil, for the period from 03/12/2008 to 05/01/2009, regarding to the consumption of 18.043 MWh (ref. 23); ▪ Fiscal Invoice N° 002688322, Issued by Bandeirante Energias do Brasil, for the period from 05/01/2009 to 04/02/2009, regarding to the consumption of 19.991 MWh (ref. 23); ▪ Fiscal Invoice N° 002636340, Issued by Bandeirante Energias do Brasil, for the period from 04/02/2009 to 04/03/2009, regarding to the consumption of 21.481 MWh (ref. 23);
Landfill waste	waste disposal during a year in Alto-Tietê Landfill-metric tonnes	<p>The waste disposed in the landfill is weighted. The company PAJOAN is responsible for the operation of the landfill and the waste disposal. This parameter is not used in the CERs calculation. There is one weighbridge, - 60 tonnes (Perfecta brand). The scale is controlled by Pajoan (ref. 15).</p> <p>Regarding the calibration, according to CDM VMM V. 1.2 para 184 a) and as per EB 52 Annex 60 para 8, in cases where neither the monitoring methodology, nor the monitoring plan specify any requirements for calibration frequency for measuring equipments, the DOE shall ensure that the equipments are calibrated either in accordance with the specifications of the local/national standards, or as per the manufacturer specification. If local/national standards or the manufacturer specification is not available, international standards may be used.</p> <p>In this way, the monitoring methodology (ref. 2.a) does not have any information which regards to the calibrations of the scales. Continuous with the analysis in accordance with the EB 52 Annex 60 para 8 the assessment team checked that the no information regarding to the calibration of the scales was presented in the revised monitoring plan (ref. 1b).</p> <p>In this way, the assessment team checked that according with the specifications of the local/national standards as per the Decree N° 236 dated 22nd December 1994 (ref. 39) of the National Institute of Metrology, Standardization and Industrial Quality, with regards to the weighing instruments for consumer protection, for ease of use and accuracy of mass measurements, for fraud prevention and influences to which these instruments can be subject. This decree sets that the periodicity of the calibration/verification is limited to 1 (one) year, except for special cases that can be defined by INMETRO.</p> <p>As the standard calibration established by INMETRO is yearly, the assessment team verified the following:</p> <ul style="list-style-type: none"> ▪ Calibration certificate issued by INMETRO, nº 819693 (28/05/2008) <p>PAJOAN sends data from the weighbridge and they are inserted directly into</p>

		<p>the internal system. Every month data is consolidated by the Alto Tietê Biogás.</p> <p>Verified Pajoan report sent to Alto Tiete informing the waste landfilled per month (ref. 13).</p>
Regulatory requirements relating to landfill gas projects	Regulatory requirements relating to landfill gas projects	<p>CL #6 was raised as the registered monitoring plan requires monitoring the regulatory requirements relating to landfill gas projects. However, no evidence was presented during site visit and it was not possible to verify how the monitoring of this parameter has been done. The monitoring report version 1 presented during site visit (first periodic verification), established that the regulatory requirements were monitored. However, it did not present information about how the regulatory requirements were checked and CL # 6 remained open.</p> <p>To close out CL #6, PP described in the Monitoring Report version 02, that the regulatory review was performed based on the most recent Operation Permit of ATB (ref. 12a, 12b). All of the Environmental Permit's requirements were evaluated and ATB concluded that they do not result in any change in the Project Baseline. A copy of the Operation Permit was provided during the verification site visit and no requirement relating to the landfill gas project is required by the environmental agency. CL #6 was closed out. Please refer to Annex 9 – Findings Overview, CL #6 of this document for more details.</p>
FE	Combustion efficiency %	<p>The flare efficiency is calculated according to the “tool to determine project emissions from flaring gases containing methane”. Parameters are continuously measured. Refer to CL# 1 regarding formulas into the spreadsheet.</p> <p>Also, the tool requires to monitor some parameters that are listed below ($f_{vi,h}$; $FV_{RG,h}$; $t_{O2,h}$; $f_{VCH4,FG,h}$; T_{flare}). Refer to CL#4 regarding T_{flare}.</p> <p>CAR #2 was raised as during verification site visit, it was possible to verify that the equipment AG-02, serial number N1-W1-027 was not working. The measurements of this equipment are necessary to calculate the flare combustion efficiency. However, it was verified that the internal system was registering this parameter as 100%. This is not in accordance with the requirement of the tool to determine project emissions from flaring gases containing methane.</p> <p>To close out CAR #2, the PP explained that all failures in AG-02 are registered by the operators. In the period when AG-02 was not in operation or when it provided inconsistent measurements (e.g. $\%CH4 < 0$), the flare efficiency was considered to be 90%, according to “the Tool”.</p> <p>Regarding to the approach which can be observed from the data from the register panel and CERs spreadsheet (ref. 11a), that presents a FE as 100% when $-13 < f_{VCH4,FG,h} < 0$ & t_{O2} measurement is normal ($< 21\%$), and presents a FE as 90% when $f_{VCH4,FG,h} < -13$.</p> <p>The assessment team also discussed with the PP during the site visit that the failures which are entered in the diary by the operators related to AG02, is when the equipment is out of operation (i.e. due to electricity energy breaks or when the plant is not in operation).</p> <p>The assessment team has discussed the appliance of the ranges presented above (100% and 90%) with the PP during the site visit and the documentation provided for the appliance of the 100% FE efficiency range was due that once the error of the Gas Analyser instrument is 1% of 2500ppmv or 25ppmv (ref, 45 - Gas Analyser Fabrication Manual AG-01 & AG-02 - page 3-14 and 3-15), in this way values between zero and -25 ppmv</p>

		<p>ppmv could be interpreted as zero (Flare efficiency = 100%). For values below -25ppmv, the flare efficiency of 90% could be applied. Therefore, the values below zero does not refer to an AG02 failure.</p> <p>Instead of using the instrument error, the PP applied half of the error, to be more conservative, ie: 0.5% or 13ppmv. Therefore, values between zero and -13 ppmv was interpreted as zero (Flare Efficiency = 100%) and to values lower than -13 ppmv, the flare efficiency of 90% was applied. This approach was considered conservative by the assessment team once the intrinsic error of the Gas Analyser instrument is 1% or 25ppmv (ref, 9 - Gas Analyser Fabrication Manual AG01 & AG02 – page 3-14 and 3-15), and the project participant has applied half of the error (0.5% or 13ppmv).</p> <p>Also, with regards to the 90% FE was applied to this monitoring period when AG02 went out of work this value was applied when all other parameters required by the flare system manufacturer specifications (ref. 16) were operating accordingly and with the conditions presented in the Step 6 of the “Tool to determine project emissions from flaring gases containing methane” (ref. 2b).</p> <p>In order to verify if the conditions presented above were in accordance with the flare manufacture specifications (ref. 16) which provide that the lower temperature of the flare on proper operation is 700°C and a minimum LFG flow rate of 1000 Nm³/h. In this way, the assessment team collected a sample of three days of each month which have applied the 90% flare efficiency according to the step 6 of the tool (total of 13 days, because for the month of September and March there is no 90% FE appliance and for February only one day had few minutes applying 90% FE). Also, to verify if the temperature was above 700°C during those days, the data which is already excluded from the ERs calculation (for eg. If the flare temperature was lower than 500 °C; LFG<1000 Nm³/h and no operation activity), were not considered.</p> <p>The DOE analysis presented that the system was stable and the flare temperature was met according to the Step 6 of the tool. Firstly, the temperature was more than 500 °C and secondly more than 700 °C. This was verified through percentile analysis which showed that in 99% of the operation hours the flare temperature was above 818 °C and a LFG flow rate of 2117 Nm³/h. Therefore, the DOE assessment team could conclude that the PP has correctly applied the 90% of the flare efficiency in accordance with step 6 of the “Tool to determine project emissions from flaring gases containing methane” (ref. 2b).</p> <p>Furthermore, the assessment team verified that in the open spreadsheets (detailed, with formulas, data measured every minute), that data is consistent and followed the required by the tool. This spreadsheet was used for emission reduction calculation. Thus, CAR #2 was closed out. Please refer to Annex 9 – Findings Overview, CAR #2 of this document for more details.</p> <p>This data parameter is calculated automatically using the spreadsheet. The data reported and the records of abnormal situations were taken from the spreadsheet and checked against the data from the supervisory system. Data from open spreadsheet, audited by Arquipélago, are used in the monitoring report.</p> <p>The data presented in the monitoring report are the average of the values of the minutes of the day. Moreover, an external analysis of the flare efficiency was conducted by a third party company called Bioagri (ref. 19). The value of the FE found was 99.997% (ref. 19), which is consistent with the</p>
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		continuously monitoring of the flare efficiency.
T_{flare}	Temperature in the exhaust gas of the flare- °C	<p>C L#4 was raised as that it was not possible to see from spreadsheets and the site visit what temperature was being recorded by TT-04 and TT-05 (in spreadsheet "atb_queima_ch4"). The registered PDD requires both T_{flare} (temperature in the exhaust gas of the flare) and T_{flaring} (flaring temperature) to be measured.</p> <p>To close out CL #4, the PP explained that the temperatures T_{flaring} and T_{flare} described in the PDD refer to the same parameter, which is measured by TT-05 (for flow rates equal or lower than 4.200 Nm³/h) or TT-04 (for flow rates greater than 4.200 Nm³/h).</p> <p>The tool requires the monitoring of the parameter T_{flare}. The temperature is not used directly in the CERs calculation. Verified that CERs are only accounted if the temperature of the flare is above 500°C. Verified that the flare is operating according to the flare specifications regarding the flow and temperature of the exhausted gas (maximum temperature 1050 °C) (ref. 16). CL #4 was closed out and CAR #9 was raised to request PP to revise the monitoring plan during the first verification in order to be in compliance with the required by the methodology and tool. Registered Monitoring Plan requires both to be measured as different parameters. However the temperature of the flare and the temperature of the exhaust gas consist in the same parameter. Moreover, as part of CAR #9 the PP are requested to include in the revised monitoring plan the monitoring of the LPG used to the ignition of the flare and to revise the monitoring of the electricity consumed by the project activity as being monitored by a third party company.</p> <p>Regarding the calibration, according to CDM VMM V. 1.2 para 184 a) and as per EB 52 Annex 60 para 8, in cases where neither the monitoring methodology, nor the monitoring plan specify any requirements for calibration frequency for measuring equipments, the DOE shall ensure that the equipments are calibrated either in accordance with the specifications of the local/national standards, or as per the manufacturer specification. If local/national standards or the manufacturer specification is not available, international standards may be used.</p> <p>The monitoring methodology (ref. 2.a) does not have a specific requirement to monitor the T_{flare} as this parameter is required in the calculations to obtain the PE. In this way, the monitoring methodology parameter of the Project Emissions sets that "<i>the parameters used for determining the project emissions from flaring of the residual gas stream in year y ($PE_{\text{flare},y}$) should use the QA/QC procedures as per the "Tool to determine project emissions from flaring gases containing Methane".</i> The assessment team checked the Tool to determine project emissions from flaring gases containing Methane (ref. 2b), which sets that the "thermocouples should be replaced or calibrated every year".</p> <p>In addition the revised monitoring plan (ref. 1b) is consistent with the tool setting a calibration periodicity for the T_{flare} as yearly or it can be replaced yearly as well.</p> <p>Please find presented below the verified calibration certificates:</p> <p>TT 04:</p> <ul style="list-style-type: none"> ▪ Calibration conducted on 03/09/2008, by Ecil, certificate n° 6074/08 (ref. 6c) ▪ Calibration conducted on 18/02/2009, by GDD, certificate n° ATBG 008/09 (ref. 6.2.c)

		<p>TT 05:</p> <ul style="list-style-type: none"> Calibration conducted on 03/09/2008, by Ecil, certificate nº 6075/08 (ref. 6d) Calibration conducted on 18/02/2009, by GDD, certificate nº ATBG 007/09 (ref. 6.2.d) (the calibration was made before one year because the company GDD was on site that time). <p>Data is transferred automatically from the inviolable register to the CERs spreadsheet.</p> <p>Data reported in the spreadsheet were checked against the data from the supervisory system and were found consistent. Data presented in the monitoring report is the average of the minutes of the day.</p>
Flare _h	Flare working hours- hours	<p>CL #5 was raised as the registered monitoring plan requires to monitor the flare working hours. However, no evidence was presented during the verification site visit and it was not possible to verify how the monitoring would be done.</p> <p>To close out CL #5, the PP provided spreadsheets accounting the working hours, summing minute by minute the time of operation of the flare. The PP also explained that the working hours are updated by the supervisory system, at the operator's command, and are shown in the application software screen. Spreadsheet with detailed data is consistent and the data are presented in hours, as required by the methodology and monitoring plan. CL #5 was closed out.</p> <p>Data reported in the spreadsheet were checked against the data from the supervisory system and were found consistent. Data presented in the monitoring report are the sum of the minutes of the day.</p>
FV _{RG,h}	volumetric flow rate of the landfill gas in dry basis at normal conditions in the hour h-m ³ /h	<p>The flow rate of the landfill gas is measured continuously in wet basis at normal conditions (Normal conditions of temperature and pressure). The assessment team has verified during the site visit that no dry treatment was performed in the landfill gas, being in this way the LFG going to the flare on a wet basis.</p> <p>Regarding to the way that this parameter shall be monitored at the applicable methodology ACM0001 V.05 (ref. 2a) there is no information with regards to the measurement of this parameter as it is a parameter required to calculate the project emissions (PE).</p> <p>In this way, the assessment team checked that in the "Tool to determine project emissions from flaring gases containing Methane" (ref. 2b) the information regarding to FV_{RG,h} parameter is in accordance with the text presented in the revised monitoring plan (ref. 1b).</p> <p>In the text presented in the line regarding to the description of the parameter it is presented that "volumetric flow rate of the residual gas in dry basis at normal conditions in the hour (h)", however, in the line presented below regarding the measurement procedures the text presents the following: "ensure that the same basis (dry or wet) is considered for this measurement and the measurement of volumetric fraction of all components in the residual gas (fv_{i,h}) when the residual gas temperature exceeds 60°C. Therefore, as the measurements of the fv_{i,h} - volumetric fraction of all components in the residual gas, is monitored in a wet basis and as the FV_{RG,h} shall be at the same basis of the fv_{i,h} (dry or wet) the assessment team considered that it was correctly monitored by the project activity on a wet basis.</p> <p>There is a flow meter located before the flare, the equipment is identified as</p>

		<p>FIT-01:</p> <ul style="list-style-type: none"> ST 98 Flex MASter™, Serial Number 288577. <p>The data is continuously measured and transferred automatically to the inviolable register and downloaded in the computer for emission reductions calculation. Data is registered every minute and can be aggregated daily, monthly and yearly. The internal system has restricted access. There is no manual transference.</p> <p>Data is monitored automatically in Nm³/h.</p> <p>Regarding the calibration, according to CDM VMM V. 1.2 para 184 a) and as per EB 52 Annex 60 para 8, in cases where neither the monitoring methodology, nor the monitoring plan specify any requirements for calibration frequency for measuring equipments, the DOE shall ensure that the equipments are calibrated either in accordance with the specifications of the local/national standards, or as per the manufacturer specification. If local/national standards or the manufacturer specification is not available, international standards may be used.</p> <p>In this way, the monitoring methodology (ref. 2.a) sets out that the flow meters should be subject to a regular maintenance and testing regime to ensure accuracy. Continuous with the analysis in accordance with EB 52 Annex 60 para 8 the assessment team checked that the same information was presented in the revised monitoring plan (ref. 1b), which does not refer to a specific period of calibration.</p> <p>In accordance with EB 52 Annex 60 para 8, the assessment team checked that the PP internal procedure P459/R04/V01/08 (ref. 5a) defines a calibration periodicity as annual, which is more conservative than the manufacturer specification which refers to a calibration period of 18 months (ref. 37 – Flow Meter Manufacturer Manual).</p> <p>In this way, the assessment team verified the following calibration certificates issued by:</p> <ul style="list-style-type: none"> FCI- Fluid Components Intl, on 26/02/2008, certificate number C040066 (ref. 6.a); GDD, certificate number RCBG001/09 on 18/02/2009 (ref. 6.2.a) HC Service, certificate number 001, 06/03/2009 (ref. 6.3.a). (Note that the calibration from HC Service was conducted because the track standard from the calibration of GDD was not provided). <p>Also, preventive maintenance was conducted by GDD on 19/12/2008, report number RSATB 001/08 (ref. 9).</p> <p>Data reported in the spreadsheet were checked against the data from the supervisory system and were found consistent. Data presented in the monitoring report is the consolidation of the minutes of the day. Data presented in the monitoring report is the average of the day.</p>
t _{O2,h}	Volumetric fraction of O ₂ in the exhaust gas of the flare in the hour h	<p>This parameter is used to calculate the PE_{flare,y} and FE. Refer to CAR #2 regarding to the gas analyser AG 02 and calculus of PE_{flare,y} and FE. Gas analyser, ULTRAMAT Siemens, AG 02, serial number N1-W1-027. During site visit, it was possible to verify that the gas analyzer is located in the upper section of the flare as requested by the tool to determine project emissions from flaring gases containing methane. The flare project- P459 Projeto de captação de biogas (ref. 16) also shows that the gas analyzer is located in the upper section of the flare.</p> <p>Data is continuously recorded by the gas analyzer. The result is transferred</p>

		<p>automatically to the inviolable register and downloaded in the computer for emission reductions calculation. Data is registered every minute and can be aggregated daily, monthly and yearly. The internal system has restricted access. There is no manual transference.</p> <p>Regarding the calibration, according to CDM VMM V. 1.2 para 184 a) ii and as per EB 52 Annex 60 para 8, in cases where neither the monitoring methodology, nor the monitoring plan specify any requirements for calibration frequency for measuring equipments, the DOE shall ensure that the equipments are calibrated either in accordance with the specifications of the local/national standards, or as per the manufacturer specification. If local/national standards or the manufacturer specification is not available, international standards may be used.</p> <p>The monitoring methodology (ref. 2.a) does not have a specific requirement to monitor the $t_{O_2,h}$ as this parameter is required in the calculations to obtain the PE. In this way, the monitoring methodology parameter of the Project Emissions sets that <i>"the parameters used for determining the project emissions from flaring of the residual gas stream in year y ($PE_{flare,y}$) should use the QA/QC procedures as per the "Tool to determine project emissions from flaring gases containing Methane".</i> The assessment team checked the Tool to determine project emissions from flaring gases containing Methane (ref. 2b), which sets that the <i>"analysers must be periodically calibrated according to the manufacturers recommendation. A zero check and a typical value check should be performed by comparison with a standard gas"</i>.</p> <p>In addition the revised monitoring plan (ref. 1b) is consistent with the tool setting a calibration periodicity for the $t_{O_2,h}$ as presented above.</p> <p>In accordance with the EB 52 Annex 60 para 8, the assessment team checked that the manufactures manual (ref. 7, page 4-4), which establish that the equipment has to be calibrated every six months to twelve months depending on the ambient conditions.</p> <p>Verified the external calibration certificates:</p> <ul style="list-style-type: none"> ▪ Certificate issued by Siemens on 20/04/2008 (ref. 6e) ▪ Certificate issued by Arquipélago on 22/09/2008, number 11/2008 (ref. 6eiii) ▪ Certificate issued by Arquipélago on 24/09/2008, number 13/2008 (ref. 6eii) (calibration made in the commissioning of the plant operation) ▪ Certificate issued by Siemens on 24/11/2008 (ref. 6f) <p>Also, verified that a zero check and typical value check are performed by comparison with standard gases (ref. 6h) are done every 15 days (ref. 6g).</p> <p>Data reported in the spreadsheet were checked against the data from the supervisory system and were found consistent. Data presented in the monitoring report is the average of the minutes of the day.</p>
$fv_{CH_4,FG,h}$	Concentration of methane in the exhaust gas of the flare in dry basis at normal conditions in the hour h-	<p>This parameter is used to calculate the $PE_{flare,y}$ and FE. Refer to CAR# 2 regarding to the gas analyser AG 02 and calculus of $PE_{flare,y}$ and FE. Gas analyser, ULTRAMAT Siemens, AG 02, serial number N1-W1-027. During site visit, it was possible to verify that the gas analyzer is located in the upper section of the flare as requested by the tool to determine project emissions from flaring gases containing methane. The flare project- P459 Projeto de captação de biogas (ref. 16) also shows that the gas analyzer is located in the upper section of the flare.</p> <p>This parameter date is continuously monitored by a gas analyser on a wet</p>

	mg/m ³	<p>basis.</p> <p>Regarding to the way that this parameter shall be monitored at the applicable methodology ACM0001 V.05 (ref. 2a) there is no information with regards to the measurement of this parameter as it is a parameter required to calculate the project emissions (PE).</p> <p>In this way, the assessment team checked that in the “Tool to determine project emissions from flaring gases containing Methane” (ref. 2b) the information regarding to $fv_{CH_4,FG,h}$ parameter is in accordance with the text presented in the revised monitoring plan (ref. 1b).</p> <p>In the text presented in the line regarding to the description of the parameter it is presented that “concentration of methane in the exhaust gas of the flare in dry basis at normal conditions in the hour h”, however, in the line presented below regarding to the measurement procedures the text presents the following: “extractive sampling analysers with water and particulates removal devices or in situ analyser for wet basis determination”.</p> <p>Therefore, in accordance with the RMP (ref. 2b) and with the “Tool to determine project emissions from flaring gases containing Methane” (ref. 2b) in the point specific to the measurements procedures of the $fv_{CH_4,FG,h}$ – concentration of methane in the exhaust gas, this parameter can be measured in situ by a analyser for a wet basis determination the assessment team considered that it was correctly monitored by the project activity on a wet basis.</p> <p>The result is transferred automatically to the inviolable register and downloaded in the computer for emission reductions calculation. Data is registered every minute and can be aggregated daily, monthly and yearly. The internal system has restricted access. There is no manual transference.</p> <p>Data is measured in ppm and converted in mg/m³.</p> <p>Regarding the calibration, according to CDM VMM V. 1.2 para 184 a) ii and as per EB 52 Annex 60 para 8, in cases where neither the monitoring methodology, nor the monitoring plan specify any requirements for calibration frequency for measuring equipments, the DOE shall ensure that the equipments are calibrated either in accordance with the specifications of the local/national standards, or as per the manufacturer specification. If local/national standards or the manufacturer specification is not available, international standards may be used.</p> <p>The monitoring methodology (ref. 2a) does not have a specific requirement to monitor the $fv_{CH_4,FG,h}$ as this parameter is required in the calculations to obtain the PE. In this way, the monitoring methodology parameter of the Project Emissions sets that “<i>the parameters used for determining the project emissions from flaring of the residual gas stream in year y (PE_{flare,y}) should use the QA/QC procedures as per the “Tool to determine project emissions from flaring gases containing Methane”.</i> The assessment team checked the Tool to determine project emissions from flaring gases containing Methane (ref. 2b), which sets that the calibration of the gas analysers to monitor the $fv_{CH_4,FG,h}$ “<i>analysers must be periodically calibrated according to the manufacturers recommendation. A zero check and a typical value check should be performed by comparison with a standard gas</i>”.</p> <p>In addition the revised monitoring plan (ref. 1b) is consistent with the tool setting a calibration periodicity for the $fv_{CH_4,FG,h}$ as presented above.</p> <p>In accordance with EB 52 Annex 60 para 8, the assessment team checked that the manufactures manual (ref. 7, page 4-4), which establish that the equipment has to be calibrated every six months to twelve months</p>
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		<p>depending on the ambient conditions.</p> <p>Verified the external calibration certificates:</p> <ul style="list-style-type: none"> ▪ Certificate issued by Siemens on 20/04/2008 (ref. 6e) ▪ Certificate issued by Arquipélago on 22/09/2008, number 11/2008 (ref. 6eiii) ▪ Certificate issued by Arquipélago on 24/09/2008, number 13/2008 (ref. 6eii) (calibration made in the commissioning of the plant operation) ▪ Certificate issued by Siemens on 24/11/2008 (ref. 6f) <p>According to the revised monitoring plan (ref. 1b) approved on 23rd December 2009, the QA/QC procedures for the $f_{V_{CH_4,FG,h}}$ is that according to AM_CLA_0047 (ref. 49), the methane composition profile will be measured once a year from 5th January 2010 on, date of the EB's request using the traversing measuring procedure.</p> <p>Therefore, as this first monitoring period is from 25th September 2008 to 4th March 2009 and according to the page 6, parameter $f_{V_{CH_4,FG,h}}$, QA/QC procedures of the revised monitoring plan the AM_CLA_0047 is only applicable to the project from 5th January 2010, being in this way out of this first monitoring period.</p> <p>Furthermore, in parallel and in a conservative way of the monitoring the project participant has performed a Flare Efficiency test by a third party company called Bioagri and the assessment team has also verified the analysis report N° 3677/09 dated 12/01/2009 (ref. 19), which presents how the test was performed and an average flare efficiency of 99,996% during the test performed, which is in accordance with the monitored parameter.</p> <p>Also, is important to highlight that according to the information presented above and the revised monitoring plan (ref. 1b), this test was only verified in order to compare the values of the Flare Efficiency and the values applied to the calculations of the emissions reductions were the values monitored by the Gas Analyser in accordance with the revised monitoring plan (ref. 1b) and the ERs spreadsheets (ref. 11).</p> <p>Also, verified that a zero check and typical value check are performed by comparison with standard gases (ref. 6h) are done every 15 days (ref. 6g).</p> <p>Data reported in the spreadsheet were checked against the data from the supervisory system and were found consistent. Data presented in the monitoring report is the average of the minutes of the day.</p>
LPG	Total amount of LPG consumed to start up the flare (kg)	<p>LPG consumption used to start up the flare. This parameter is not established in the approved monitoring methodology ACM0001 Version 05 (ref. 2a) and was also not described in the previous monitoring plan presented in the registered PDD (ref. 1a). Please refer to CAR #9.</p> <p>In this way, according to the revised approved monitoring plan (ref. 1b), the source of data to be used is the invoice of the LPG suppliers and the QA/QC procedures of this parameter is scope of the LPG supplier.</p> <p>Therefore, the consumption of LPG was monitored through the purchase receipts of the cylinders used in the monitoring period (ref. 14 - LPG Invoices). The emissions from the LPG consumption were discounted from the ERs as Project Emissions in the CERs spreadsheet.</p> <p>The invoices details of the cylinders which were verified by the assessment team are presented bellow:</p>

		<ul style="list-style-type: none"> ▪ Ultragaz N° 062118, 30th August 2008, referent to two cylinders of 45 kg each, totalizing 90kg (ref. 14); <p>The emissions are discounted from ERs in the ERs spreadsheet (ref. 11). The equation regarding to the LPG consumption is presented below:</p> <ul style="list-style-type: none"> ▪ $LPG_{\text{emission}} = 90 \text{ kg} * 10,990 \text{ kcal/kg} * 4186.8 \times 10^{-12} \text{ TJ/kcal} * 63.1 \text{ tCO}_2\text{e/TJ} = 0.26 \text{ tCO}_2\text{e}$
CEF _{elec,BL,y} (GRID)	CO ₂ e emissions conversion factor for electricity-tCO ₂ e/MWh	<p>External data:</p> <p>The CO₂ Operating Margin emission factor of the grid (EF_{OM,y}) in tCO₂/MWh, CO₂ Build Margin emission factor of the grid (EF_{BM,y}) in tCO₂/MWh parameters were calculated by the Brazilian DNA (MCT) using information from ONS, the Brazilian electricity system manager.</p> <p>The building margin and operate margin emission factor of the grid is calculated by the Brazilian DNA in accordance with the Tool to calculate the Tool to calculate the emission factor for an electricity system version 1, 1.1 and 2 as the information found at the reference 43 or the at link: http://www.mct.gov.br/index.php/content/view/307492.html.</p> <p>In addition the values obtained through the calculations and which were applied to this project activity are available at the Brazilian DNA web site (MCT): http://www.mct.gov.br/index.php/content/view/303073.html or at reference 17 - Building and Operating Margin of 2007 - Brazilian DNA website screenshot, dated 15/04/2010.</p> <p>As the operation margin data relies from the information obtained through the data monitored during the year and according to Step 3, page 6 of the Tool to calculate the emission factor for an electricity system, Version 02.1.0 (ref. 44), "If the data is usually only available 18 months after the end of year y, the emission factor of the year proceeding the previous year y-2 may be used. The same data vintage (y, y-1 or y-2) should be used throughout all crediting periods", which is also in line with the information provided in the meeting report of the EB 51 para 89 (ref. 48).</p> <p>In this way, during the site visit performed on 25/03/2009, the assessment team verified through the Brazilian DNA website that the most recent data available was the EF of 2007 and as per the tool to calculate the emission factor for an electricity system (ref. 44) and by EB 51 – Meeting Report para 89 (ref. 48). Therefore, the emission factor value of 2007 year is applicable to this monitoring period of the project activity.</p> <p>The calculations performed by the project participant were checked and verified by the assessment team.</p> <p>According to the Step 7 of the tool (ref. 44) the calculation of combined margin emission factor shall be calculated per the formula:</p> <ul style="list-style-type: none"> ▪ EF_{grid,CM,y} = EF_{grid,OM,y} X w_{OM} + EF_{grid,BM} X w_{BM} <p>In this way, as calculated by the Brazilian DNA (ref. 17) we have:</p> <ul style="list-style-type: none"> ▪ Building Margin EF (tCO₂/MWh) = 0,0775 ▪ Average of the Operating Margin (tCO₂/MWh) = (0.2292+ 0.1954+ 0.1948+ 0.1965+ 0.1606+ 0.2559+ 0.3096+ 0.3240+ 0.3550+ 0.3774+ 0.4059+ 0.4865)/12 = 0.2909 <p>Also, as per the tool the apart from the wind and solar power generation project activities the values applied for the first crediting period are: w_{OM} = 0.5 and w_{BM} = 0.5.</p>

		<p>Therefore the combined EF is calculated:</p> <ul style="list-style-type: none"> ▪ $EF_{grid,CM,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM} \times w_{BM} = 0.0775 \times 0.5 + 0.2909 \times 0.5 = 0.1842 \text{ tCO}_2/\text{MWh}$
CEF _{LPG}	emission factor of the LPG	<p>External data:</p> <p>Emission factor of the LPG used to start up the flare.</p> <p>Official data was used. Verified the source of data through IPCC and CETESB (Environmental Agency) website.</p> <p>The data from CETESB are available at www.cetesb.sp.gov.br and the screenshot with the information is available at reference 35. The data from IPCC is public available and were saved in the reference 36 (2006 IPCC Guidelines for national Greenhouse Gas Inventories, Volume 2, section 2, P16).</p> <p>$CEF_{thermal,y} = 63.1 \text{ tCO}_2\text{e/TJ}$ (ref. 36)</p> <p>Lower Heating Value (LHV)_{LPG} = 10,990 kcal/kg (ref. 35)</p> <p>$LPG_{emission} = 90 \text{ kg} \times 10,990 \text{ kcal/kg} \times 4186.8 \times 10^{-12} \text{ TJ/kcal} \times 63.1 \text{ tCO}_2\text{e/TJ} = 0.26 \text{ tCO}_2\text{e}$</p>

3.5 Accuracy of Equipment

The reporting procedures reflect the content of the revised monitoring plan (ref. 1). The monitoring mechanism is effective and reliable.

3.6 Accuracy of Emission Reduction Calculations

The calculation of emission reductions is found to be correct. CAR#2 was raised to address the flare efficiency analyses in case of failure of the gas analyser. The response was satisfactory and in this way, the CAR was closed out. The details of the reported and the verified values for all parameters are listed in section 4.

All data were available and in accordance with the revised monitoring plan (ref. 1). The emission factors and default values were correctly applied in the calculations. The emission reductions are being calculated minute by minute which is considered appropriate and inline with methodology ACM0001 version 5. The minute by minute emission reductions are summarized on daily basis in the same raw data sheet and values are correctly linked following the formulas. These daily emission reductions data are extracted into the new 'summary sheet' for daily values corresponding to all month data. The extracted valued in the summary sheet can be cross checked from the raw minute by minute data.

3.7 Quality of Evidence to Determine Emission Reductions

Critical parameters used for the determination of the Emission Reductions are discussed in section 3.4 above. All the data recorded is in compliance with the monitoring report.

3.8 Management System and Quality Assurance

The company involved in the project have quality assurance system implemented; therefore we can affirm that the management system the CDM project is in place; with the responsibilities properly identified and in place.

In order to verify data quality, the company involves in the project works in accordance with a quality assurance procedure (*Procedure for Monitoring Plan Implementation*), which establishes the operational and management structure implemented.

3.9 Data from External Sources

The CO₂ Operating Margin emission factor of the grid (EF_{OM,y}) in tCO₂/MWh, CO₂ Build Margin emission factor of the grid (EF_{BM,y}) in tCO₂/MWh parameters were calculated by the Brazilian DNA (MCT) using information from ONS, the Brazilian electricity system manager.

The building margin and operate margin emission factor of the grid is calculated by the Brazilian DNA in accordance with the Tool to calculate the emission factor for an electricity system version 1, 1.1 and 2 as the information found at the reference 43 or the at link: <http://www.mct.gov.br/index.php/content/view/307492.html>.

In addition the values obtained through the calculations and which were applied to this project activity are available at the Brazilian DNA web site (MCT): <http://www.mct.gov.br/index.php/content/view/303073.html> or at reference 17 - Building and Operating Margin of 2007 - Brazilian DNA website screenshot, dated 15/04/2010.

As the operation margin data relies from the information obtained through the data monitored during the year and according to Step 3, page 6 of the Tool to calculate the emission factor for an electricity system, Version 02.1.0 (ref. 44), *"If the data is usually only available 18 months after the end of year y, the emission factor of the year proceeding the previous year y-2 may be used. The same data vintage (y, y-1 or y-2) should be used throughout all crediting periods"*.

In this way, during the site visit performed on 25/03/2009, the assessment team verified through the Brazilian DNA website that the most recent data available was the EF of 2007 and as per the tool this year value could be applicable to this monitoring period of the project activity.

The calculations performed by the project participant were checked and verified by the assessment team.

According to the Step 7 of the tool (ref. 44) the calculation of combined margin emission factor shall be calculated per the formula:

$$\text{EF}_{\text{grid,CM,y}} = \text{EF}_{\text{grid,OM,y}} \times w_{\text{OM}} + \text{EF}_{\text{grid,BM}} \times w_{\text{BM}}$$

In this way, as calculated by the Brazilian DNA (ref. 17) we have:

- Building Margin EF (tCO₂/MWh) = 0,0775
- Average of the Operating Margin (tCO₂/MWh) =
(0.2292+ 0.1954+ 0.1948+ 0.1965+ 0.1606+ 0.2559+ 0.3096+ 0.3240+ 0.3550+ 0.3774+ 0.4059+ 0.4865)/12 = 0.2909

Also, as per the tool the apart from the wind and solar power generation project activities the values applied for the first crediting period are: w_{OM} = 0.5 and w_{BM} = 0.5.

Therefore the combined EF is calculated:

$$\text{EF}_{\text{grid,CM,y}} = \text{EF}_{\text{grid,OM,y}} \times w_{\text{OM}} + \text{EF}_{\text{grid,BM}} \times w_{\text{BM}} = 0.0775 \times 0.5 + 0.2909 \times 0.5 = 0.1842 \text{ tCO}_2/\text{MWh}$$

The Emission Factor of the LPG used to start up the flare was obtained from IPCC web site: http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_2_Ch2_Stationary_Combustion.pdf (ref. 36).

The Lower heating Value (LHV) of the LPG used is 10,990 kcal/kg in accordance with the Environmental Agency of São Paulo State, and can be obtained from the website <http://www.cetesb.sp.gov.br> and reference 35.

4. Calculation of Emission Reductions

Parameter	Reported Value	Verified Value
$LFG_{total,y} / LFG_{flared,y}$	11,732,480 Nm ³	11,732,480 Nm ³
$PE_{flare,y}$	2,285 tCO ₂ e	2,285 tCO ₂ e
$WCH_{4,y} // fvch_{4,h}$	Several data reported	Several data reported checked
EL_{IMP}	153.859 MWh	157.699 MWh
Landfill waste received	360,928.58 tonnes	315,656.1 tonnes
Regulatory requirements relating to landfill gas projects	It is not required to change the baseline. The AD remains 20% as described in the registered PDD.	It is not required to change the baseline. The AD remains 20% as described in the registered PDD
FE	Several data reported Average of the monitored period 97.9%	Several data reported checked Average of the monitored period 97.9%
T_{flare}	Several data reported	Several data reported checked
$Flare_h$	3683.8 hours	3683.8 hours
$Fv_{RG,h}$	Several data reported	Several data reported checked
$t_{O_2,h}$	Several data reported	Several data reported checked
$fv_{CH_4,FG,h}$	Several data reported	Several data reported checked
LPG	90 kg	90 kg
$CEF_{elec,BL,y} (GRID)$	0.1842 tCO ₂ e/MWh	0.1842 tCO ₂ e/MWh
CEF_{LPG}	63.1 tCO ₂ e/TJ	63.1 tCO ₂ e/TJ

$$ERY = LFG_{flared,y} * w_{CH_4,y} * FE * D_{CH_4} * (1-EAF) * GWP_{CH_4}$$

The formula is inserted directly in the system spreadsheet. Three samples per month were checked and also verified the exceptions occurred during monitored period. Data is automatically measured and calculated. Open spreadsheets with formulas were presented.

Emission reduction without discounting of project emissions from electricity and LPG consumption: **67,324.80 tCO₂e**.

Project emissions from electricity imported:

Electricity consumption: 157.699 * 0.1842 = 29.05 tCO₂e

Project emissions from fossil fuel consumption (LPG):

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

Lower Heating Value (LHV)_{LPG} = 10,990 kcal/kg

$LPG_{emission} = 90 \text{ kg} * 10,990 \text{ kcal/kg} * 4186.8 \times 10^{-12} \text{ TJ/kcal} * 63.1 \text{ tCO}_2\text{e/TJ} = 0.26 \text{ tCO}_2\text{e}$

Final Emissions reduction calculated:

$ER = 67,324.80 \text{ tCO}_2\text{e} - (29.05 + 0.26) = \mathbf{67,295 \text{ tCO}_2\text{e}}$

5. Recommendations for Changes in the Monitoring Plan

CAR #9 was raised to request to PP to revise the monitoring plan during the first verification in order to be in compliance with the requirements of the methodology and tool, regarding the parameters Tflare (temperature in the exhaust gas of the flare) and Tflaring (flaring temperature). The Registered Monitoring Plan requires both to be measured as different parameters. However both the temperature of the flare and the temperature of the exhaust gas are the same. In addition, PP was requested to include in the revised monitoring plan the monitoring of the LPG used to the ignition of the flare and to revise the monitoring of the electricity consumed by the project activity as being monitored by a third part company.

The revision of the monitoring plan (ref. 1) was approved on 23rd December 2009 in accordance with what was raised in CAR #9. The details of the approved monitoring plan are available at the UNFCCC website (<http://cdm.unfccc.int/Projects/DB/RWTUV1204280292.23/view>) or at reference 26.

Thus, **CAR#9 was closed out**. Please refer to Annex 9 – Findings overview CAR #9, of this document for more information.

No additional recommendation was done.

6. Overview of Results

Assessment Against the Provisions of Decision 17/CP.7:

Is the project documentation in accordance with the requirements of the registered PDD and relevant provision of decision 17/CP.7, EB decisions and guidance and the COP/MOP?

Yes. The results of the compliance assessment are recorded in the verification checklist which is used as an internal report only.

Have on-site inspections been performed that may comprise, inter alia, a review of performance records, interviews with project participants and local stakeholders, collection of measurements, observations of established practices and testing of the accuracy of monitoring equipment?

Yes. Members of the Assessment team visited the site and undertook interviews, collected data, audited the implementation of procedures, checked calibration certificates and checked data, inter alia.

The results of the site visit are recorded in the verification checklist which is used as an internal report only.

The evidences have been checked and collected. The revised monitoring report is attached with this verification report.

Has data from additional sources been used? If yes, please detail the source and significance.

The project uses additional source for the LPG and electricity emission factor (ex-post EF).

Emission Factor of the Brazilian Grid (EF) = 0.1842 tCO₂e/MWh, this data comes from official sources, provided by ONS, calculated and published by the Brazilian DNA (ref. 17);

*Emission factor from the LPG (EF_{LPG}) = 63.1 tCO₂e/TJ, data obtained from IPCC web site:
http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_2_Ch2_Stationary_Combustion.pdf
(page 16) or available at reference 36.*

Lower Heating Value (LHV)_{LPG} = 10,990 kcal/kg, data obtained from the São Paulo State Environmental Agency available at:

<http://www.cetesb.sp.gov.br/> or at reference 35.

Please review the monitoring results and verify that the monitoring methodologies for the estimation of reductions in anthropogenic emissions by sources have been applied correctly and their documentation is complete and transparent.

Yes. The monitoring methodology has been correctly applied and the monitoring report and supporting references are complete and transparent.

Have any recommendations for changes to the monitoring methodology for any future crediting period been issued to the project participant?

No.

Determine the reductions in anthropogenic emissions by sources of greenhouse gases that would not have occurred in the absence of the CDM project activity, based on the data and information using calculation procedures consistent with those contained in the registered project design document and the monitoring plan.

*The data used in anthropogenic emission reduction calculation is lower than those contained in the registered PDD and monitoring plan. The emission reduction was 164,641 tCO₂ for the period 25/09/2008 to 04/03/2009 as per the estimation made in the registered PDD. The actual emission reduction has been verified as 67,295 tCO₂ for the same period. **CL #8 was raised** to request PP to*

clarify the difference between the emission reduction estimated in the PDD and the emission reduction verified in the first verification.

The project participant provided the following information: "The PDD forecasted a generation of 354,776 CERs in 2008 and of 396,399 in 2009, i.e. an average of approximately 31,300 CERs/month in the two first years of operation. From September 25th 2008 (date when the flare started to operate continuously) until March 04th 2009, the accrued CERs totaled 67,295, corresponding to a monthly average of approximately 12,600 CERs/month.

The difference between the estimated credits and the actual accrued credits are due to:

A more cautious operation of the LFG capturing and flaring system in the initial phase of the project, when the staff is getting familiar with the system and with its interaction with the landfill

Longer downtime periods, for inspections, verifications and maintenance, which are also common during the initial operation of the system and are not expected to be so frequent in the future

The operation of the landfill, which adversely interfered in the LFG extraction, requiring sometimes the disconnection of rich-methane LFG wells (up to 30 wells at a time)

Heavy rains in the summer, which did not allow corrective actions in the landfill, causing downtime of some gas extraction wells / branches during the period

Some problems in the gas analyser AG-02, which also caused a reduction in the CERs (i.e. use of a flaring efficiency of 90% for the destruction of methane during the downtime of AG-02)

ATB is continuously working to improve the LFG capturing efficiency in the landfill, in order to maximize the amount of collected and destroyed methane. While in February 2009 the average LFG flow to the flare was 3,600 Nm³/h with 46% methane, the LFG flow to the flare in May (until May 18th 2009) is 4,500 Nm³/h with 44% methane. ATB expects to extract over 6,000 Nm³/h with 45% methane by the end of December 2009".

*It was concluded that the difference from the CERs verified and the ones forecasted in the PDD are mainly due to the operation of the landfill. **CL #8 was closed out.***

Identify and inform the project participants of any concerns related to the conformity of the actual project activity and its operation with the registered project design document. Project participants addressed the concerns and supplied relevant additional information.

*Yes, **CAR #9 was raised** to request to PP to revise the monitoring plan during the first verification in order to be in compliance with the requirements of the methodology and tool, regarding the parameters T_{flare} (temperature in the exhaust gas of the flare) and T_{flaring} (flaring temperature). The Registered Monitoring Plan requires both to be measured as different parameters. However both the temperature of the flare and the temperature of the exhaust gas are the same. In addition, PP was requested to include in the revised monitoring plan the monitoring of the LPG used to the ignition of the flare and to revise the monitoring of the electricity consumed by the project activity as being monitored by a third part company.*

The revision of the monitoring plan (ref. 1) was approved on 23rd December 2009 in accordance with what was raised in CAR #9. The details of the approved monitoring plan are available at the UNFCCC website (<http://cdm.unfccc.int/Projects/DB/RWTUV1204280292.23/view>) or at reference 26.

*Thus, **CAR#9 was closed out.***

Post monitoring report on UNFCCC website

Yes, the monitoring report is available at ref. 1636 on UNFCCC website <http://cdm.unfccc.int/Projects/DB/RWTUV1204280292.23/view>.

7. Verification and Certification Statement

SGS United Kingdom Ltd has been contracted by Alto Tietê Biogás, Redução de Emissões e Geração de Energia Ltda. to perform the verification of the emission reductions reported for the CDM project Alto-Tietê landfill gas capture project, UNFCCC Reference Number 1636 in the period 25/09/2008 – 04/03/2009. .

The verification is based on the validated and registered project design document and the monitoring report for this project. Verification is performed in accordance with section I of Decision 3/CMP.1, and relevant decisions of the CDM EB and CoP/MoP. The scope of this engagement covers the verification and certification of greenhouse gas emission reductions generated by the above project during the above mentioned period, as reported in Report on Greenhouse Gas Emission Reduction: Alto-Tietê landfill gas capture project, 16/06/2011, version 06 .

The management of the Alto Tietê Biogás, Redução de Emissões e Geração de Energia Ltda. is responsible for the preparation, calculation and determination of the GHG emissions data and the reported GHG emissions reductions on the basis set out within the project Monitoring Report version 06, dated 16/06/2011. The development and maintenance of records and reporting procedures are in accordance with the monitoring report.

It is our responsibility to express an independent GHG verification opinion on the GHG emissions and on the calculation of GHG emission reductions from the project for the period 25/09/2008 – 04/03/2009 based on the reported emission reductions in the Monitoring Report version 06, dated 16/06/2011 for the same period.

Based on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate these, SGS planned and performed our work to obtain the information and explanations that we considered necessary to provide sufficient evidence for us to give reasonable assurance that this reported amount of GHG emission reductions for the period is fairly stated.

SGS confirms that the project is implemented as described in the validated and registered project design documents. Based on the information we have seen and evaluated, we confirm the following:

Project Title:	Alto-Tietê landfill gas capture project
UNFCCC Reference Number:	1636
Registered PDD Used for Verification:	PDD version 6, 13/12/2007 and the revised monitoring plan approved 23/12/2009.
Methodology Used for Verification:	ACM0001, version 05, EB 28
Applicable Period:	25/09/2008 – 04/03/2009
Total GHG Emission Reductions Verified:	67,295 tCO ₂ e

Signed on behalf of the Verification Body by Authorized Signatory

Signature:



Name: Siddharth Yadav

Date: 22 July 2011

8. Document References

/1.a/	Registered PDD: Alto -Tietê landfill gas capture project, version 06, 13/12/2007
/1.b/	Alto – Tietê Revised Monitoring Plan, 23/12/2009
/2.a/	Methodology: ACM0001 Version 05: “Consolidated baseline methodology for landfill gas project activities”
/2.b/	“Tool to determine project emissions from flaring gases containing Methane”
/3.a/	ATB Report on GHG ER V01 16Marc09, Version 1, Dated 16 th March 2009; ATB Report on GHG ER V02 21Mai09 AR, Version 2, Dated 21 st May 2009; ATB Report on GHG ER V03 18Jan10 AR, Version 3, Dated 8 th January 2010; MR ATB Report on GHG ER V04 22Marc10 AR, Version 4, Dated 22 th March 2010; ATB_Report_on_GHG_ER_V05_101229, Version 5, Dated 4 th January 2011; ATB_Report_on_GHG_ER_V06_16-jun-2011, Version 6, Dated 16 th June 2011;
/3.b/	
/3.c/	
/3.d/	
/3.e/	
/3.f/	
/4/	Monitoring Protocol, dated 28/11/2008
/5a/	Maintenance Manual - P459/R04/V01/08
/5b/	Monitoring Manual - P459/R05/V01/08
/5c/	Operation Manual - P459/R03/V01/08
/6a/	Calibration certificate, FIT-01, dated 26/02/2008
/6.2.a/	Calibration certificate, FIT-01, dated 18/02/2009
/6.3.a/	Calibration certificate, FIT-01, dated 06/03/2009
/6b/	Calibration certificate, PIT-02, TIT-02, dated 03/03/2008
/6.2.b/	Calibration Certificate TIT-01; TIT-02 and PIT-01; PIT-02 – 18/02/2009
/6c/	Calibration certificate, TT-04, dated 03/09/2008
/6.2.c/	Calibration certificate, TT-04, dated 18/02/2009
/6d/	Calibration certificate, TT-05, dated 03/09/2008
/6.2.d/	Calibration certificate, TT-05, dated 18/02/2009
/6.e/	Calibration certificate, AG-01 and AG-02, dated 20/04/2008
/6.ei/	Calibration certificate, AG-01, dated 24/09/2008
/6.eii/	Calibration certificate, AG-02, dated 24/09/2008
/6.eiii/	Calibration certificate, AG-01 and AG-02, dated 22/09/2008
/6f/	Calibration certificate, AG-01 and AG-02, dated 24/11/2008
/6g/	Internal calibration of the gas analysers, different dates.

/6h/	Calibration certificate of standard gases
/7/	Gas analyser manual (AG-01 and AG-02)
/8a/	Siemens training certificates
/8b/	Arquipélago training certificates
/9/	Preventive maintenance
/10/	Energy Invoices
/11a/	Data from the register panel and CERs spreadsheet
/11b/	Calculation SUMMARY_03mai10_AR, dated 03/05/2010
/11c/	System CERs spreadsheet (without formulas)
/12a/	Environmental installation license
/12b/	Environmental operation permit
/13/	Pajoan Report- waste land filled
/14/	LPG invoices
/15/	Scale calibration certificate (28/05/2008) issued by INMETRO
/16/	Flare specifications – Arquipélago Soluções Tecnológicas Ltda, dated 24/09/2008.
/17/	Screenshot of the Emission Factor 2007
/18/	Emission Factor of the LPG from IPCC website (page 16).
/19/	Flare Analysis - ATB x Bioagri 3677-09
/20/	EB 48 Annex 68
/21.a/	Pressure meter serial number photograph
/21.b/	Pressure meter equipment display photograph
/22.a/	Flare temperature meter serial number photograph
/22.b/	Flare temperature meter equipment display photograph
/23/	ELimp Energy Imported Project Alto Tietê
/24/	Existing devices of the landfill gas capturing and flaring system
/25.a/	Flow meter ST 98 Flex MASSter serial number photograph
/25.b/	Flow meter ST 98 Flex MASSter equipment display photograph

/26/	Screenshot of the project in the UNFCCC website, dated 03/05/2010
/27/	Data Download and Backup
/28/	Emergency Plan
/29/	Program of Risk Management
/30/	Quality Assurance and Quality Control Procedure
/31/	Quantitative Risk Assessment
/32.a/	AG01 Gas Analyser Serial Number photo
/32.b/	AG01 Gas Analyser Display photo
/33.a/	AG02 Gas Analyser Serial Number photo
/33.b/	AG02 Gas Analyser Display photo
/34/	LPG photo
/35/	Lower Heat Value (LHV) of the LPG, from CETESB
/36/	IPCC Stationary Combustion, IPCC Emission Factor of LPG
/39/	Flow Meter Manufacturer Specifications
/38/	CDM – Validation and Verification Manual - Version 01.2
/39/	INMETRO – National Institute of Metrology, Standardization and Industrial Quality <ul style="list-style-type: none"> Decree N°. 236 dated 22/12/1994, which regards to the weighing instruments for consumer protection, for ease of use and accuracy of mass measurements, for fraud prevention and influences to which these instruments can be subject.
/40/	ONS Website Information, Dated 11/05/2011
/41/	About ONS – Screenshot Website Information, Dated 11/05/2011
/42/	ONS Procedure N° 12.3, Dated 01/09/2005
/43/	Brazilian DNA (MCT) Emission Factors Screenshot website, Dated 12/05/2011
/44/	Tool to calculate the emission factor for an electricity system, Version 02.1.0
/45/	Gas analyzer Fabrication Manual AG-01 & AG-02
/46/	Electricity Company Attested – Installation N° 150261814
/47/	Certification of Calibration DCME – 42/10 – Installation N° 150261814
/48/	EB 51 – Meeting Report.
/49/	Clarification, AM_CLA_0047, dated 17/07/2007

MR Version	Date of Revision	Main changes reason for Revision
01	16/03/2009	Original version published in the UNFCCC website
02	21/05/2009	Revision of Monitoring Report section 4.2 and 5.0
03	08/01/2010	Revision of Monitoring Report section 4.2 and 5.0
04	22/03/2010	Revision of Monitoring Report section 4.2, 5.0 and Annex A
05	04/01/2011	Revision of Monitoring Report section 4.2
06	16/06/2011	Revision of Monitoring Report section 4.2, 5 and Annex A

9. Findings Overview

Findings Overview

Findings Overview Summary

	CARs	CLs	FARs
Total Number raised	5	5	0

Date:	25/03/2009	Raised by:	Fabian Gonçalves		
Type:	CL	Number:	1	Reference:	Au4, section 3
Lead Assessor Comment:			Date: 25/03/2009		
The parameters measured at the landfill are transferred automatically to the internal system (register) that has restricted access. Data is downloaded in the computer and inserted automatically into the spreadsheet (atb_queima_ch4). Also, all calculations, including the emission reduction calculus, are done automatically in the spreadsheet. As the system and the computer program have restricted access, during verification site visit, it was not possible to verify if formulas are correctly applied in the internal system according to the required by the methodology and tool.					
Project Participant Response:			Date: 25/03/2009		
<i>The computer automatically calculates ERs according to the methodology Version 05 of ACM0001 and to the Methodological "Tool to determine project emissions from flaring gases containing methane" ("the Tool"). Open spreadsheets with all calculations are provided together with the Monitoring Report. Please refer to the list of soft copies at the end of this document.</i>					
Documentation Provided as Evidence by Project Participant:					
Calculation Spreadsheets: Calculation_ATB_01_SEPTEMBER_01apr09_LM.xls Calculation_ATB_02_OCTOBER_01apr09_LM.xls Calculation_ATB_03_NOVEMBER_01apr09_LM.xls Calculation_ATB_04_DECEMBER_01apr09_LM.xls Calculation_ATB_05_JANUARY_01apr09_LM.xls Calculation_ATB_06_FEBRUARY_01apr09_LM.xls Calculation_ATB_07_MARCH_01apr09_LM.xls					
Information Verified by Lead Assessor:					
Spreadsheets with formulas were checked. Data used in the calculus are downloaded from the inviolable system and calculations are done according to the required by the methodology and tool.					
Reasoning for not Acceptance or Acceptance and Close Out:					
The assessment team verified the spreadsheets with the open formulas (ref. 11a), which were used in the calculus and are downloaded from the inviolable system. It was possible to verify that the calculations were performed in accordance with the applicable methodology ACM0001 Version 05 (ref. 2a) and the "Tool to determine project emissions from flaring gases containing Methane" (ref. 2b).					
CL#1 was closed out.					
Acceptance and Close out by Lead Assessor:			Date: 30/04/2009		

Date:	25/03/2009		Raised by:	Fabian Gonçalves		
Type:	CAR	Number:	2		Reference:	Section 3, parameter 1.9
Lead Assessor Comment:				Date: 25/03/2009		
During verification site visit, it was possible to verify that the equipment AG-02, serial number N1-W1-961 was not working. The measurements of this equipment are necessary to calculate the flare combustion efficiency. However, it was verified that the internal system was registering this parameter as 100%. This is not in accordance with the requirement of the tool to determine project emissions from flaring gases containing methane.						
Project Participant Response:				Date: 25/03/2009		

All failures in AG-02 are registered by the operators. These failures are also commented in the detailed calculation spreadsheets. In the periods when AG-02 was not in operation or when it provided inconsistent measurements (e.g. %CH₄<0), the flare efficiency was considered to be 90%, according to "the Tool". Open spreadsheets with all calculations are provided together with the Monitoring Report. Please refer to the list of soft copies at the end of this document.

Documentation Provided as Evidence by Project Participant:

Calculation spreadsheets with formulas.

Information Verified by Lead Assessor:

Verified in the calculation spreadsheets that the flare efficiency was considered as 90% in the days that AG-02 was not working.

Reasoning for not Acceptance or Acceptance and Close Out:

Regarding the approach which can be observed from the data from the register panel and CERs spreadsheet (ref. 11a), that presents a FE as 100% when $-13 < \text{fvCH}_4, \text{FG}, \text{h} < 0$ & tO₂ measurement is normal (<21%), and presents a FE as 90% when $\text{fvCH}_4, \text{FG}, \text{h} < -13$.

The assessment team has discussed the appliance of the ranges presented above (100% and 90%) with the PP during the site visit and the documentation provided for the appliance of the 100% FE efficiency range was due that once the error of the Gas Analyser instrument is 1% of 2500ppmv or 25ppmv (ref, 45 - Gas Analyser Fabrication Manual AG-01 & AG-02 - page 3-14 and 3-15), in this way values between zero and -25 ppmv could be interpreted as zero (Flare efficiency = 100%). For values below -25ppmv, the flare efficiency of 90% could be applied.

Instead of using the instrument error, the PP applied half of the error, to be more conservative, ie: 0.5% or 13ppmv. Therefore, values between zero and -13 ppmv was interpreted as zero (Flare Efficiency = 100%) and to values lower than -13 ppmv, the flare efficiency of 90% was applied. This approach was considered conservative by the assessment team once the intrinsic error of the Gas Analyser instrument is 1% or 25ppmv (ref, 9 - Gas Analyser Fabrication Manual AG01 & AG02 – page 3-14 and 3-15), and the project participant has applied half of the error (0.5% or 13ppmv).

Also, with regards to the 90% FE was applied to this monitoring period when AG02 went out of work this value was applied when all other parameters required by the flare system manufacturer specifications (ref. 16) were operating accordingly and with the conditions presented in the Step 6 of the "Tool to determine project emissions from flaring gases containing methane – version 1" (ref. 2b).

In order to verify if the conditions presented above were in accordance with the flare manufacture specifications (ref. 16) which provide that the lower temperature of the flare on proper operation is 700 °C and a minimum LFG flow rate of 1000 Nm³/h. In this way, the assessment team collect a sample of three days of each month which have applied the 90% flare efficiency according to the step 6 of the tool (total of 13 days, because for the month of September and March there is no 90% FE appliance and for February only one day had few minutes applying 90% FE). Also, to verify if the temperature was above 700 °C during those days, the data which is already excluded from the ERs calculation (for eg. If the flare temperature was lower than 500 °C; LFG<1000 Nm³/h and no operation activity), were not considered.

The DOE analysis presented that the system was stable and the flare temperature was met according to the Step 6 of the tool. Firstly, the temperature was more than 500 °C and secondly more than 700 °C. This was verified through percentile analysis which showed that in 99% of the operation hours the flare temperature was above 818 °C and a LFG flow rate of 2117 Nm³/h. Therefore, the DOE assessment team could conclude that the PP has correctly applied the 90% of the flare efficiency in accordance with step 6 of the "Tool to determine project emissions from flaring gases containing methane – version 1" (ref. 2b).

Furthermore, the assessment team verified that in the open spreadsheets (detailed, with formulas, data measured every minute), that data is consistent and followed the required by the tool. This spreadsheet was used for emission reduction calculation.

Once the approaches are in compliance with the "Tool to determine project emissions from flaring gases containing methane – version 1" (ref. 2b), which requires that in case of use of default value, "the enclosed flare was operated and maintained pursuant to the manufacturer's specifications", **CAR #2 was closed out.**

Acceptance and Close out by Lead Assessor:

Date: 30/04/2009

Date:	25/03/2009	Raised by:	Fabian Gonçalves		
Type:	CAR	Number:	3	Reference:	Section 2
Lead Assessor Comment:			Date: 25/03/2009		
During site visit, PP explained that internal audits are conducted by Arquipélago to check if data in the spreadsheet, which is generated automatically, is consistent. However, no evidence of data conference was available.					
Project Participant Response:			Date: 03/04/2009		
<i>Open spreadsheets with all calculations are provided together with the Monitoring Report. Please refer to the list of soft copies at the end of this document.</i>					
Documentation Provided as Evidence by Project Participant:					
Calculation spreadsheets with formulas					
Information Verified by Lead Assessor:					
Open spreadsheets were checked. Verified that Arquipélago checked all the abnormalities as failure of AG-02, flare temperature, no LFG flow, etc.					
Reasoning for not Acceptance or Acceptance and Close Out:					
The PP explained that the evidence of the internal audits performed by Arquipelago were presented in the Monitoring Report (ref, 3). The assessment team verified that the information were provided in the Monitoring Report (ref. 3) and the open spreadsheets with the formulas from the register panel (ref. 11a) presenting that the internal audits were performed for the monitoring period. In this way, CAR#3 was closed out.					
Acceptance and Close out by Lead Assessor:			Date: 30/04/2009		

Date:	25/03/2009		Raised by:	Fabian Gonçalves	
Type:	CL	Number:	4	Reference:	Section 3, parameter 1.10
Lead Assessor Comment:				Date: 25/03/2009	
It was not possible to tell from spreadsheets and the site visit which temperature is being recorded as TT-04 and TT-05 in spreadsheet (atb_queima_ch4). The PDD registered requires both T_{flare} (temperature in the exhaust gas of the flare) and T_{flaring} (flaring temperature) to be measured.					
Project Participant Response:				Date: 03/04/2009	
<i>Temperatures T_{flaring} and T_{flare} described in the PDD refer to the same parameter, which is measured by TT-05 (for flow rates equal or lower than 4.200 Nm³/h) or TT-04 (for flow rates greater than 4.200 Nm³/h).</i>					
Documentation Provided as Evidence by Project Participant:					
<i>CERs spreadsheet.</i>					
Information Verified by Lead Assessor:					
Calculation spreadsheets with formulas					
Reasoning for not Acceptance or Acceptance and Close Out:					
Verified that both parameters refer to the same measurements. The temperature is not used directly in the CERs calculation. Verified that CERs are only accounted if the temperature of the flare is above 500°C. CL #4 was closed out and CAR #9 was raised to request PP to revise the monitoring plan before next verification in order to be in compliance with the required by the methodology and tool. Registered Monitoring Plan requires both to be measured as different parameters. However both the temperature of the flare and the temperature of the exhaust gas are the same.					
CL#4 converted to CAR#9					
Refer to CAR#9 below.					
Acceptance and Close out by Lead Assessor:				Date: 18/05/2009	

Date:	25/03/2009		Raised by:	Fabian Gonçalves		
Type:	CL	Number:	5		Reference:	Section 3, parameter 1.9
Lead Assessor Comment:				Date: 25/03/2009		
The registered monitoring plan requires monitoring the flare working hours. However, no evidence was presented during site visit and it was not possible to verify how the monitoring will be done. Note that according to the monitoring plan, values must be presented in hours.						
Project Participant Response:				Date: 25/03/2009		

Open spreadsheets with all calculations are provided together with the Monitoring Report. These spreadsheets accounts the working hours, summing minute by minute the time of operation of the flare. Please refer to the list of soft copies at the end of this document. The working hours are also updated by the supervisory system, at the operator's command, and are shown in the application software screen.

Documentation Provided as Evidence by Project Participant:

Calculation spreadsheets with formulas

Information Verified by Lead Assessor:

The spreadsheets contain data measured every minute. Data are measured by the supervisory system. These are consolidated in hours, as required by the methodology.

Reasoning for not Acceptance or Acceptance and Close Out:

According to the information presented in the spreadsheets with the calculations of the data from the register panel and CERs spreadsheet (ref. 11a) the assessment team verified that the spreadsheets contain the flare working hours data measured every minute in accordance with the methodology and registered monitoring plan.

Thus, **CL#5 was closed out.**

Acceptance and Close out by Lead Assessor:

Date: 30/04/2009

Date:	30/03/2009		Raised by:	Fabian Gonçalves		
Type:	CL	Number:	6		Reference:	Section 3, parameter 1.8

Lead Assessor Comment:

Date: 30/03/2009

04/02/2009: The registered monitoring plan requires monitoring the regulatory requirements relating to landfill gas projects. However, no evidence was presented during site visit and it was not possible to verify how the monitoring will be done.

30/03/2009: The monitoring report version 1 presented during site visit (periodic verification), established that the regulatory requirements were monitored. However, it did not presented information about how the regulatory requirements were checked.

Project Participant Response:

Date: 03/04/2009

As described in the Monitoring Report version 02, a regulatory review was performed, based on the most recent Operation Permit of ATB. A copy of the Operation Permit was provided during the verification site visit. All of the Environmental Permit's requirements were evaluated and ATB concluded that they do not result in any change in the Project Baseline.

Documentation Provided as Evidence by Project Participant:

Operation Permit

Information Verified by Lead Assessor:

The operation permit issued by the environmental agency was checked and no requirement relating to the landfill gas project is necessary.

Reasoning for not Acceptance or Acceptance and Close Out:

The project participant provided the environmental Installation License N° 26000094 (ref. 12a) and the environmental Operation License N° 26001234 (ref. 12b).

The assessment team checked the information provided in the environmental licenses and concluded that there is no legal obligation in destroying the methane of the landfill gas. Therefore, no changes in the registered baseline were identified.

In this way, **CL#6 was closed out.**

Acceptance and Close out by Lead Assessor:

Date: 30/04/2009

Date:	30/03/2009		Raised by:	Fabian Gonçalves		
Type:	CAR	Number:	7	Reference:	Section 2	
Lead Assessor Comment:				Date: 30/03/2009		

Lead Assessor Comment:

Date: 30/03/2009

The values for the parameter landfill waste were not presented in the monitoring report version 1. Also, a summary data for the monitored parameters, as presented during site visit, is required to be included in the monitoring report. Note that the parameter LFG_{total} must be also presented in m³ as required by the monitoring plan.

Project Participant Response:

Date: 03/04/2009

<p>The Monitoring Report version 02 contains the amount of landfill waste accepted during the monitoring period. Information regarding waste acceptance from January 2008 to March 4th 2009 was provided to SGS during the site visit. Annex A of the Monitoring Report version 02 shows summary data for all monitored parameters and presents the parameter LFG_{total} in m³ and in Nm³, as required in the monitoring plan.</p>	
Documentation Provided by Project Participant:	
Calculation spreadsheets with formulas and revised monitoring report.	
Information Verified by Lead Assessor:	
Revised documents were checked.	
Reasoning for not Acceptance or Acceptance and Close Out:	Date: 30/04/2009
<p>The project participant provided the revised Monitoring report (ref. 3) and the ERs spreadsheets with the formulas (ref. 11a). The assessment team analysed the information provided by the PP and concluded that the parameter landfill waste and LFG_{total} were correctly monitored and presented in the revised Monitoring Report and ERs spreadsheet following the required by the applicable methodology (ref. 2a). Thus, CAR#7 was closed out.</p>	
Acceptance and Close out by Lead Assessor:	Date: 30/04/2009

Date:	18/05/2009	Raised by:	Fabian Gonçalves		
Type:	CL	Number:	8	Reference:	Au4, section 2
Lead Assessor Comment:			Date : 18/05/2009		
It is requested to PP to clarify in the difference between the carbon credits estimated in the PDD and the carbon credits verified in the first verification.					
Project Participant Response:			Date: 21/05/2009		
<p>The PDD forecasted a generation of 354,776 CERs in 2008 and of 396,399 in 2009, i.e. an average of approximately 31,300 CERs/month in the two first years of operation.</p> <p>From September 25th 2008 (date when the flare started to operate continuously) until March 04th 2009, the accrued CERs totaled 67,296.14, corresponding to a monthly average of approximately 12,600 CERs/month (roughly 40% of the predicted amount).</p> <p>The difference between the estimated credits and the actual accrued credits are due to:</p> <ul style="list-style-type: none">i) A more cautious operation of the LFG capturing and flaring system in the initial phase of the project, when the staff is getting familiar with the system and with its interaction with the landfillii) Longer downtime periods, for inspections, verifications and maintenance, which are also common during the initial operation of the system and are not expected to be so frequent in the futureiii) The operation of the landfill, which adversely interfered in the LFG extraction, requiring sometimes the disconnection of rich-methane LFG wells (up to 30 wells at a time)iv) Heavy rains in the summer, which did not allow corrective actions in the landfill, causing downtime of some gas extraction wells / branches during the periodv) Some problems in the gas analyzer AG-02, which also caused a reduction in the CERs (i.e. use of a flaring efficiency of 90% for the destruction of methane during the downtime of AG-02) <p>ATB is continuously working to improve the LFG capturing efficiency in the landfill, in order to maximize the amount of collected and destroyed methane. While in February 2009 the average LFG flow to the flare was 3,600 Nm3/h @ 46% methane, the LFG flow to the flare in May (until May 18th 2009) is 4,500 Nm3/h @ 44% methane. ATB expects to extract over 6,000 Nm3/h @ 45% methane by the end of December 2009.</p>					
Documentation Provided by Project Participant:					
PP's explanation.					
Information Verified by Lead Assessor:					
PP's explanation.					
Reasoning for not Acceptance or Acceptance and Close Out:				Date: 22/05/2009	
<p>During the verification processes the assessment team could confirm that mainly of the difference from the ERs verified and the ones forecasted in the PDD are due to the operation of the landfill. Also, according to the calculations provided in the data from the register panel and ERs spreadsheet presents the appliace of 90% of FE due to the AG02 failure which has also impacted the ERs verified and the ones forecasted in the PDD.</p> <p>Therefore, CL #8 was closed out.</p>					

Acceptance and Close out by Lead Assessor:				Date: 22/05/2009	
Date:	18/05/2009		Raised by:	Fabian Gonçalves	
Type:	CAR	Number:	9	Reference:	AU4 section 3
Lead Assessor Comment:				Date: 18/05/2009	
It is requested to PP to revise the monitoring plan during the first verification in order to be in compliance with the required by the methodology and tool, regarding the parameters T_{flare} (temperature in the exhaust gas of the flare) and T_{flaring} (flaring temperature). Registered Monitoring Plan requires both to be measured as different parameters. However both the temperature of the flare and the temperature of the exhaust gas are the same. Moreover PP are requested to include in the revised monitoring plan the monitoring of the LPG used to the ignition of the flare and to revise the monitoring of the electricity consumed by the project activity as being monitored by a third part company.					
Project Participant Response:				Date: 21/05/2009	
The monitoring plan will be revised before the next verification. The parameter T_{flaring} (flaring temperature) will be excluded from the monitoring plan.					
Documentation Provided as Evidence by Project Participant:					
Revised monitoring plan.					
Information Verified by Lead Assessor:					
Revised monitoring plan.					
Reasoning for not Acceptance or Acceptance and Close Out:					
The monitoring plan of the registered PDD was revised to be in accordance with approved methodology ACM0001 version 5 and submitted to UNFCCC for approval on 27 th August 2009. SGS was informed by email on 14 th April 2010 that the Request for revision of the monitoring plan of "Alto-Tietê landfill gas capture project" (1636) was approved on 23 rd December 2009. In this way, CAR#9 was closed out.					
Acceptance and Close out by Lead Assessor:				Date: 21/05/2010	

Date:	16/03/2010	Raised by:	Lucas Engelbrecht/Fabian Goncalves		
Type:	CAR	Number:	10	Reference:	AU4, section 2
Lead Assessor Comment:					
The Monitoring Report Version 3 (ref. 3) is not in compliance with the “Guidelines on Completeness Check of Requests for Issuance” in the EB 48 Annex 68 Section C paragraph 10 (ref. 20). The Project Participant is request to review the Monitoring Report Version 3 (ref. 3), in order to attend the requirements of the EB 48 Annex 68 (ref. 20).					
Project Participant Response:				Date: 12/05/2010	
According to the EB48, Annex 68, Section C, Paragraph 10, the Monitoring Report must contain: (i) The implementation status of the project during the monitoring period under consideration; the project was built and is operating – refer to Sections 1 and 2 of the MR (ii) Monitoring systems and procedures, including any quality assurance and quality control system employed by the project activity; described in Section 4.2 of the MR (iii) All parameters required to be monitored and reported at the intervals required by the monitoring plan and the applied methodology; compliance with the PDD’s monitoring plan and with ACM0001 is described in Section 4.2 of the MR (iv) Information on calibration of monitoring instruments as specified by the monitoring methodology and the monitoring plan; described in Annex A of the MR (v) Emission factors, IPCC default values, and other reference values used in the calculation of emission reductions; calculations, emission factors and reference values are described in Section 5 of the MR (vi) Reference to any deviation request approved by the Executive Board for the monitoring period in consideration; not applicable (vii) Calculations of baseline emissions, project emissions, leakage (if any), and emission reductions, including reference to formulae and methods used; calculations are described in Section 5 of the MR (viii) Comparison of the actual emission reduction claimed in the monitoring period with the estimate in the registered PDD, and explanation on any significant increase: a comparison is described in the end of Section 5 of the MR – accrued ERs were lower than those described in the PDD, during this first monitoring period					

Documentation Provided by Project Participant:	
<i>Version 4 of the MR</i>	
<i>Annex A Calibration Control 26-mar-2010 AR(1)</i>	
Information Verified by Lead Assessor:	
Revised monitoring plan version 4 and ref. 30, 31.	
Reasoning for not Acceptance or Acceptance and Close Out:	Date: 12/05/2010
The project participant presented the Monitoring Report Version 04 (Ref.3) which were checked by the DOE assessment team and it is in compliance with the EB 48 Annex 68 Section C paragraph 10 (ref. 20). CAR#10 was closed out.	
Acceptance and Close out by Lead Assessor:	Date: 12/05/2010

10. Statement of Competence

Statement of Competence

Name: Fernandez, Alicia

Status

- Lead Assessor	<input checked="" type="checkbox"/>	- Expert	<input type="checkbox"/>
- Assessor	<input checked="" type="checkbox"/>	- Financial Expert	<input type="checkbox"/>
- Local Assessor	<input checked="" type="checkbox"/>	- Technical Reviewer	<input checked="" type="checkbox"/>

Scopes of Expertise

1. Energy Industries (renewable / non-renewable)	<input type="checkbox"/>
Technical Area(s):	
2. Energy Distribution	<input type="checkbox"/>
Technical Area(s):	
3. Energy Demand	<input type="checkbox"/>
Technical Area(s):	
4. Manufacturing	<input type="checkbox"/>
Technical Area(s):	
5. Chemical Industry	<input type="checkbox"/>
Technical Area(s):	
6. Construction	<input type="checkbox"/>
Technical Area(s):	
7. Transport	<input type="checkbox"/>
Technical Area(s):	
8. Mining/Mineral Production	<input type="checkbox"/>
Technical Area(s):	
9. Metal Production	<input type="checkbox"/>
Technical Area(s):	
10. Fugitive Emissions from Fuels (solid, oil and gas)	<input type="checkbox"/>
Technical Area(s):	
11. Fugitive Emissions from Production and Consumption of Halocarbons and Sulphur Hexafluoride	<input type="checkbox"/>
Technical Area(s):	
12. Solvent Use	<input type="checkbox"/>
Technical Area(s):	
13. Waste Handling and Disposal	<input type="checkbox"/>
Technical Area(s):	
14. Afforestation and Reforestation	<input type="checkbox"/>
Technical Area(s):	
15. Agriculture	<input type="checkbox"/>
Technical Area(s):	

Approved Member of Staff by: Siddharth Yadav Date: 02/03/2011

Statement of Competence

Name: Jett Zhang

Status

- Lead Assessor		- Expert	x
- Assessor	x	- Financial Expert	
- Local Assessor	China	- Technical Reviewer	

Scopes of Expertise

1. Energy Industries (renewable / non-renewable)	x
Technical Area(s): TA 1.2 Energy generation from renewable energy sources	
2. Energy Distribution	
Technical Area(s):	
3. Energy Demand	
Technical Area(s):	
4. Manufacturing	
Technical Area(s):	
5. Chemical Industry	
Technical Area(s):	
6. Construction	
Technical Area(s):	
7. Transport	
Technical Area(s):	
8. Mining/Mineral Production	
Technical Area(s):	
9. Metal Production	
Technical Area(s):	
10. Fugitive Emissions from Fuels (solid, oil and gas)	
Technical Area(s):	
11. Fugitive Emissions from Production and Consumption of Halocarbons and Sulphur Hexafluoride	
Technical Area(s):	
12. Solvent Use	
Technical Area(s):	
13. Waste Handling and Disposal	x
Technical Area(s): TA 13.1: Waste handling and disposal	
14. Afforestation and Reforestation	
Technical Area(s):	
15. Agriculture	
Technical Area(s):	

Approved Member of Staff by:

Siddharth
Yadav

Date:

04/04/2011

Statement of Competence

Name: **Goncalves, Fabian.**

Status

- Lead Assessor	x	- Expert	
- Assessor	x	- Financial Expert	
- Local Assessor	Brazil	- Technical Reviewer	

Scopes of Expertise

1. Energy Industries (renewable / non-renewable)	
<i>Sub scope(s):</i>	
2. Energy Distribution	
<i>Sub scope(s):</i>	
3. Energy Demand	
<i>Sub scope(s):</i>	
4. Manufacturing	
<i>Sub scope(s):</i>	
5. Chemical Industry	
<i>Sub scope(s):</i>	
6. Construction	
<i>Sub scope(s):</i>	
7. Transport	
<i>Sub scope(s):</i>	
8. Mining/Mineral Production	
<i>Sub scope(s):</i>	
9. Metal Production	
<i>Sub scope(s):</i>	
10. Fugitive Emissions from Fuels (solid, oil and gas)	
<i>Sub scope(s):</i>	
11. Fugitive Emissions from Production and Consumption of Halocarbons and Sulphur Hexafluoride	
<i>Sub scope(s):</i>	
12. Solvent Use	
<i>Sub scope(s):</i>	
13. Waste Handling and Disposal	
<i>Sub scope(s):</i>	
14. Afforestation and Reforestation	
<i>Sub scope(s):</i>	
15. Agriculture	
<i>Sub scope(s):</i>	

Approved Member of Staff by:

Siddharth Yadav

Date:

25/10/2009

Statement of Competence

Name: Engelbrecht, Lucas

Status

- Lead Assessor		- Expert	
- Assessor	x	- Financial Expert	
- Local Assessor	Brazil	- Technical Reviewer	

Scopes of Expertise

1. Energy Industries (renewable / non-renewable)	
<i>Sub scope(s):</i>	
2. Energy Distribution	
<i>Sub scope(s):</i>	
3. Energy Demand	
<i>Sub scope(s):</i>	
4. Manufacturing	
<i>Sub scope(s):</i>	
5. Chemical Industry	
<i>Sub scope(s):</i>	
6. Construction	
<i>Sub scope(s):</i>	
7. Transport	
<i>Sub scope(s):</i>	
8. Mining/Mineral Production	
<i>Sub scope(s):</i>	
9. Metal Production	
<i>Sub scope(s):</i>	
10. Fugitive Emissions from Fuels (solid, oil and gas)	
<i>Sub scope(s):</i>	
11. Fugitive Emissions from Production and Consumption of Halocarbons and Sulphur Hexafluoride	
<i>Sub scope(s):</i>	
12. Solvent Use	
<i>Sub scope(s):</i>	
13. Waste Handling and Disposal	
<i>Sub scope(s):</i>	
14. Afforestation and Reforestation	
<i>Sub scope(s):</i>	
15. Agriculture	
<i>Sub scope(s):</i>	

Approved Member of Staff by:

Siddharth Yadav

Date:

10/11/2010

Statement of Competence

Name: Lorna Guerrero

Status

-	Lead Assessor	<input type="checkbox"/>	-	Expert	<input checked="" type="checkbox"/>
-	Assessor	<input type="checkbox"/>	-	Financial Expert	<input type="checkbox"/>
-	Local Assessor	<input type="checkbox"/>	-	Technical Reviewer	<input type="checkbox"/>

Scopes of Expertise

5. Energy Industries (renewable / non-renewable)	<input type="checkbox"/>
Technical Area(s):	
6. Energy Distribution	<input type="checkbox"/>
Technical Area(s):	
7. Energy Demand	<input type="checkbox"/>
Technical Area(s):	
8. Manufacturing	<input type="checkbox"/>
Technical Area(s):	
16. Chemical Industry	<input type="checkbox"/>
Technical Area(s):	
17. Construction	<input type="checkbox"/>
Technical Area(s):	
18. Transport	<input type="checkbox"/>
Technical Area(s):	
19. Mining/Mineral Production	<input type="checkbox"/>
Technical Area(s):	
20. Metal Production	<input type="checkbox"/>
Technical Area(s):	
21. Fugitive Emissions from Fuels (solid, oil and gas)	<input type="checkbox"/>
Technical Area(s):	
22. Fugitive Emissions from Production and Consumption of Halocarbons and Sulphur Hexafluoride	<input type="checkbox"/>
Technical Area(s):	
23. Solvent Use	<input type="checkbox"/>
Technical Area(s):	
24. Waste Handling and Disposal	<input checked="" type="checkbox"/>
Technical Area(s): TA 13.1: Waste handling and disposal TA 13.2: Animal waste management	
25. Afforestation and Reforestation	<input type="checkbox"/>
Technical Area(s):	
26. Agriculture	<input checked="" type="checkbox"/>
Technical Area(s): TA 15.2: Animal waste management	

Approved Member of Staff by: Siddharth Yadav Date: 21/01/2011

11. Photographic Evidence



Unique reference number: 288577 (ref. 25a and b) Parameter: $LFG_{total,y}$; $Fv_{RG,h}$

Name of equipment: Flow Meter – ST 98 Flex MASter Date: 25/03/2009



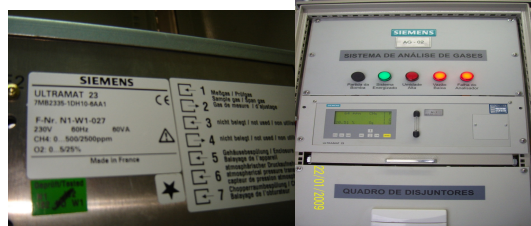
Unique reference number: AG01 - N1-W1-961 (ref. 32a and b) Parameter: $W_{CH4,y}$; $fv_{CH4,h}$

Name of equipment: Gas Analyser – ULTRAMAT Siemens AG01 Date: 25/03/2009



Unique reference number: SN: 12526590 Parameter: EL_{IMP}

Name of equipment: Electricity Meter - ELO 2113 Date: 25/03/2009



Unique reference number: AG02 – N1-W1-027 Parameter: $t_{O_2,h}$, $f_{v_{CH_4,FG,h}}$
(ref. 33a and b)

Name of equipment: Gas Analyser ULTRAMAT Date: 25/03/2009
Siemens AG02



Unique reference number: N/A – ref. 34 Parameter: MassLPG

Name of equipment: LPG Cylinders of 45kg Date: 25/03/2009
each.

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