VERIFICATION AND CERTIFICATION REPORT

Alquimiatec S.A.

Zámbiza Landfill Gas Project

SGS Climate Change Programme
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Date of Issue:	**Project Number:**
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Project Title:	
Zámbiza Landfill Gas Project	
Organisation:	**Client:**
SGS United Kingdom Limited	Alquimiatec S.A.
Publication of Monitoring Report: Published on UNFCCC website on 25/01/2008	
Monitoring Period:	08/03/2007 to 31/12/2007
First Monitoring Version and Date:	Version 1, 02/01/2008
Final Monitoring Version and Date:	Version 4, 10/10/2008

Summary:

SGS United Kingdom Ltd has performed the first periodic verification of the CDM project Zámbiza Landfill Gas Project (UNFCCC Ref.0798). The verification includes confirming the implementation of the monitoring plan of the registered PDD (UNFCCC Ref.0798) and the application of the monitoring methodology as per ACM0001 Version 4 of 28th July 2006. A site visit was conducted to verify the data submitted in the monitoring report.

The Zámbiza Landfill Gas Project was developed in the Zámbiza dumpsite located in Ecuador closed by the end of 2002, in which since 1979 the municipal waste basically generated by households of the city of Quito was being deposited. The project activity involved the implementation of a gas collection and flaring system which, through the landfill gas combustion, reduces the greenhouse gas emissions from the landfill. A Landfill Gas To Energy (LFGTE) module will be attached in a second construction stage in case a private or commercial power purchaser is identified in the future. At the time of this first monitoring period verification, this module was not implemented in the project activity.

SGS confirms that the project is implemented in accordance with the validated and registered Project Design Document. 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 12,573 tCO2e during period 08/03/2007 to 31/12/2007.

Subject:		
CDM Verification		
Verification Team:		
Mayra Caradec – Lead Assessor		☒ No Distribution (without permission from the Client or responsible organisational unit)
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2	27-08-2008	24
3	19-10-2008	26

Abbreviations

ACM	Approved Consolidated Methodology
CDM	Clean Development Mechanism
CAR	Corrective Action Request
$CEF_{electricity}$	CO_2 Emission Factor for Electricity Grid
CER	Certified Emission Reduction
CO2	Carbon Dioxide
CO2e	Carbon Dioxide Equivalent
D_{CH4}	Methane Density
DNA	Designated National Authority
DOE	Designated Operational Entities
EL_{imp}	Energy Imported
ER	Emission Reduction
FAR	Forward Action Request
FE	Flare Efficiency
GGG	Green Gas Germany GmbH
GHG	Greenhouse Gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
KWh	Kilo Watt Hour
LFG	Landfill Gas
LFGTE	Landfill Gas To Energy
MP	Monitoring Plan
MWh	Mega Watt Hour
NIR	New Information Request
P	Pressure
PDD	Project Design Document
REF	Reference
SGS	SGS United Kingdom Ltd
T	Temperature
UNFCCC	United Nations Framework Convention on Climate Change
W_{CH4}	Methane Concentration

Table of Content

1. Introduction

1.1 Objective

SGS United Kingdom Ltd has been contracted by Alquimiatec S.A. to perform an independent verification of its CDM project Zámbiza Landfill Gas 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:	Zámbiza Landfill Gas Project
UNFCCC Registration Number:	0798
Monitoring Period Covered in this Report	08/03/2007 to 31/12/2007
Project Participants	Alquimiatec S.A.
	Noble Carbon Credits Limited
Location of the Project Activity:	Ecuador, City of Quito

The Zámbiza Landfill Gas Project installed at Zámbiza dumpsite in Ecuador, city of Quito, involved the implementation of a gas collection and flaring system, which through the landfill gas combustion reduces the greenhouse gas emissions from the landfill. According to the PDD, a Landfill Gas To Energy (LFGTE) module will be attached in a second construction stage in case a private or commercial power purchaser is identified in the future. At the time of this first monitoring period verification, this module was not implemented in the project activity.

Technology employed by the project is conventional and presents no major changes when compared to other installations of the same type: blower, flare station, electronic data manager and meters related to parameters as described in ACM0001 version 4 and in the registered monitoring plan.

2. Methodology

2.1 General Approach

SGS's 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

Name	***Role***	***SGS Office***
Mayra Caradec	Lead Assessor	SGS Panama

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 0 of this report.

2.3.2 Site Visits

As part of the verification, the following on-site inspections have been performed:

Location: Zámbiza Landfill site, Quito, Ecuador	
Date: 11th February 2008	
Coverage:	**Source of Information / Persons Interviewed**
Overall Project Planning and Management: • Confirmation on site of equipments installed related to the project activity as described in the PDD and required by the methodology applied (from the pipelines to the flare station); • Project personal interviews; check on data management with personnel on site; simulation of abnormal situations and how it is solved. Parameters Related to the Project Activity. Monitoring Plan, PDD and Methodology Related Issues: • Data reported in Monitoring Report: Compliance with total values in internal system. Sampling of internal system data cross-checked with procedures held on site and records. Verification of electricity consumption records. • Confirmation of Records: Training procedures and records, Operational procedures and records, Internal audit procedures and records, Organization chart (responsibilities), Troubleshooting and Emergency procedures and records, and other relevant documents related to the project activity. An audit plan provided to client is available upon request.	**Alquimiatec S.A.** (Client/Project owner) Personnel interviewed: Matthias Zohm – General Manager of Alquimiatec S.A. Juan Carlos Mayacha – Site Supervision Responsible **Proviento S.A.** Subcontracted by Green Gas Germany GmbH - GGG - for technical on-site operation. Green Gas Germany GmbH is subcontracted by Alquimiatec S.A. for project operation and maintenance. Personnel interviewed: Olaf Schwetje – on-site operator An attendance list used during the site visit is available upon request.

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 New Information Request (NIR) 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. the verification is not able to obtain sufficient evidence for the reported emission reductions or part of the reported emission reductions. In this case these emission reductions shall not be verified and certified;

II. the verification has identified misstatements in the reported emission reductions. Emission reductions with misstatements shall be discounted based on the verifiers ex-post determination of the achieved emission reductions

The verification process may be halted until this information has been made available to the assessors' satisfaction. Failure to address a NIR may result in a CAR. Information or clarifications provided as a result of an NIR may also lead to a CAR.

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.

Corrective Action Requests and New Information Requests are detailed in Periodic Verification Checklist. The Project Developer is given the opportunity to "close" outstanding CARs and respond to NIRs and Observations.

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 Documentation and Compliance with the Registered PDD

The start date of the monitoring period mentioned in the monitoring report (Ref. 3) is 08/03/2007 which is consistent with the project crediting period (08/03/2007 – 07/03/2017), fixed for 10 years. Information is available at http://cdm.unfccc.int/Projects/DB/TUEV-SUED1165843266.17/view.

Project boundary was found to be in compliance with the registered PDD and the approved methodology. According to the methodology, the project boundary is the site of the project activity where the gas is captured and destroyed. Also, the methodology establishes that for the project boundary, "*where the project activity involves electricity generation, only the net quantity of electricity fed into the grid should be used (…). Where the project activity does not involve electricity generation, project participants should account for CO2 emissions by multiplying the quantity of electricity required with the CO2 emissions intensity of the electricity displaced (CEFelectricity,y)*". As stated before, at the time of this first monitoring period verification, the Landfill Gas to Energy (LFGTE) module to generate electricity was not implemented in the project activity, therefore the energy consumed is being considered in the monitoring report for this monitoring period accordingly.

According to ACM0001 version 4, no leakage effects need to be accounted. The parameters and the monitoring approach discussed in the monitoring report (Ref. 3) and verified in the project's internal system are consistent with the registered PDD (Ref. 1) and the applied monitoring methodology ACM0001 version 4. Please see Section 3.2 for details on the monitoring results.

QA/QC procedures are designated to a contracted company. Please see Section 3.8 for details.

CAR01 was raised because Monitoring Report version 1 (Ref. 3) contained minor typing errors and extra information not related to CDM monitored data. Monitoring Report version 2 (Ref. 3) was provided with changes as requested. Information was already available in the registered PDD and not related to the monitoring data (technical information to operation of the landfill) was deleted and an observation such as "for more details please refer to registered PDD" was added in relevant sections. Data units not complying with the nomenclature of the methodology were also corrected. The document has reduced in size with the change, and relevant data to the period monitored was then easily identified. CAR01 was closed out.

3.2 Monitoring Results

The parameters and the monitoring approach discussed in the monitoring report (Ref. 3) and verified in the project's internal system are consistent with the registered PDD (Ref. 1) and the applied monitoring methodology ACM0001 version 4. Some parameters were not reported by the project activity in this monitoring period because:

1. At the time of the verification of the first monitoring period the project was not generating electricity yet (Landfill Gas To Energy (LFGTE) module was not implemented yet in the project activity), the parameters related to electricity generation are not monitored, reported or verified in this monitoring period.
2. No thermal energy is produced by the project activity, therefore the parameters related to it mentioned here are not applicable, and not monitored, reported or verified: LFG thermal,y; ETy - Thermal energy used in landfill; CEF thermal, y: Hours of operation of the boiler.
3. According to ACM0001 version 4, the Regulatory Requirements should be recorded at the renewal of crediting period. The project has a fixed crediting period for 10 years; therefore the data is not applicable for the project. The information also complies with Section D.2.2 of the registered PDD (Ref.1).
4. T – Temperature of gas and P – Pressure of gas: Measured to determine the density of methane. According to the methodology "*No separate monitoring of temperature and pressure is necessary when using flow meters that automatically measure temperature and pressure, expressing LFG volumes in normalized cubic meters*". Not monitored for CDM project purpose as flow is generated

in Normalized cubic meters. Values of temperature and pressure are monitored and can be seen in the raw data generated, and is monitored for operational purpose (verified during site visit).

The parameters monitored by the project activity in this monitoring period are:

- $LFG_{total,y} = LFG_{flare,y}$ (total amount of landfill gas captured)
- FE (Flare efficiency)
- $W_{CH4,y}$ (Methane fraction of the landfill gas)
- EL_{Imp}. (Energy consumed by project activity)
- Hour counter

3.2.1 LFG total,y = LFG flare,y

Equipments specifications verified on site:

Flow Meter: Manufacturer Elster-Instromet Q-75-K / Serial No.: 10508046; 2006

The equipment is used to obtain data of the amount of landfill gas captured data. The certificate of the manufacture calibration was provided (Flow Meter Q-75-K N.10508046 manufacture calibration certificate Number G1/S/7074r1 of December 2006). Accuracy result 0.25%. (Ref. 6 - Annex 3.01), complies with PDD information Table D.3.

According to the PDD, “The flow meter will be subject to a regular calibration and testing regime to ensure accuracy”. According to monitoring report version 1, the calibration of the flow meter is done every 6 years. This information was not identified in the equipment description document “Turbine Gas Meter Q-Series”. NIR06 was raised and evidence of manufacturer’s recommendation was requested. In response to NIR06 an email from the manufacturer clarified that the periodicity of 6 years was applicable in Switzerland and provided to project participant a Maintenance and Recalibration Procedure from manufacturer Instromet with a specifics procedure for the project activity (Ref. 22; Ref. 24). The procedure recommends a periodicity for calibration for the equipment of every 2 years and if everything is correct, every 4 years. The same procedure has been updated in the Monitoring Report. The equipment was calibrated in December 2006 and will be recalibrated according to the manufacturer’s recommendation. NIR06 was closed out.

Volume corrector associated with flow meter: Instromet Model 999-P. N.04277001. Base temperature: 273K, presure: 1 bar.

The equipment is used to automatically correct data generated in m3 to Nm3. In NIR04 raised it has been clarified that the volume corrector is calibrated together with the temperature and pressure sensors and the flow meter Q-75-K, and it will be calibrated according to the manufacturer’s recommendation (Ref.24). Monitoring Report Version 3 was provided including the information on the calibration procedure. NIR04 was closed out.

Spare flow meter: TERZ 94 / EC 24. N. 602576

The spare flow meter (TERZ 94 / EC 24) calibration certificate was verified (Fabrication number: 602576; Type: TEC 24; date of calibration: 01/09/2006). Accuracy result: 0.10% (Ref. 20). NIR08 was raised because it was not clear if the spare flow meter verified on site would be used in case of failure of the main flow meter Q-75-K). It was clarified that the equipment has not been used during the monitoring period as stated in the Monitoring report, but may be used for future monitoring periods as a back-up meter in case the main meter is not working properly. Project developer will obtain information on calibration recommendation to guarantee quality of data obtained with the stand by equipment in case it is used.

FAR12 was raised to ensure verification of actions planned in the next monitoring period verification. NIR08 was closed out.

The data of the amount of landfill gas captured is recorded every minute and is generated automatically through a logging system. Data Log in the system is then recorded by operator (Proviento) on site into a computer or CD 2 to 5 times a week (all past data), and sent to GGG based in Germany along with Visit Report. Data available in the equipment panel is reported in the site visit report. During the site visit it was verified that the values obtained from the panel complies with Memograph data panel and are recorded from

the system in Proviento personnel computer. Frequency of data records also verified in the system (1 record per minute). The Proviento personnel was interview in the site visit and all steps for the data collection were done to verify compliance with the information provided in the monitoring reports (procedures) which is also in compliance with the registered PDD and monitoring methodology ACM0001 version 4.

To verify the data reported in the Monitoring Report for this monitoring period, one sample of all records was taken on day 8 and day 20 during the monitoring period. . When there was no visit report to crosscheck, another day was chosen based on available visit reports. Days in which an event was identified (flare not operating for example) were also verified.

It was verified that the equipment registers data continuously and periodically as required by the methodology. However the reported amount of landfill gas in Monitoring Report version 1 and CER Spreadsheet Version 1 was obtained from the equipment panel readings, recorded manually at the beginning and the end of each month by the operator, and data from the system was not being used for calculation. A clarification was requested regarding the accuracy of this method, if compared with data obtained from the internal system recordings. NIR09 was raised

In response to NIR09 all monthly data log spreadsheets (Ref. 21) were adapted to calculate the total of each month based on raw data records in the system (one record per minute). The new values are reported in Monitoring Report Version 3 and Spreadsheet Version 2. Considering the more accurate method applied in the new documents provided (Ref. 21), in which the values recorded every minute are considered (monitored data) in the calculation and not the manual values obtained from the equipment panel, the final value of CER has increased (Ref. 5). The value has been updated in a new version of the monitoring report (version 3) accordingly, and the procedure used for the CER calculation was also revised (Section B.2.2). NIR09 was closed out.

3.2.2 FE – Flare Efficiency

Equipment specifications confirmed on site (photo available). Flare's manufacturer: Hofstetter Type: HOFGAS-Ready C 2000. N. 9857. Constructed: 2006. According to ACM0001 version 4, page 9 "*Enclosed flares shall be monitored yearly, with the first measurements to be made by the time of the installation*", and the same information was verified in the PDD "*Flare efficiency will be checked yearly beginning with the time of installation*".

Flare efficiency is conducted by GGG, and the first measurement was done at the time of the project installation as required by the methodology. Equipment Testo; 300 XL / Serial No.: 00289726 is used for this purpose, as verified in the project monitoring report and GGG Flare efficiency reports. The quality tests and calibration of Testo equipment are done in situ by GGG at the time of the flare efficiency analysis. Results of quality tests can be confirmed by the GGG flare efficiency reports on page 9. (Ref. 10; Ref. 11).

Project participant provided the following results of flare efficiency:

- ✓ For first year of operation: December 2006 – December 2007

  Flare analysis conducted on 14/12/2006 (measurement date), right before the start of operation as required by the methodology. Result applied for this period (99.99%). Report provided: 15/12/2006. Order Number: 40701. Measurement date: 14/12/2006. GreenGas. Value: 99.99%

- ✓ For second year of operation: December 2007 – December 2008

  Flare analysis conducted on 14/01/2008 (measurement date), within the period. Result applied for this period (99.99%). Report provided: 04/02/2008. Order Number 40701. Date of measurement: 14/01/2008. GreenGas. Value: 99.99%

Project participant informed that the "yearly measurement" according to methodology and PDD has been interpreted by the technical operator in the way that one measurement of flare efficiency had to be done per year of operation of the flare, as illustrated above. Considering the term "annual" as a 12 month interval the analysis would be delayed for about 30 days. However, SGS considered the value of 99.99% applied for this interval conservative based on the fact that:

1. Both results obtained were exactly the same (99.99%) for the analysis conducted on 14/12/2006 and 14/01/2008 (1 year and a month later);

2. The results for both analysis showed that the flare was operating in a high efficient condition (almost 100%). Also it is unlikely to expect the equipment to work in a lower efficiency in between two events of high efficiency, especially considering no changes in external conditions.

Project participant explained that: "neither technical equipment has been changed or modified nor ambient conditions have changed, an alteration of efficiency of the combustion as recorded during efficiency measurements in Dec 06 and Jan 08 is very unlikely. As there is no other continuous monitoring than the combustion temperature this can be used to prove stable conditions and proper operation of the equipment. The average combustion temperature in December 07 was 973.5℃. Considering the average methane concentration of 39.9% the graph (page 6/8 of Annex 7 – "HOFGAS equipment accuracy information" – Ref.26) shows that the combustion is within the optimal Lambda range of 1.5 to 2.0 with lowest Corg emissions. Based on the fact that neither hardware nor other external conditions have been changed and combustion conditions based on recorded temperature have been stable and in optimal range it is very unlikely that the efficiency of the flare has changed for the time between 15.12.07 and 31.12.07 respectively 14.01.08. These explanations should underline the proper operation of the flare with continuous high efficiency at any time. For this reason we apply for the flare efficiency of 99,99% according to the measurement in Dec 06 for the complete crediting period in 2007."

In order to avoid any misunderstanding for the next monitoring period and in a way to assure it complies with both calendar and operation calendar SGS recommends project proponent to conduct this analysis in a calendar basis (one analysis per calendar year - every 12 months). The project proponent assures that the flare efficiency will be conduct within this periodicity for the next monitoring period, which will be verified in the next verification,

Regular maintenance of the flare station as specified in the PDD was verified in the Alquimiatec and GGG contracts, and are done by Proviento personnel on site according to the schedule established and provided (Ref. 17; Ref. 18).

Value applied in CER Spreadsheet (Ref. 5) and monitoring report (Ref. 3) complies with the 2 contracts verified (99.99%) (Ref. 10; Ref. 11).

The operation hours of the flare are monitored through a run time meter connected to a flame detector continuously. Equipment verified on site: Bauser; Type 631.2, in compliance with monitoring report.

NIR05 was raised to request information on calibration of the equipment. Project participant provided the information that the run time meter is a measurement device that can neither be modified nor be calibrated according to manufacturer (works or it is defect). For this reason this measurement device is only for cross-checking logged data but is not used for calculating Emission Reduction Units. Based on manually logged data of the operation hours during site visits the operation hours of the flare as recorded by the run time meter in-between two site visits can be used for cross-checking the operation hours as calculated based on the raw data based on recorded gas flow and flare temperature. In case of any failure or malfunction of data-logger the run time meter gives evidence on total operation time.

To verify if the value available on the equipment panel complied with the project time, the hour counter value (9870 hours) was cross checked with flare operation period (from the start of project to the date of site visit – total of approximately 10,244 hours). Considering the shutdown period verified in the Monthly Reports from Proviento to GGG available for the monitoring period of about 225 hours (Operating for 9999 hours), the difference from the hour counter and the internal system obtained was not significant, as is expected to have happened a few additional hours of shutdown during the period from the project start to the monitoring period start.

As the data has low risk as it is only used for cross checking (project obtains the efficiency for the flare through the methane content of the exhaust gas), the difference was considered not relevant and NIR05 was closed out.

As stated in the PDD a regular maintenance will ensure optimal operation of the flare, which was verified to be done by GGG as described in the sections above.

3.2.3 $W_{CH4,y}$ - Methane Fraction

Equipments:

Fixed Gas analyzer: Manufacturer NUK, Stationary Gas Analysing System for landfill gas NGA 5 – CH4 – CO2 – O2, Fabrication Number 4003.2. Calibration periodicity: every site visit (2-5 days a week). Information was checked in site visit reports and results obtained on the calibration reports (Ref.6 – Annex 3.05). Calibration is done with gases available on site. Gases used for calibration of fixed gas analyzer: Cylinders analysis certificates verified as AGA – Linde Gas and Westfalen AG; March 2006; October 2007. (Ref.12; photos available).

Portable Gas Analyzer:

NIR 07 was raised to request clarification on the calibration periodicity of this equipment, as the equipments had been changed during the monitoring period. Changes in equipments (compliance in dates of use) and calibration periodicity have been clarified in NIR07, which was closed out.

GA 94 S/N: 3800/3695. Used for operational purpose. Calibration periodicity: Every 12 months. Certificates: Geotechnical Instruments G3800. Date of calibration 06/06/2006. Equipment changed to GA94 N.G3695. Certificate of calibration provided. Date of calibration: 09/02/2007. Original equipment sent back to site on 14/01/2008. It was clarified in NIR08 that this equipment can be used as troubleshooting procedures in case of failure of the equipment (was not used during this monitoring period).

It was verified during the site visit that the methane fraction of the landfill gas data is recorded continuously through the fixed gas analyzer. The data is recorded every minute and is generated automatically through a logging system. Data Log in the system is then recorded by operator (Proviento) on site into a computer or cd 2 to 5 times a week (all past data), and sent to GGG based in Germany along with Visit Report. In the site visit report the operator registers data from the equipment panel for cross checking and operational purpose. Data collection was found to be in compliance with the responsibilities established in GGG and Alquimialtec contract and the monitoring report information.

To verify data reported of methane fraction during the monitoring period, the same sampling used for landfill gas collected was used. The value reported in the monitoring report for the month of July was 45.8 while the verified value was 45.9. CAR 10 was raised because the value of WCH4,y (July 2007) verified in the raw data spreadsheet was 45.9, and it was reported as 45.8 in the monitoring report. In CAR10 project participant explained that the value was transferred to monthly report without rounding, which was corrected in Monitoring Report version 3. CAR10 was closed out.

CAR11 was raised because it was verified in the samples taken that the data for the period from 12/03/2007 15:05 to 20/03/2007 22:09 and from 30/03/2007 12:46 to 03/04/2007 15:33 were lost (was not registered), even though the system confirmed the flare was operating. Where data have been lost, it was possible to identify an “interpolation” sign.

In response to CAR11, it was explained that the “interpolation” sign was used because to cover this period, manual data available from the site visit reports were used. The data available from the visit reports were 13/03/2007 09:50 h; 15/03/2007 10:00 h; 19/03/2007, 11:00; 20/03/2007, 11:15 h. For the calculation of CDM-data, the CH4-value had to be reconstructed (to be more conservative than using the same value for a longer period). For this, the latest logged data and the data from the visit reports have been taken as base for an interpolation (using in the intervals between data recorded by the system and data available by the site visit report to obtain values for every minute and maintain the periodicity of data). Interpolation times are:

12/03/2007 15:04 to 13/03/2007 09:50;

13/03/2007 09:50 to 15/03/2007 10:00

15/03/2007 10:00 to 19/03/2007 11:00

19/03/2007 11:00 to 20/03/2007 11:15

20/03/2007 11:15 to 20/03/2007 22:10

30/03/2007 12:46 to 03/04/2007 15:33

According to the methodology, “*the fraction of methane in the landfill gas (wCH4,y) should be measured with a continuous analyzer or, alternatively, with periodical measurements, at a 95% confidence level*”. It has been

requested to client to provide sufficient information of how this calculation represented a conservative approach in which guarantees a 95% of confidence level.

With reference to the request a statistical analysis was done for the two data sets named as “Continuously Logged Data” and “Manually Recorded/Interpolated Data” measured from 08/03/2007 (0:00) to 07/04/2007 (23:59). This period was chosen as both periodical measurements with different monitoring frequency took place in the period of one month (31 days). The measurement interval for “Continuously Logged Data” is one minute. The measurement interval for “Manually Recorded/Interpolated Data” is based on non-regular site visits with manually measured methane fractions of landfill gas. All missing data during malfunction of data logging based on a minute interval is calculated based on linear interpolation.

Client provided a statistic analysis (Ref. 23) and the following explanation:

For the statistical analysis of the two data sets it is assumed that the populations of both data sets follow the Gaussian distribution. The Alternative Hypothesis in order to point out that both data sets can be considered as coming from on population states that the means are related. By falsifying the null hypothesis (arithmetic mean of the ”Continuously Logged Data” is not related with the arithmetic mean of the “Manually Recorded/Interpolated Data”) it can be shown that the logged and the manually recorded/interpolated values are likely coming from the same population. For testing the Null Hypothesis the mean value for CH4 concentration was calculated for both data sets as well as the standard deviation of the total data sets. As the mean value as well as the standard deviation of both data sets only deviates by less than 4.46 % the evidence is given that the Null Hypothesis is not valid and that the data sets can be assumed dependent. By this analysis the appropriateness of the measures of “Manually Recorded/Interpolated Data” is shown. Furthermore, the standard deviation of both data sets is within the confidence level of 95% and the standard deviation of “Manually Recorded/Interpolated Data” is within the confidence level of the data set of “Continuously Logged Data”. Therefore, it is confirmed that the periodical measurements of the fraction of methane in the landfill gas for each site and for each period with different monitoring frequency are at a 95% confidence level as requested by the methodology.

The statistical analysis (Ref. 23) was verified and is in accordance with client explanation. As required by the consolidated monitoring methodology for landfill gas project activities (page 7 of ACM0001 version 4), client has used a statistically valid number of samples (data lost period: 12/03/2007 15:05 to 20/03/2007 22:09 and from 30/03/2007 12:46 to 03/04/2007 15:33; data used in the statistic analysis: 08/03/2007 0:00 to 07/04/2007 23:59; therefore 100% of data lost have been included in the analysis). In the analysis it was specified the null hypothesis (H0) and the alternative hypothesis (H1) tested as explained and it was clearly demonstrated how the standard deviations for the different data sets (intervals) were obtained and used to calculate the variances of the continuously logged data and the manually recorded/Interpolated data, which were compared. The deviation obtained from the analysis was less than 4.46 %, and as the methodology requires data to have a maximum deviation of 5%, data was considered to be at a 95% confidence level. The procedures available in the monitoring report have been updated to include the information on use of secondary data as required by the methodology, Monitoring Report version 3, Section B.3. CAR 11 was closed out.

A request for review was received from the Board regarding the verification of the interpolation method applied by project participant in accordance with the methodology. Additional information was provided as a response to this issue, and also taking in consideration guidance in most recent version of the methodology additional analysis was conducted by project participant as explained below.

The methodology ACM0001 “Consolidated baseline and monitoring methodology for landfill gas project activities”, version 4, page 7, states that: “The fraction of methane in the landfill gas (wCH4,y) should be measured with a continuous analyzer or, alternatively, with periodical measurements, at a 95% confidence level, using calibrated portable gas meters and taking a statistically valid number of samples and accordingly the amount of landfill gas from LFGtotal,y, LFGflare,y, LFGelectricity,y, LFPL,y and LFGthermal,y shall be monitored in the same frequency (…)”.

Compliance Regarding Frequency of Records

The equipment used (flow meter, temperature and pressure of gas, methane fraction, flare temperature), monitor project data continuously as established by the methodology and are set up to record data every minute automatically and electronically. This is in line with the methodology, which does not require a specific or minimum periodicity of records. Periodical measurements are taken with a portable gas analyzer by the

project operator at least once a week, and reading from the equipments panel (flow meter, temperature and pressure of gas, methane fraction, flare temperature) are also taken in the same frequency for cross-checking. This is in line with the methodology, which states that LFGtotal,y, LFGflare,y (applicable for the project activity) shall be monitored in the same frequency as the periodical measurements of the fraction of methane, and does not require a specific or minimum periodicity of records.

Compliance Regarding 95% Confidence Level

The periodical measurements should be at a 95% confidence level according to the methodology. The analysis was conducted based on the following available information from project participant (Annex 4):

Electronic data recorded has been lost on the following periods:

- ✓ 12/03/2007 (15:05) to 20/03/2007 (22:09)
- ✓ 25/03/2007 (01:59) to 25/03/2007 (02:59)
- ✓ 30/03/2007 (12:46) to 03/04/2007 (15:33)

According to the operator site visit reports verified, periodical measurements were taken within this period in the following days:

- ✓ 13/03/2007 (09:50) – Value of CH4 (47.2)
- ✓ 15/03/2007 (10:00) – Value of CH4 (49.1)
- ✓ 19/03/2007 (11:00) – Value of CH4 (45.5)
- ✓ 20/03/2007 (11:15) – Value of CH4 (43.6)

Methodology ACM0001 version 4 states that a statistically valid number of samples for the statistic analysis should be taken, however it does not provide a criteria against which the number of samples can be tested to assure it is statistically valid. In June 2008, a Request for Clarification was submitted by SGS regarding this issue (AM_CLA_0095), and responses were addressed by the Meth Panel in the revised methodology. Taking into account guidance from most recent version of the methodology ACM0001 version 9, it is stated that “the fraction of methane in the landfill gas (wCH4,y) can either be measured with a continuous analyzer or, alternatively, conducting periodical measurements with a minimum of four quarterly measurements per year”. Therefore the four available data from project participant obtained from periodical measurements are considered valid for the analysis, as within a period from 12/03/2007 to 03/04/2007 (less than 1 year), four records are being used.

In order to analyze the 95% confidence level from this data, the project participant chose to interpolate the periodical measurements with electronic data available, as the frequency of data obtained from periodical measurements (4 data) is different from the set up frequency for the equipment when data is recorded continuously (every minute). As explained by project participant, the linear interpolation has been used to determine fraction of methane during the periods of default of logging these data, which represents the physical behaviour of the gas production of landfill sites in general (as observed in the methane variance graphic on Annex 4 provided by project participant).

The methodology ACM0001 version 4, applied for the project activity, does not require a standard approach for the statistic analysis and from the analysis conducted by project participant SGS verified that the data used was within the 95% of confidence level as explained in the verification report, and as required by the methodology.

In the request for clarification submitted by SGS (AM_CLA_0095) this issue was taken in consideration (“The methodology does not give guidance on at which frequency should the calculation of confidence interval be conducted”). The revised methodology ACM0001 version 9 includes the information that “In case periodical measurements, the lower bound of the 95% confidence interval should be used to estimate baseline methane emissions to ensure conservativeness”.

After receiving a request for review from the Board, project participant provided an additional statistic analysis in which the 4 data available is analyzed without interpolation, and the lower bound of the 95% confidence interval is used for the intervals where data is lost, taking into account the guidance on the revised methodology. As explained by project proponent, both mean values for no interpolated data and interpolated data are within the maximum deviation of 5% required by the methodology applied. Considering the lower bound of the 95% confidence interval (-5%), the value obtained for the no interpolated data was 44.03%, while for the continuous logged data with interpolated data was 44.65%.

Applying the value of 44.03%, based on guidance available on most recent version of the methodology ACM0001 (version 9), total CERs changes to 12,573 tons of CO2e. Project participant adressed this change, which resulted in a more conservative value, in the Monitoring Report Version 4 and CER Spreadsheet Version 4.

During the sampling it was also verified that the methane fraction data were obtained as an average value of each month for ER calculation of the monitoring period. As data monitored was available in a smaller interval (per minute), and also data of landfill gas collected was adapted to a minute interval calculation (more accuracy), the monthly data log spreadsheets (Ref. 21) were adapted to calculate data for ER based on raw data records in the system (one record of CH4 per minute, not average values). These changes are reflected in CAR10 and in NIR09 along with landfill gas use of data procedures described above. Values in the monitoring report don't change as they illustrate the average value obtained monthly, not used for calculation. CAR10 and NIR09 were closed out as above.

Obs: Value of "LFGflared* wCH4* DCH4* GWPCH4" is obtained every minute in updated logged data (Ref. 21), indicated in column "N". The same value is indicated in Column "J" of CER Spreadsheet (Ref. 5), which is then multiplied by FE and discounted value of ELimp to obtain MDflared, in Column "O". Therefore, the mean value of wCH4 in the CER Spreadsheet (Ref.5 column G) and reported in the monitoring report versions 1, 2 and 3 is illustrative based on the monthly average values, and not used for CER calculation.

3.2.4 EL_{Imp}

The energy consumed by project is monitored and consider in emission reductions calculation as project is not generating energy in the project activity, as described above.

Meters were verified installed on site. Meter used for all landfill activities: Landis + Gyr. Solid Waste electricity meter. Empresa eletrica Quito S.A. N.90001535. Year of 2005. Type: 4P242030. RXRS4. Meter used for the operation of flaring system (CDM project): Socomec. Diris Am.

According to project procedures "Accumulated energy consumption is logged only at the multi function energy meter and has to be recorded manually". It was verified that the site visit report contains data collected (data from the project meter is obtained manually from the equipment panel during the site visits). Invoices can be used for troubleshooting procedures as clarified in NIR08 as refer to the total consumed in the site.

It was verified that the value of energy consumed is obtained through the operator visit report (Ref. 7).

The amount of energy registered in the operator visit report (Ref. 7) for the first day of the monitoring period (08/03/2007) verified was 10512 kWh. For the last day of the monitoring period (31/12/2007) the value of energy verified was 33407 kWh. The value obtained was 22895 kWh for the monitoring period, which differs in 155 kWh from the value reported in the monitoring report (22.74 MWh). As the procedure to obtain the value of energy consumed is based on the site visit reports (first and final values of energy consumed), it was not possible to identify why values reported and obtained were not the same. NIR02 was raised. In response, project participant explained that as the power consumption is continuously measured and automatically recorded in the power meter the monthly power consumption is calculated based on the first reading of each month. This value is interpolated to get the value for the first day of the month. The difference between two values provides the power consumption for the according month. For cross-checking we refer to power consumption according to visit reports from 08/03/2007, 11:00 and 31/12/2007, 8:00; the difference is 22895 kWh in total for this period; the accumulated value of monthly read values is 22740 kWh; the difference of 155 kWh seems to be caused by rounding.

Energy consumption procedure has been clarified and complies with the methodology which does not specify the periodicity to report the energy consumed (monthly or total for the monitoring period). The energy consumed for the period is based on the energy recorded values in the beginning and the end of each month. The values obtained from the first and last record of the monitoring period is used for cross checking. The procedure has been clarified in Section B.1.1.6 of the Monitoring Report. The difference did not impact final value of CERs as it represents 0,10354 ton CO2e and as explained by project participant and verified by SGS the difference of 155 Kwh is within the equipment accuracy (1%) (Ref.6 – Annex 2.08 of Monitoring Report). For future monitoring periods, in case the difference between the two records is higher than the 1% accepted by the equipment accuracy, SGS recommends project participant to apply the lowest value for conservativeness, which will be verified in the next verification.

Also a typing mistake in the monitoring report has been corrected as the amount of tCO2 for energy consumed (Monitoring Report version 1, Table D.3.4.1) was being reported with the same value of kWh consumed (22.75). NIR02 was closed out.

Equipment QA/QP are provided by Empresa eletrica Quito S.A. (Energy company).

It is part of Alquimiatec and GGG contract that all data provided by Proviento are reviewed by GGG in Germany. Information is cross checked and monthly reports (Ref. 6 – Annex 4 of Monitoring Report) prepared by GGG are sent to Alquimiatec based on the information of log data (received monthly), Visit Reports (received every visit) (Ref. 7).

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

There are no pending issues from the previous validation.

3.4 Project Implementation

Project was implemented and equipment installed as described in the registered PDD; as described above, according to the PDD, a Landfill Gas To Energy (LFGTE) module will be attached in a second construction stage in case a private or commercial power purchaser is identified in the future. By the time of this first monitoring period verification, this module was not implemented in the project activity. Therefore all equipments related to the combustion of the landfill gas (flaring) were verified to be in place at the time of the site visit (blower, flare station, electronic data manager and meters related to parameters as described in the methodology ACM0001 version 4 and in the registered PDD monitoring plan).

3.5 Completeness of Monitoring

The reporting procedures reflect the content of the monitoring plan. The monitoring mechanism is effective and reliable.

3.6 Accuracy of Emission Reduction Calculations

The calculation of emission reductions is found to be correct in monitoring report version 4.

CARs and NIRs were raised based on monitoring report version 1 and CER spreadsheet version 1 provided at the start of the verification exercise, as described in Section 3.2 above for each parameter. The number of ERs changed because of the following reasons:

- CH4 (fraction of methane): data used for calculation (CER Spreadsheet version 1) was being used based on average values obtained monthly. As more accurate monitored data was available "per minute", it was used in the calculations, reflected in CER Spreadsheet version 2.
- 95% of confidence level on statistic analysis for data lost (please also see Section 3.2.3 for details): After receiving a request for review from the Board, project participant provided an additional statistic analysis in which the 4 data available is analyzed without interpolation, and the lower bound of the 95% confidence interval is used for the intervals where data is lost, taking into account the guidance on the revised methodology. As explained by project proponent, both mean values for no interpolated data and interpolated data are within the maximum deviation of 5% required by the methodology applied. Considering the lower bound of the 95% confidence interval (-5%), the value obtained for the no interpolated data was 44.03%, while for the continuous logged data with interpolated data was 44.65%. Applying the value of 44.03%, based on guidance available on most recent version of the methodology ACM0001 (version 9), total CERs changes to 12,573 tons of CO2e. Project participant adressed this change, which resulted in a more conservative value, in the Monitoring Report Version 4 and CER Spreadsheet Version 4.
- LFG (amount of gas collected): data used for calculation (CER Spreadsheet version 1) was being used from values obtained from the equipment panel recorded by the operator. A more accurate data "per minute" was used in the calculation (using available monitored electronic data) reflected in CER Spreadsheet version 2.

Project participant updated logged data sheets with data from 08/03/2007 to 31/12/2007 with CER calculation per minute (Ref. 21) based on the according value for methane fraction and gas flow generated every minute in the raw data. Formulae have been applied correctly to obtain value of LFGflared in a separated column in every line of the monthly spreadsheets (one line represents one record per minute), and only considers data when the project was operating (conditional formulae included). It was also verified that the data summary - CER spreadsheet (Ref. 5) - provided applies correctly the values obtained from the updated logged data, and formulae applied complies with the methodology. Values used in the final CER spreadsheet are also linked to these data spreadsheets, which avoids manual transference of data and eventual errors. Data were considered to be more accurate and transparent for emission reduction calculation.

The response to CARs and NIRs was satisfactory and these were closed. The details of the reported and the verified values for all parameters are listed in section 4.

3.7 Quality of Evidence to Determine Emission Reductions

Critical parameters used for the determination of the Emission Reductions are discussed above in section 3.2. All data recorded is in compliance with the monitoring report.

3.8 Management System and Quality Assurance

QA/QP procedures are designated to a contracted company (Green Gas Germany GmbH). The responsibilities are defined in the monitoring report. NIR03 was raised to request specific information on the management of CDM data and reporting . Project participant clarified the relation between the companies and its responsibilities in the project activity. Section C.1.1 of Monitoring Report version 1 was revised to include the responsible person for the monitoring of the project data.

Also the contract between GGG and Alquimiatec provided “Operation and Maintenance Agreement” (Ref. 19/confidential) was verified, and contains the responsibilities for each company which comply with actual activities conducted.

As stated in the monitoring report and verified in the companies’ contracts, Alquimiatec S.A. as the project owner is responsible for the project site. Green Gas Germany GmbH (referred as GGG) was subcontracted by Alquimiatec S.A. for operation and maintenance including monitoring of the degassing system and equipment installed and implemented for this project within the project boundaries. Proviento S.A. (also referred as Proviento) was subcontracted by Green Gas Germany GmbH for technical on-site operation of the degassing system including all equipment installed and implemented for this project within the project boundary. It is part of Alquimiatec S.A. and GGG contract that all data provided by Proviento S.A. are reviewed by GGG in Germany. Information is cross checked and monthly reports (Ref. 6 – Annex 4 of Monitoring Report) prepared by GGG are sent to Alquimiatec S.A. based on the information of log data (received monthly), Visit Reports (received every visit) (Ref. 7). Internal audits are also conducted every 6 months as established in Alquimiatec and GGG contract, and records were verified during the site visit. The roles of all personnel in the project activity has also been included more clearly in the monitoring report, Section C.1.1. NIR03 was closed out.

During the site visit Proviento S.A. personnel demonstrated that the system sends a warning message with a description of the occurance to their mobile phones if an abnormal conditions occurs (concentration of gases out of limits established, flare turns off, etc). Photos were taken to illustrate the process and are available upon request.

Training certificates were provided (Ref. 6 - Annex 6 of the monitoring report). The same personnel trained are identified in the site visit reports (Ref. 7) during the monitoring period.

It is part of the project procedures and contract with GGG conditions that all data are kept for at least the crediting period plus 2 years.

With the information verified we can affirm that the management system of the CDM project is in place, with the responsibilities properly identified and in place.

3.9 Data from External Sources

External data applied according to the registered PDD and applied methodology, are:

- $CEF_{electricity,y}$ - CO2 emission intensity of the electricity and/or other energy carriers in ID 9. Even though project is not exporting energy yet, as project imports energy, it's necessary to apply the emission factor to calculate the discount on emission reductions as per methodology ACM0001 version 4.
- D_{CH4} (density of methane)
- GHP_{CH4} (Global Warming Potential value for methane for the first commitment period is 21 tCO2e/tCH4)

3.9.1 CEFelectricity,y

Data is used to obtain the quantity of energy consumed by the project in tCO2 and is obtained from the registered PDD (Ref. 1) Annex 3 and Table D.2.2.1 (established ex-ante as 0.668 tCO2/MWh). Monitoring Report and CER Spreadsheet reports the value correctly. Calculations verified to be correct (CEFelectricity is multiplied by the quantity of energy consumed in the monitoring period in MWh).

3.9.2 D_{CH4}

According to the methodology, at standard temperature and pressure (0 degree Celsius and 1,013 bar) the density of methane is 0.0007168 tCH4/m3CH4. (Established in the methodology as a default value). Values found to be correctly applied in the CER Spreadsheet, Monitoring Report and the log data spreadsheets. Obs: Value of "LFGflared* wCH4* DCH4* GWPCH4" is obtained every minute in updated logged data (Ref. 21), indicated in column "N". The same value is indicated in Column "J" of CER Spreadsheet (Ref.5), which is then multiplied by FE and discounted value of ELimp to obtain MDflared, in Column "O". Therefore, the mean value DCH4 (Ref.5 column I) is being used for reporting purpose, as it has been used in the calculation already in updated logged data spreadsheet in every minute recorded.

3.9.3 GHP_{CH4}

According to the methodology, Global Warming Potential value for methane for the first commitment period is 21 tCO2e/tCH4 (Established in the methodology page 14 from source: Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories; 1996 – present). Data is correctly applied in the CER Spreadsheet, and reported in the Monitoring Report. Obs: Value of "LFGflared* wCH4* GWPCH4* DCH4" is calculated in a separated column of the logged data based on the monitored data, every minute (every records) (Ref. 21), indicated in column "N". The same value used in the calculation is indicated in Column "J" of CER Spreadsheet (Ref. 5), which is then multiplied by FE and discounted value of ELimp to obtain MDflared, in Column "O". Therefore, the value of GWPCH4 in the CER Spreadsheet (Ref. 5 column L) is illustrative (reporting purpose) as it has been already used in the dependent spreadsheets (Ref. 21).

4. Calculation of Emission Reductions

Parameter	*Reported Value*	*Verified Value*
$LFG_{total,y}$ **$LFG_{flare,y}$** **Amount of landfill gas flared** Obs: according ACM0001 ver.4 LFG_{flare} plus $LFG_{electricity}$ plus $LFG_{thermal}$ equals LFG_{total} and all of these are monitored parameters (see page 6). Since this project neither has electricity nor thermal generation, these two parameters are not monitored and therefore LFG_{flare} = LFG_{total}.	1,992,738 Nm3	1,992,738 Nm3
***w*CH4** **Methane fraction in the landfill gas** Obs: Data is reported as percentage (average) in the monitoring report and CER Spreadsheet for every month (March – December). It is not possible to have a single value reported, as data is recorded every minute (continuously) and used for ER calculation in the excel files.	46.0 % 47.1 % 46.0 % 49.3 % 45.9 % 39.2 % 38.7 % 38.8 % 35.6 % 39.9 %	46.0 % 47.1 % 46.0 % 49.3 % 45.9 % 39.2 % 38.7 % 38.8 % 35.6 % 39.9 %
Flare Efficiency	99.99%	99.99%
EL_{IMP} **Electricity Imported**	22.74 MWh	22.74 MWh
$CEF_{electricity,y}$	0.668 tCO2/MWh	0.668 tCO2/MWh
GWPCH4	21 tCO2e/tCH4	21 tCO2e/tCH4
D_{CH4} **Methane Density**	0.0007168 tCH4/m3CH4	0.0007168 tCH4/m3CH4

Calculation of Emission Reductions:

ERy = (LFGflared* wCH4* DCH4* FE*GWPCH4) – ELimp*EFelectricity

ERy = 12,573 tCO2e

5. Recommendations for Changes in the Monitoring Plan

No recommendations were made to the client in order to improve their monitoring plan.

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. Mayra Caradec 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 visits 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.

CEFelectricity,y: obtained from the registered PDD (Ref. 1) Annex 3 and Table D.2.2.1 (established ex-ante as 0.668 tCO2/MWh).

D_{CH4}: According to the methodology, at standard temperature and pressure (0 degree Celsius and 1,013 bar) the density of methane is 0.0007168 tCH4/m3CH4. (Established in the methodology as a default value).

GHP_{CH4}: According to the methodology, Global Warming Potential value for methane for the first commitment period is 21 tCO2e/tCH4 (Established in the methodology page 14 from source: Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories; 1996 – present).

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 is complete and transparent.

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

No recommendations for changes to the monitoring methodology were issued to project participants.

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 consistent with those contained in the registered PDD and monitoring plan. The emission reduction was 55,139 tCO2 for the period 15/02/2007 to 31/12/2007 as per the estimation made in the registered PDD. The actual emission reduction has been verified as 12,573 tCO2 for the period from 08/03/2007 to 31/12/2007. Differences was explained during site visit as being common on landfill projects as the landfill gas is also related to uncontrolled variants (rain, heat, etc).

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 shall address the concerns and supply relevant additional information.

No such non conformity of the actual project activity and its operation with the registered project design document has been observed.

Post monitoring report on UNFCCC website

Yes, the monitoring report is available at UNFCCC Ref. 0798 on UNFCCC website
http://cdm.unfccc.int/Issuance/MonitoringReports/index.html?p=21

7. Verification and Certification Statement

SGS United Kingdom Ltd has been contracted by Alquimiatec S.A. to perform the verification of the emission reductions reported for the CDM project Zámbiza Landfill Gas Project (UNFCCC Ref. 0798) in the period 08/03/2007 to 31/12/2007.

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 Zámbiza Landfill Gas Project Monitoring Report version 4 dated 10/10/2008.

The management of Alquimiatec S.A. is responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions on the basis set out within the project Monitoring Report version 4 dated 10/10/2008. Calculation and determination of GHG emission reductions from the project is the responsibility of the management of the Zámbiza Landfill Gas Project. 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 08/03/2007 to 31/12/2007 based on the reported emission reductions in the Monitoring Report version 4 dated 10/10/2008 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:	Zámbiza Landfill Gas Project
UNFCCC Reference Number:	0798
Registered PDD and Approved Used for Verification:	PDD Version 3 dated 8th November 2006
Methodology Used for Verification:	ACM0001 Version 4, dated 28th July 2006, valid from 28th July 2006 to 21st December 2006.
Applicable Period:	08/03/2007 to 31/12/2007
Total GHG Emission Reductions Verified:	**12,573 tCO2e**

Signed on behalf of the Verification Body by Authorized Signatory

Signature: 

Name: Siddharth Yadav

Date: 20th October 2008

8. Document References

1 Zámbiza Landfill Gas Project PDD
Registered PDD (UNFCCC number 0798) Version 03; November 08, 2006. available in UNFCCC website:
http://cdm.unfccc.int/UserManagement/FileStorage/JHSHVN3MGEV1CNZTO84HDDHUYJ4GE6

2 Methodology ACM0001 V04
Approved methodology applied by project activity. ACM0001 Version 04, 28th July 2006, Valid from 28 Jul 06 to 21 Dec 06. Available in UNFCCC website:
http://cdm.unfccc.int/methodologies/DB/ILONQS1VUJJVIA7UIS3Q9YG9DLYBD4/view.html

3 Zámbiza Landfill Gas Project Monitoring Report V01
Project Monitoring Report for the first monitoring period (08th March 2007 to 31st December 2007) dated as 2nd January 2008, Version 01. Published on UNFCCC website on 25th January 2008 in accordance with the "Procedures for making the monitoring report available to the public in accordance with paragraph 62 of the modalities and procedures for the CDM".
Available at: http://cdm.unfccc.int/Projects/DB/TUEV-SUED1165843266.17/iProcess/SGS-UKL1201188592.12/view

3 Zámbiza Landfill Gas Project Monitoring Report V02
Project Monitoring Report for the first monitoring period (08th March 2007 to 31st December 2007) dated as 11th April 2008, Version 02.

3 Zámbiza Landfill Gas Project Monitoring Report V03
Project Monitoring Report for the first monitoring period (08th March 2007 to 31st December 2007) dated as 23rd July 2008, Version 03.

3 Zámbiza Landfill Gas Project Monitoring Report V04
Final Project Monitoring Report for the first monitoring period (08th March 2007 to 31st December 2007) dated as 10th October 2008, Version 04.

4 Zámbiza Landfill Gas Project Validation Report
Project Validation Report No. 693296, Revision 03, dated as 1st December 2006.
Available at:
http://cdm.unfccc.int/UserManagement/FileStorage/V9Q1UFEGQ5XP4K7ZZSK34JHKXCYPKV

5 Zámbiza CERs Spreadsheet V1: CER Spreadsheet Version 1 submitted along with Monitoring Report Version 1

5 Zámbiza CERs Spreadsheet V2: CER Spreadsheet Version 1 submitted along with Monitoring Report Version 3

6 Zámbiza Monitoring Report Annexes: Annexes as referred in the Monitoring Report and provided during the verification exercise (includes equipment technical information, calibration certificates, site visit report, monthly reports and project data log).

7 Sampling of Site Visit Reports: Samples of Site Visit Reports used during verification exercise

8 Sampling of Data Log: Samples of data log data used during the verification exercise

9 Continuous Gas Analyzer Calibration Reports: Continuous Gas Analyzer Calibration Reports (AGA and Westfalen manufacturers)

10 Flare Efficiency Report 2006: Flare efficiency analysis conducted by GGG in 14th December 2006

11 Flare Efficiency Report 2007: Flare efficiency analysis conducted by GGG in 14th January 2008

12 Gases for Gas Analyzer Calibration Certificates: Quality analysis certificates for gases used by the continuous gas analyzer

13 Environmental License: Environmental license obtained on 23rd June 2006, number 14, for the capture and destruction of the landfill gas.

14 Environmental License Certificate: Certificate refering to the environmental the license obtained on 23rd June 2006, number. States the environmental license expires after 5 years.

15 Portable Gas Analyzer Calibration Certificate: Certificates containing the periodicity of calibration as 12 months.
16 Total electricity consumption invoices: Energy consumption invoices from Empresa Eletrica Quito (Energy company) related to the monitoring period.
17 Flare maintenance procedures: Procedures for the quality assurance of the flare station
18 Gas collection maintenance procedures: Procedures for the quality assurance of the gas capture system
19 GGG and Alquimiatec obligations contract (confidencial): Contract between project participant and sub-contractor responsible for the operation and maintanance of the gas capture system
20 Spare flow meter calibration ceriticate
21 Data log with formulas for CER Calculation: Data log (project raw data recorded from equipments)
22 Email to Zámbiza from Instromet Zähler: Flow meter and volume corrector manufacturer´s response to solicitation of equipments calibration recommendation
23 Statistical Analysis 95% confidenciality data: Analysis conducted by GGG to demonstrate 95% of confidence level of data when using manual data for ER calculation
24 Maintenance and Recalibration Procedure Instromet: Flow meter and volume corrector manufacturer´s recommendation for equipment calibration
25 Calibration schedule information: Monitoring equipments calibration periodicity schedule
26 HOFGAS – information on combustion efficiency

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