Verification Report

Consorcio Santa Marta S.A.

Initial and First Periodic Verification

of the registered CDM project

“Project 0799: Santa Marta Landfill Gas (LFG) Capture Project”

in Chile

Report No. 1059437
Version 4

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TÜV SÜD Industrie Service GmbH
Carbon Management Service
Westendstr. 199 - 80686 Munich - GERMANY

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Subject:	Initial and First Periodic Verification of a CDM Project
Executing Operational Unit:	TÜV SÜD Industrie Service GmbH Carbon Management Service Westendstr. 199 - 80686 Munich, Federal Republic of Germany
Client:	Consorcio Santa Marta S.A. Avenida General Velásquez 8990, San Bernardo Santiago, Chile
Contract approved by:	Werner Betzenbichler
Report Title:	Initial and First Periodic Verification of the CDM Project: "Santa Marta Landfill Gas (LFG) Capture Project"
Number of pages	20 (excluding cover page and annexes)

Summary:

TÜV SÜD Industrie Service GmbH has performed the Initial and First Periodic Verification of the registered CDM project: "Project 0799: Santa Marta Landfill Gas (LFG) Capture Project" in Chile. The verification is based on requirements of the UN Framework Convention on Climate Change (UNFCCC). In this context, the relevant documents are the "Marrakech Accords".

The managements of Consorcio Santa Marta S.A. are responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions on the basis set out within the project Monitoring and Verification Plan indicated in the final PDD version 06 dated December 05, 2006. The development and maintenance of records and reporting procedures in accordance with that plan, including the calculation and determination of GHG emission reductions from the project is the responsibility of the management of the project.

The verifier confirms that the project is implemented as planned and described in validated and registered project design documents. Installed equipment being essential for generating emission reduction runs reliably and is calibrated appropriately. The monitoring system is in place and the project is already generating emission reductions.

The verifier can confirm that the GHG emission reduction for the whole monitoring period is calculated without material misstatements. Our opinion relates to the project's GHG emissions and resulting GHG emissions reductions reported and related to the valid and registered project baseline and monitoring, and its associated documents. Based on the information we have seen and evaluated we confirm the following statement:

Reporting period: From 11/03/2007 to 31/08/2007

Verified emission in the above reporting period:

Emission Reductions from Methane destruction:	44 815	t CO_2 equivalents
Baseline Emissions:	9 386	t CO_2 equivalents
Emission Reductions considering flare efficiency:	35 429	t CO_2 equivalents

Work carried out by:

- Javier Castro (Asessment Team Leader)
- Víctor Abarca (GHG auditor)
- Sergio Degener (GHG Auditor)

Internal Quality Control by:

- Werner Betzenbichler

Abbreviations

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
DNA	Designated National Authority
DOE	Designated Operational Entity
EB	Executive Board
ER	Emission reduction
FAR	Forward Action Request
GHG	Greenhouse gas(es)
KP	Kyoto Protocol
MP	Monitoring Plan
MR	Monitoring Report
MDS	Monitoring Devise System
PDD	Project Design Document
TÜV SÜD	TÜV SÜD Industrie Service GmbH
UNFCCC	United Nations Framework Convention on Climate Change
VVM	Validation and Verification Manual

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1 INTRODUCTION

1.1 Objective

Consorcio Santa Marta S.A. has commissioned an independent verification by TÜV SÜD Industrie Service GmbH (TÜV SÜD) for its registered CDM project: "Santa Marta Landfill Gas (LFG) Capture Project". Verification is the periodic independent review and ex post determination by the Designated Operational Entity / Independent Entity of the monitored reductions in GHG emissions during the defined verification period.

The objective of verification can be divided in Initial Verification and Periodic Verification:

- Initial Verification:
  The objective of an initial verification is to verify that the project is implemented as planned, to confirm that the monitoring system is in place and fully functional, and to assure that the project will generate verifiable emission reductions. A separate initial verification prior to the project entering into regular operations is not a mandatory requirement.
- Periodic Verification:
  The objective of the periodic verification is to verify that actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan; further more the periodic verification evaluates the GHG emission reduction data and express a conclusion with a high, but not absolute, level of assurance about whether the reported GHG emission reduction data is "free" of material misstatements; and verifies that the reported GHG emission data is sufficiently supported by evidence, i.e. monitoring records. If no prior initial verification has been carried out, the objective of the first periodic verification also includes the objectives of the initial verification.

The verification shall consider both quantitative and qualitative information on emission reductions. Quantitative data comprises the monitoring reports submitted to the verifier by the project entity. Qualitative data comprises information on internal management controls, calculation procedures, and procedures for transfer, frequency of emissions reports, review and internal audit of calculations/data transfers.

The verification follows UNFCCC criteria refer to the Kyoto Protocol criteria and the CDM rules and modalities as agreed in the Bonn Agreement and the Marrakech Accords.

1.2 Scope

Verification scope is defined as an independent and objective review and ex post determination by the Designated Operational Entity of the monitored reductions in GHG emissions. The verification is based on the submitted monitoring report and the validated project design documents including its monitoring plan. These documents are reviewed against Kyoto Protocol requirements, UNFCCC rules and associated interpretations. TÜV SÜD 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 risks and reliability of project monitoring and generation of CERs.

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 monitoring activities.

The audit team has been provided with a Monitoring Report and underlying data records in September 14th, 2007, covering the period March 11th, 2007 till August 31th, 2007 which has been made publicly available on the UNFCCC website as required by the modalities and procedures of the CDM (http://cdm.unfccc.int/Issuance/MonitoringReports). Based on this documentation a document review and a fact finding mission in form of an on-site audit has taken place. The Monitoring Report version 01 submitted on September 2007 serves as the basis for the assessment presented herewith.

Studying the existing documentation belonging to this project, it was obvious that the competence and capability of the audit team performing the verification has to cover at least the following aspects:

- Knowledge of Kyoto Protocol and the Marrakech Accords
- Environmental and Social Impact Assessment
- Skills in environmental auditing (ISO 14000, EMAS)
- Quality assurance
- Technical aspects of solid waste management systems.
- Monitoring technologies.
- Monitoring concepts.
- Political, economical and technical random conditions in host country

According to these requirements TÜV SÜD has composed a project team in accordance with the appointment rules of the TÜV certification body "Climate and Energy":

Javier Castro is the Assessment Team leader, and auditor for environmental management systems at the department "Carbon Management Service" in the head office of TÜV SÜD Industrie Service GmbH in Munich. He is specialised in environmental issues.

Víctor Abarca is heading the department "Environmental Services" of ccaQualitas in Santiago de Chile, a local company being member of the TÜV SÜD Group. Having an academic education as Constructor Engineer and specialized on waste management is well familiar with the assessment of landfills and gas capture. He has received extensive training in the CDM validation and verification process, is an appointed auditor for CDM projects and participated already in several CDM project assessments all over Latin America.

Sergio Degener is a GHG auditor at the "Carbon Management Service" in the head office of TÜV SÜD Industrie Service GmbH, Germany. Mr. Degener studied environmental engineer at the University of Applied Science in Bingen, Germany. Beside his main focus in studies of environmental economics and law, he dealt with environmental management and environmental controlling issues.

The audit team covers the above mentioned requirements as follows:

- Knowledge of Kyoto Protocol and the Marrakech Accords (ALL)
- Environmental and Social Impact Assessment (ALL)
- Skills in environmental auditing (ALL)
- Quality assurance (ALL)
- Technical aspects of waste management systems (ALL).
- Monitoring technologies (ALL).
- Monitoring concepts (ALL).
- Political, economical and technical random conditions in host country (Abarca).

In order to have an internal quality control of the project, a team of the following persons has been composed by the certification body "Climate and Energy":

- Werner Betzenbichler (Certification body "Climate and Energy")

1.3 GHG Project Description

Santa Marta Landfill Gas (LFG) Capture Project is a project designed to explore the landfill gas produced in Santa Marta landfill, one of the landfills in Santiago, Chile. This landfill is located in the metropolitan region of Santiago in the Talagante Province, Chile's biggest city and financial center of the country.

Aiming to avoid environmental problems related to waste management and methane emissions, including also global warming, Santa Marta Landfill Gas (LFG) Capture Project was the designed solution created by Consorcio Santa Marta S.A. And it's goal is to find an environmental, social, and financial solution to avoid landfill gas release into the atmosphere.

Concerning climate protection and thus CDM the project captures the methane generated by the landfill. The landfill gas is burnt and converted into carbon dioxide. Hence the high global warming potential of methane is avoided.

The project has been registered as CDM activity on March 11th, 2007, having the reference number 0799 (see http://cdm.unfccc.int/Projects/DB/DNV-CUK1165902714.87)

2 METHODOLOGY

The project assessment aims at being a risk based approach and is based on the methodology developed in the Validation and Verification Manual, an initiative of all Applicant Entities and Designated Operational Entities, which aims to harmonize the approach and quality of all such assessments.

In order to ensure transparency, a verification protocol was customized for the project, according to the Validation and Verification Manual. The protocol shows, in a transparent manner, criteria (requirements), means of verification and the results. The verification protocol serves the following purposes:

- It organizes, details and clarifies the requirements a CDM/JI project is expected to meet;
- It ensures a transparent verification process where the verifier will document how a particular requirement has been proved and the result of the verification.

The verification protocol consists of four tables. The different columns in these tables are described in Figure 1.

The completed protocol is enclosed in Annex 1 to this report.

Initial Verification Checklist – table 1			
OBJECTIVE	Ref.	COMMENTS	Concl.(incl FARs/CARs)
The requirements the project must meet.	*Gives reference to the legislation or agreement where the requirement is found.*	*Description of circumstances and further commendation to the conclusion.*	*This is either acceptable based on evidence provided (**OK**), or a **Corrective Action Request (CAR)** of risk or non-compliance with stated requirements. The corrective action requests are numbered and presented to the client in the Verification report. The Initial Verification has additional Forward Action Requests (FAR). FAR indicates essential risks for further periodic verifications*

Periodic Verification Checklist Table 1: Data Management System/Controls		
Expectations for GHG data management system/controls	Score	Verifiers Comments (including *Forward Action Requests*)
The project operator's data management system/controls are assessed to identify reporting risks and to assess the data management system's/control's ability to mitigate reporting risks. The GHG data management system/controls are assessed against the expectations detailed in the table.	A score is assigned as follows: **Full** all best-practice expectations are implemented. **Partial** a proportion of the best practice expectations is implemented **Limited** this should be given if little or none of the system component is in place.	*Description of circumstances and further commendation to the conclusion. This is either acceptable based on evidence provided (**OK**), or a **Corrective Action Request (CAR)** of risk or non-compliance with stated requirements. The corrective action requests are numbered and presented to the client in the Verification report. The Initial Verification has additional Forward Action Requests (FAR). FAR indicates essential risks for further periodic verifications*

Periodic Verification Checklist Table 2: GHG calculation procedures and management control testing		
Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks
Identification of potential reporting risks based on an assessment of the emission estimation procedures. Identification of key source data. Focus on those risks that impact the accuracy, completeness and consistency of the reported data.	Identification of the key controls for each area with potential reporting risks. Assessment of adequacy of the key controls and eventually test that the key controls are actually in operation. Internal controls include, Understanding of responsibilities and roles, Reporting, reviewing and formal management approval of data; Procedures for ensuring data completeness, conformance with reporting guidelines, maintenance of data trails etc.	*Identification of areas of residual risks, i.e. areas of potential reporting risks where there are no adequate management controls to mitigate potential reporting risks* *Areas where data accuracy, completeness and consistency could be improved are highlighted.*

Periodic Verification Checklist Table 3: Detailed audit testing of residual risk areas and random testing		
Areas of residual risks	**Additional verification testing performed**	**Conclusions and Areas Requiring Improvement (including *FARs*)**
List of residual areas of risks of Periodic Verification Checklist Table 2 where detailed audit testing is necessary. *In addition, other material areas may be selected for detailed audit testing.*	*The additional verification testing performed is described. Testing may include:* ▪ *Sample cross checking of manual transfers of data* ▪ *Recalculation* ▪ *Spreadsheet 'walk throughs' to check links and equations* ▪ *Inspection of calibration and maintenance records for key equipment* ▪ *Check sampling analysis results* *Discussions with process engineers who have detailed knowledge of process uncertainty/error bands.*	*Having investigated the residual risks, the conclusions are noted here. Errors and uncertainties are highlighted.*

Figure 1 Verification Protocol Tables

2.1 Review of Documents

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 as annex 2 to this report.

2.2 Follow-up Interviews

On September 27th, 2007, TÜV SÜD performed interviews with project stakeholders to confirm selected information and to resolve issues identified in the initial and first Verification and document review. Representatives of Consorcio Santa Marta S.A. and DEUMAN were interviewed. The main topics of the interviews are summarized in Table 1. As informed in the audit DEUMAN was the consultant and the monitoring activities were performed by Consocrio Santa Marta S.A.

Table 1 Interview topics

Interviewed organization	Interview topics
Consorcio Santa Marta S.A.	➢ Monitoring Report, Version 1 ➢ Operating Procedures and Criteria. ➢ Reporting procedures ➢ Responsibilities. ➢ Qualifications and trainings. ➢ Equipment Installation Dates. ➢ Project Boundaries. ➢ Monitoring Plan. ➢ Quality Assurance and Quality Control. ➢ Quality Management ➢ Monitored data. ➢ Data uncertainty and residual risks. ➢ GHG calculation. ➢ Data archiving, special events. ➢ Compliance with national laws and regulations. ➢ Checking of Systems
DEUMAN (consultant)	➢ Baseline and Monitoring calculation ➢ Efficiency Determination of the combustion on the flare ➢ Data Uncertainty. ➢ Monitored Data. ➢ Calibration certificates

2.3 Resolution of Corrective and Forward Action Requests

The objective of this phase of the verification was to resolve the requests for corrective actions and any other outstanding issues which needed to be clarified for TÜV SÜD`s positive conclusion on the GHG emission reduction calculation. Most of the Corrective Action Requests, raised by TÜV SÜD were solved during communication between the client and TÜV SÜD. Forward Action Requests are indicated issues which do not affect the generation of emission reduction in the verified period, but shall be improved in order to ensure the reliability of future data. To guarantee the transparency of the verification process, the concerns raised and responses that have been given are summarized in chapter 3 below and documented in more detail in the verification protocol in annex 1.

3 VERIFICATION FINDINGS

In the following sections the findings of the verification are stated. The verification findings for each verification subject are presented as follows:

The findings from the desk review of the final monitoring report and the findings from interviews during the follow up visit are summarized. A more detailed record of these findings can be found in the Verification Protocol in annex 1.

1) Where TÜV SÜD had identified issues that needed clarification or that represented a risk to the fulfillment of the project objectives, a Clarification (CR), Corrective (CAR) or Forward Action (FAR) Request, respectively, have been issued. The Corrective and Forward Action Requests are stated, where applicable, in the following sections and are further documented in the Verification Protocol in annex 1. The verification of the project resulted in one Corrective Action Request and one Forward Action Requests.
2) Where Corrective Action Requests have been issued, the exchanges between the Client and TÜV SÜD to resolve these Corrective Action Requests are summarized.
3) In the context of Forward Action Requests, risks have been identified, which may endanger the delivery of high quality CER´s in the future, i.e. by deviations from standard procedures as defined by the MP. As a consequence, such aspects should receive a special focus during the next consecutive verification. A FAR may originate from lack of data sustaining claimed emission reductions. Forward Action Requests are understood as recommendation for future project monitoring; they are stated, where applicable, in the following sections and are further documented in the Verification Protocol in annex 1.
4) The final conclusions for verification subject are presented.

The verification findings relate to the project implementation as documented and described in the final monitoring report.

Initial Verification Findings

3.1 Remaining issues, CLs, CARs, FARs from previous validation

3.1.1 Discussion

In addition the monitoring plan submitted by the PDD of the registered project, the validator considered all Corrective Action Requests and Clarification Requests of the validation process are closed.

3.1.2 Findings

None

3.1.3 Conclusion

The project complies with the requirements.

3.2 Project Implementation

3.2.1 Discussion

Equipment of this project activity actually is installed as described on the PDD.

LFG flow, temperature and pressure measurements are collected electronically (PLC). Wells, piping, blowers, flares are installed as described in the PDD. Blowers, flares, chillers and pumps include operative time counting devices (evidenced on site), allowing demonstration of equipment installation date with appropriate accuracy. A list of all equipment was handed over including copies of all dates of operation start, supported by transfer documentation for each equipment from the provider to the client.

The project activity imports energy from the grid, which is considered as project emissions for ER calculations. This has already been indicated in the PDD and the validation report and now has been proved by inspecting the type and operating mode of the project.

The flares (3 units) contain a self-ignition equipment and safety valves in order to avoid any unintended methane emissions (electronically controlled).

Evidences from on site monitoring spreadsheets according to PDD dates were shown.

The MR provides a list of all parameter to be monitored either by accounting input data or by using technical metering by equipment. The list is in line with the monitoring plan provided by the PDD of the registered project and already evaluated during the validation process. All required equipment and procedures are implemented in an appropriate manner using state of the art technology or reference to standardized analysis procedures. A comprehensive list was issued to the audit team providing integrated information of metered parameter on type of equipment, accuracy, physical or chemical principles and calibration requirements.

Operation data and records of gas analyses are kept in electronic and paper format by Consocio Santa Marta S.A.

The CDM project team leaded by the Technical Director and also by the Quality Assessment Team of the landfill is responsible to consolidate all data required for emission reduction calculations. Calculations are done by the use of Excel spreadsheets using specific procedures shown to the audit team to avoid risk of data management as commented by the project proponent as scrutinized in the on-site audit.

On basis of daily consolidated data the CDM team, is responsible to provide data to the management level in order to prepare the Monitoring Report.

There are 2 negative values regarding the net total CO_{2eq} use for the calculation of CERs in table D.4 of the MR (see 20.03.2007and 3.04.2007). The Environmental Clarification Resolution No. 509/05 describes a quantity of biogas that the landfill should destroy in the baseline. The baseline has been calculated in a daily basis and the days were the real destruction of biogas was lower as the one requested by Chilean law, therefore a negative value is given in the Monitoring Report.

3.2.2 Findings

An automatic data acquisition system has been implemented. Data of LFG flow is taken by a flow meter and also temperature and pressure are taken to convert the LFG flow into Normalized flow. This information is transferred automatically to a backup data logger located at the Control facilities using PLC's. A procedure is developed to perform this activity. Nevertheless it's

necessary to improve the procedure for data transferring to the excel sheets (automatic routine) to avoid any kind of errors during the data transferring. The person in charge to prepare the Monitoring Report should take in account the quality of calculations, making a revision before sending this document to the DOE.

Forward Action Request No. 1
The Monitoring Report should be checked under internal procedures before sending it to the audit team using the new improved procedure to take data from the monitoring devices to reduce data transferring errors or misused data.

Corrective Action Request No.1.
Project proponent should provide physical evidence from the trainings from the CDM Monitoring team even though they appear on the MR.

3.2.3 Conclusion

The project proponent should take in account the requested information especially the related to the good management of data collected as defined on the PDD (quality control of data transferring). This was scrutinized solved during audit activities. On the other hand and to avoid risk of data management, the procedures should be improved and training was applied as indicated on the evidences submitted to the audit team.

3.3 Internal and External data

3.3.1 Discussion

The following internal parameters need to be obtained according to the monitoring plan of the registered final PDD:

Biogas flow

Normalized flow of Biogas sent to flare

Temperature of the Biogas

Pressure of the Biogas

Percent of Methane in the biogas

Total amount of electricity imported

Methane accumulated

External data used for this project activity are public default data or validated data, which are therefore constant.

Emission Factor of the Grid

Global Warming Potential of Methane

Methane Density

Baseline CH4 methane sent flare

The implemented monitoring system is completely covering all these parameter.

No reporting risk could be identified with respect to the use of external data. As project owner indicates that the flare was manufactured in Chile, under the expertise of the provider more information should be included, to reduce risk of CER's loss.

For this 1st Verification Consorcio Santa Marta S.A. has only one third party involved which is a specialized company on gas analysis: As the analysis of methane concentration in the exhaust gas, for the calculations of flare efficiency, is made periodically, Consocrcio Santa Marta S.A. hired GASVALPO, a national and accredited laboratory to develop this analysis.

3.3.2 Findings

Clarification Request No. 1

The MR includes the parameter of Biogas flared. Please clarify if this corresponds to the gas sent to the Flares or is the fraction in the exhaust emissions.

Corrective Action Request No.3.

No emission factor of the Grid appears on the MR as stated on the PDD for imported electricity calculations.

Corrective Action Request No.4.

A risk was identified as the Flare provider defines their devices values with a function with low flare temperature (near 500°C). Project proponent must include more information of how the CH4 fraction in the exhaust gases will be reduced totally.

3.3.3 Conclusion

The project complies with the requirements. CR No. 1 was solved during the verification activities and the gas corresponds to them sent to the flares. On the other hand CAR No. 2, a default value of 1 for the Grid emission factor has been taken into account for calculations as a conservative value as stated in the PDD as ex-ante value. Evidences regarding the complete combustion of the gases have been submitted.

3.4 Environmental and Social Indicators

3.4.1 Discussion

All environmental conditions are fulfilled by the project. This issue should be evidenced and included on the Monitoring Report although it is not part of the CDM project.

3.4.2 Findings

Regarding the above mentioned issues the following comments are obtained by the audit team:

Clarification Request No. 2

Evidence of Environmental measures applied should be provided to the audit team.

Clarification Request No. 3

Calibration certificates for all monitoring devices, with date issuance and valid period should be provided to the audit team as indicated on the procedure P-MB-006.

3.4.3 Conclusion

The project complies with the requirements. Since the Consorcio Santa Marta S.A. operation worked normally no negative externalities were identified on the present audit. Moreover environmental measures were shown to the audit team. And regarding CR3, the procedure for calibration, evidence was submitted to the audit team.

3.5 Management and Operational System

3.5.1 Discussion

At the on-site audit, CDM documents related to the project activities are still under development and some evidence was shown (procedures).

3.5.2 Findings

Procedures for CDM activities within the project were shown to the audit team. Some of them are under improvement.

Monitoring Report contain the information related to the monitoring methodology and parameters and equations required to the emission reduction calculations according to methodology included on the PDD.

3.5.3 Conclusion

The project complies with the requirements. Internal audits and management review should be part of future operating management systems.

Periodic Verification Findings

3.6 Completeness of Monitoring

3.6.1 Discussion

The monitoring plan applied does comply with the methodology. In the on site audit a spot check of data was performed and the findings indicates a good quality control of the data transferred.

The submitted monitoring report forming the base of this verification was mainly done by the same routine summarizing consolidated daily data over the whole monitoring period.

A change in the Monitoring Report is needed due to a better data transparency as seen on the audit on site.

3.6.2 Findings

Corrective Action Request No.5.

Raw data should include the hour when data cut acquisition takes place.

Clarification Request No. 4:

The monitoring report refers in Section D.5 to B.2. This statement is not in line with the MR. This should be clarify.

Corrective Action Request No.6.

Data in the Monitoring Report should be revised and changed in a new version of this document.

3.6.3 Conclusion

The project complies with the requirements. Above described CAR's and CR's were solved in a new version of the Monitoring Report (version 2).

3.7 Accuracy of Emission Reduction Calculations

3.7.1 Discussion

Algorithms from applied Methodologies were used correctly. One or more standard procedures for CDM activities within the project will allow more efficiency in the verification process, since systemic and errors will be controlled.

Daily measurement data for the complete monitoring period are part of the monitoring report. These data were assessed in detail and several times during the verification process. With re-

spect to accuracy specifically, corrections included a statistical tool in order to calculate total error adequately were made by the client to the monitoring report (clearly defined on it).

3.7.2 Findings

As stated in CAR4, additional information about the low temperature flare was requested.

3.7.3 Conclusion

The project complies with the requirements. The developed procedures would enhance the accuracy of ER calculations avoiding uncertainties.

3.8 Quality of Evidence to Determine Emission Reductions

3.8.1 Discussion

Emission reductions of this project activity are composed of destroyed landfill methane at this stage, at three flares. State of the art technology is used for each of those components.

As informed by the provider and also by the evidences submitted, flares are equipped with newest technology for flare monitoring and mechanisms to avoid uncontrolled methane emissions into the atmosphere.

Landfill gas measuring units deliver normalized methane flow data electronically.

Gas analyzing system, which allows defining methane content in landfill gas, is online, with regular calibrations, ensuring data quality.

Uncertainty is well defined and considered when calculating Emission Reductions. In order to obtain the total system error, the sum of the square single errors under quadratic root is calculated. Calibrations and testing certificates for all equipment involved were shown to the audit team. Also in the on site visit it was possible to have an overview of calibration requirements for different equipment (i.e. calibration schedule).

3.8.2 Findings

Data reported from the facility are finally validated internally, and the Monitoring Report for the project activity was developed by Mrs. Andrea Viglino, from Santa Marta Landfill. Nonetheless a signature of the MR should be provided to assure origin and responsibilities.

Corrective Action Request No.7.

A signature should be included in the new version of the Monitoring Report and coming ones

Corrective Action Request No. 8

Error of devices should be included in the calculation of CER's

3.8.3 Conclusion

The project complies with the requirements. CAR7 and CAR8 were solved during this verification process as stated on the MR ver 2 submitted to the audit team.

3.9 Management System and Quality Assurance

3.9.1 Discussion

As exposed in above sections, potential for enhancement of quality assurance is evident. This potential is for related data quality, also for a system of data management. Implementing operational procedures, i.e. including document control, monitoring report preparation, working instructions, emergencies and data spreadsheets for data transfer will not only result in an enhanced management system and quality assurance but also in easier verification processes in the context of this project activity. Consorcio Santa Marta S.A. developed many procedures, which are accordingly to the data management and monitoring plan as described on the PDD, to reduce and assure any risk in the data collection activity.

3.9.2 Findings

The system provides data security due many lines of software firewalls, which are included on the project design. Only defined persons could access to the data bases of the system.

Forward Action Request No. 2

New procedures should be informed during this audit or, on the next on site audit, evidence should be shown.

Forward Action Request No. 3

In the new revision of the Monitoring Report (actual period), and in the next one, the names of the person in charge of the Data system, and the person who has access to external values should be informed.

3.9.3 Conclusion

The project complies with the requirements. FARs should be verified on the next audit activity.

4 PROJECT SCORECARD

The conclusions on this scorecard are based on the revised monitoring report.

Risk Areas		Conclusions			Summary of findings and comments
		Baseline Emissions	Project Emissions	Emission Reductions	
Completeness	Source coverage/ boundary definition	✓	✓	✓	All relevant sources are covered by the monitoring plan and the boundaries of the project are defined correctly and transparently.
Accuracy	Physical Measurement and Analysis	✓	✓	✓	State-of-the-art technology is applied in an appropriate manner.
	Data calculations	✓	✓	✓	Emission reductions are calculated correctly having resolved CARs. A systemic approach for CDM related activities is highly recommendable.
	Data management & reporting	✓	✓	✓	An eligible data management system is in place. Potential for improvement is indicated by the stated FARs and Open Issues.
Consistency	Changes in the project	✓	✓	✓	Results are consistent to underlying raw data.

5 VERIFICATION STATEMENT

TÜV SÜD Industrie Service GmbH has performed a verification of the registered CDM project: "Santa Marta Landfill Gas (LFG) Capture Project" in Chile. The verification is based on requirements of the UN Framework Convention on Climate Change (UNFCCC). In this context, the relevant documents are the "Marrakech Accords".

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The verifier can confirm that the GHG emission reduction is calculated without misstatements for the whole monitoring period.

Our opinion relates to the project's GHG emissions and resulting GHG emissions reductions reported and related to the valid and registered project baseline and monitoring, and its associated documents.

Based on the information we have seen and evaluated, we confirm the following statement:

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Munich, 18.03.2008

Werner Betzenbichler

Deputy Head of the Certification Body "Climate and Energy"

Munich, 18.03.2008

Javier Castro

Project Manager

Annex 1: Verification Protocol

INITIAL VERIFICATION CHECKLIST

OBJECTIVE	Ref.	COMMENTS	Concl.(incl FARs/CARs)
1. Opening Session			
1.1. Introduction to audits	Onsite Activities 27/09/2007	Document Review was performed before onsite visit by the audit team composed by: Mr. Victor Abarca TUV GHG Auditor Document review consisted on crosschecking of the PDD, validation protocol and other related documents. Onsite audit was performed in Santa Marta facility in which the initial verification and first periodic verification was developed in September 27, 2007 respectively, with the participation of following representatives of Santa Marta Landfill and DEUMAN (consultant): Mr. Richard Oyarce – Director Santa Marta Landfill Mrs. Andrea Viglino – QAT Santa Marta Landfill. Mr. Oscar Elliot – LFG Plant Manager Santa Marta Landfill Mr. Felipe Ortega – IT Manager Santa Marta Landfill Mr. Pedro Rivas – DRST Santa Marta Landfill Mr. Rodrigo Valenzuela – CDM Consultant DEUMAN	☑

OBJECTIVE	Ref.	COMMENTS	Concl.(incl FARs/CARs)
1.2. Clarification on open access		The team had open access to all required documents which are listed in Annex 2.	☑
1.3. Involvement of other project participants		The project participants are as stated in the PDD. No change has been made.	☑
2. Open issues indicated in validation report			
2.1. Registration	DR, 1, 2	The project has the registration number 0799 dated on March 11th, 2007	☑
2.2. Open issue forwarded to the verification process	DR, 1 ,2	No open issues are forwarded to the validation process.	☑
3. Implementation of the project			
3.1. Physical components	Onsite Visit	All physical components were visited in the on site audit. The project activity is operating as described in the PDD. Following Instalations and equipment were visited: • Offices • Flares (3) • Piping system (LFG collection system) • Monitoring devices • PLC units • IT Controls In general all the described equipment as stated on the PDD is working properly on the facility.	☑

OBJECTIVE	Ref.	COMMENTS	Concl.(incl FARs/CARs)
3.2. Project boundaries	DR, 1, 2, Onsite Visit	As stated on the PDD and the Validation protocol, the boundaries are clearly defined. This was confirmed during the on-site audit.	☑
3.3. Monitoring and metering systems	On Site Visit, Annex 1	A list with relevant equipment and metering units was shown to the audit team, which was complete.	☑
3.4. Data uncertainty	DR,	Santa Marta has a Data Management procedure (P-MB-001), to avoid risk of misuse of data management and it will include conservative rules for the management of uncertainty. Evidence was shown to the audit team.	☑
3.5. Calibration and quality assurance	DR,	Calibration certificates of all the equipment were shown to the audit team. Copy of them were given in the on site audit.	☑
3.6. Data acquisition and data processing systems		An automatic data acquisition system has been implemented. Data of LFG flow is taken by a flow meter and also temperature and pressure are taken to convert the LFG flow into Normalized flow. This information is transferred automatically to a backup data logger located at the Control facilities using PLC's. A procedure is developed to perform this activity. Nevertheless it's necessary to improve the procedure for data transferring to the excel sheets (automatic routine) to avoid any kind of human intervention during the data transferring. The person in charge to prepare the Monitoring Report should take into account the quality of calculations and make a revision before sending this document to the DOE.	~~**FAR 1**~~ ☑

OBJECTIVE	Ref.	COMMENTS	Concl.(incl FARs/CARs)
		Forward Action Request No. 1 The Monitoring Report should be checked under internal procedures before sending it to the audit team using the new improved procedure to take data from the monitoring devices to reduce data transferring errors or misused data.	
3.7. Reporting procedures	DR,	A procedure to take data was shown to the audit team. But it should be improved. **See FAR 1.**	~~**See FAR 1**~~ ☑
3.8. Documented instructions	DR, Onsite Visit, Annex 2	Documented instructions (procedures) will be part of the internal management system documentation. Procedures were presented in the on site audit. A list of documents was included on Annex 2.	☑
3.9. Qualification and training		Required qualifications of personnel involved in this CDM project activity is well defined and documented as part of the certified management system. Several training registries were shown to the audit team on the validation process, demonstrating that training events are performed and well documented as part of the management system. Any other document of new trainings should be shown to the audit team on the first periodic verification if they are performed. On the other hand, the audit team had the impression that the personnel involved is well prepared to face all technical aspects of the operation. **Corrective Action Request No.1.** Project proponent should provide physical evidence from the trainings from	~~**CAR 1**~~ ☑

OBJECTIVE	Ref.	COMMENTS	Concl.(incl FARs/CARs)
		the CDM Monitoring team even though they appear on the MR	
3.10. Responsibilities	DR, On site audit	Responsibilities are well defined. Operation Manager Diagram was shown, but is not included on the P-MB-001 Ver 3 procedure. **See FAR 1** **Corrective Action Request No.2.** An organizational chart should be included on the above mentioned procedure.	~~**See FAR 1**~~ ~~**CARI 2**~~ ☑
3.11. Troubleshooting procedures	On-site Visit	A procedure was developed in case of data loss or devices failure. In case of energy blackouts there is an UPS that maintain data acquisition and a generator. The system itself has alarms in case of failure of the data collection system. Moreover, the software for data collection indicates clearly when a problem appears, and in this event it will be reported and recorded on the logger, including time and description of the problem.	☑
4. Internal Data			
4.1. Type and sources of internal data	Onsite Visit	Internal data are: **Biogas flow,** will be measured by a turbine flow meter which need the measures from temperature and pressure to give normalized measures (as visited during the on site visit). **Normalized flow of Biogas sent to flare**, which is calculated using the Temperature and pressure devices and also the Biogas flow **Temperature of the Biogas:** This will be measured by a calibrated device (evidence provided) and will be checked during next verifications.	~~**CR 1**~~ ☑

OBJECTIVE	Ref.	COMMENTS	Concl.(incl FARs/CARs)
		Pressure of the Biogas: This will be measured by a calibrated device (evidence provided) and will be checked during next verifications. **Percent of Methane in the biogas**, which will be measured by a calibrated Gas Analyzer. **Total amount of electricity imported,** which must be measured by a calibrated electricity meter. **Methane accumulated**, measured in Tons, which is calculated which are working under hart environmental conditions. **<u>Clarification Request No. 1</u>** The MR includes the parameter of Biogas flared. Please clarify if this corresponds to the gas sent to the Flares or is the fraction in the exhaust emissions	
4.2. Data collection	Onsite Visit,	Under normal operating conditions, all data will be collected and stored automatically on a logger. Software provided by the control panel records this data under MSD routines files avoiding risk of data deletion as informed by the IT manager. The data cannot be erased.	☑
4.3. Quality assurance	Onsite visit	Quality assurance of internal data will be part of the internal management system. All Documents are written and other should be performed and included. Since normal operating conditions all data are managed automatically until the calculated emission reductions, the risk due to data management is considered to be low.	~~**FAR 2**~~ ☑

OBJECTIVE	Ref.	COMMENTS	Concl.(incl FARs/CARs)
		Forward Action Request No. 2 New procedures should be informed during this audit or, on the next on site audit, evidence should be shown.	
4.4. Significance and reporting risks	Onsite Visit	Data significance and reporting risk should be improved. **See FAR 1**	~~**See FAR 1**~~ ☑
5. External Data			
5.1. Type and sources of external data		External data are: **Emission Factor of the Grid**, value indicated on in the PDD. **Global Warming Potential of Methane,** indicated in the PDD which value is 21. **Methane Density:** indicated on the PDD. **Base line CH_4 methane sent Flare (50%):** under environmental requirements. **Corrective Action Request No.3.** No Emission factor of the Grid appears on the MR as stated on the PDD for imported electricity calculations	~~**CAR2**~~ ☑
5.2. Access to external data		External data used for this project activity are public default data or validated data, which are therefore constant.	☑
5.3. Quality assurance	NA	NA, because they are default data.	☑

OBJECTIVE	Ref.	COMMENTS	Concl.(incl FARs/CARs)
5.4. Significance and reporting risks	NA	No reporting risk could be identified with respect to the use of external data. As project owner indicates that the flare was manufactured under the expertise of the provider more information should be included, to reduce risk of CER's loss. **Corrective Action Request No.4.** Nonetheless a risk could be identified as the Flare provider defines their devices values, which could generate a problem, due to the low temperature of the Flare (near 500°C). Project proponent must include more information of how the CH4 fraction in the exhaust gases will be reduced totally.	~~CAR3~~ ☑
6. Environmental and Social Indicators			
6.1. Implementation of measures	DR,	All environmental conditions are fulfilled by the project. And all this should be evidenced, and included on the Monitoring Report, but are not part of the CDM project. **Clarification Request No. 2** Evidence of Environmental measures applied should be provided to the audit team.	~~CR2~~ ☑
6.2. Monitoring equipment	DR,	All equipment must have a calibration certificate. **Clarification Request No. 3** Calibration certificates for all monitoring devices, with date issuance and	~~CR3~~ ☑

OBJECTIVE	Ref.	COMMENTS	Concl.(incl FARs/CARs)
		period should be provided to the audit team as indicated on the procedure P-MB-006	
6.3. Quality assurance procedures		Data will be checked under the existing procedures to avoid risk of data misuse.	☑
6.4. External data		In case of use of an external laboratory it will use its own calibration procedures validated by a national accreditation entity. Data of isocinetic (not required for the CDM project) should be included every time when is required by local law)	☑
7. Management and Operational System			
7.1. Documentation	Onsite Visit,	At the on site audit, CDM documents related to the project activities are still under development and some evidence was shown (procedures).	☑
7.2. Qualification and training	Onsite Visit	Certifications, qualification and training should be well described and documented. As commented by the project proponent, trainings were performed, and evidences were shown on the audit team and should be submitted to the audit team	☑
7.3. Allocation of responsibilities	Onsite Visit	As stated on the PDD, the allocation of responsibilities was clearly described. As commented by the project proponent, a procedure which defines the responsibilities of each member of the team regarding CDM activities should be developed.	☑
7.4. Emergency procedures	Onsite Visit	Emergency procedures are developed (P-MB-005 & P-MB-004).	☑
7.5. Data archiving	Onsite Visit	Data archiving has procedures for performing this activities. Nevertheless the	~~**See FAR 1**~~

OBJECTIVE	Ref.	COMMENTS	Concl.(incl FARs/CARs)
		Monitoring Report should be developed under this procedure to avoid risk of data lost. **See Forward Action Request No. 1**	☑
7.6. Monitoring report	Onsite Visit	Monitoring Report contain the information related to the monitoring methodology and parameters and equations required to the emission reduction calculations according to methodology included on the PDD.	☑
7.7. Internal audits and management review	Onsite Visit	Internal audits and management review should be part of future operating management systems.	☑

PERIODIC VERIFICATION CHECKLIST

Table 1: Data Management System/Controls

The project operator's data management system/controls are assessed to identify reporting risks and to assess the data management system's/control's ability to mitigate reporting risks. The GHG data management system/controls are assessed against the expectations detailed in the table. A score is assigned as follows:

- Full - all best-practice expectations are implemented.
- Partial - a proportion of the best practice expectations is implemented
- Limited - this should be given if little or none of the system component is in place.

Expectations for GHG data management system/controls	Score	Verifiers Comments (including *Forward Action Requests*)
1. Defined organisational structure, responsibilities and competencies		
1.1. Position and roles *Position and role of each person in the GHG data management process is clearly defined and implemented, from raw data generation to submission of the final data. Accountability of senior management must also be demonstrated.*	Partial	Responsibilities are well defined. Organizational Chart should be developed.
1.2. Responsibilities *Specific monitoring and reporting tasks and responsibilities are included in job descriptions or special instructions for employees.*	Partial	**See FAR 1**.

Expectations for GHG data management system/controls	Score	Verifiers Comments (including *Forward Action Requests*)
1.3. *Competencies needed* *Competencies needed for each aspect of the GHG determination process are analysed. Personnel competencies are assessed and training programme implemented as required.*	Partial	The competencies for each aspect of the GHG determination process have been thoroughly checked. Experience and training program of Santa Marta employees guarantee a high level of competence. Nonetheless Trainings certificates should be submitted to the audit team.
2. Conformance with monitoring plan		
2.1. Reporting procedures *Reporting procedures should reflect the monitoring plan content. Where deviations from the monitoring plan occur, the impact of this on the data is estimated and the reasons justified.*	Partial	The monitoring plan applied does comply with the methodology. In the on site audit a spot check of data was performed and the findings indicates a good quality control of the data transferred. **Corrective Action Request No.5.** Raw data should include the hour when data cut acquisition takes place **Clarification Request No. 4:** The monitoring report refers in Section D.5 to B.2. This statement is not in line with the MR. This should be clarify.
2.2. Necessary Changes *Necessary changes to the monitoring plan are identified and changes are integrated in local procedures as necessary.*	Partial	A change in the Monitoring Report is needed due to a better data acquisitions and quality of them as seen on the audit on site. **See CAR 2**

Expectations for GHG data management system/controls	Score	Verifiers Comments (including *Forward Action Requests*)
		Corrective Action Request No.6. Data in the Monitoring Report should be revised and changed in a new version of this document.
3. Application of GHG determination methods		
3.1. Methods used *There are documented description of the methods used to determine GHG emissions and justification for the chosen methods. If applicable, procedures for capturing emissions from non-routine or exceptional events are in place and implemented.*	Full	The method to determine GHG emissions is fully documented. A procedure was shown to the audit team.
3.2. Information/process flow *An information/process flow diagram, describing the entire process from raw data to reported totals is developed.*	Full	Details of the information flow should be informed by project proponent, which avoid the risk of data transferring. Nonetheless as informed by the project proponent, a routine is applied each time when data is collected from the PC, to perform the Monitoring Report stated on a Procedure.
3.3. Data transfer *Where data is transferred between or within systems/spreadsheets, the method of transfer (automatic/manual) is highlighted - automatic links/updates are implemented where possible. All assumptions and the references to original data sources are documented.*	Full	The data transfer process consists of a procedure from the data collection system to an excel file/pdf file. All data sources are clearly referenced.
3.4. Data trails	Partial	All documents with the raw data are available and all primary data which were retrieved on a random basis could be

Expectations for GHG data management system/controls	Score	Verifiers Comments (including *Forward Action Requests*)
Requirements for documented data trails are defined and implemented and all documentation are physically available.		confirmed.
4. Identification and maintenance of key process parameters		
4.1. Identification of key parameters *The key physical process parameters that are critical for the determination of GHG emissions (e.g. meters, sampling methods) are identified.*	Full	Yes, all key parameters are identified. (Section B of the Monitoring report).
4.2. Calibration/maintenance *Appropriate calibration/maintenance requirements are determined.*	Partial	Yes, all calibration/maintenance requirements are met. See section B.1 of the M.R. Nonetheless calibration certificates should be submitted to the Audit team
5. GHG Calculations		
5.1. Use of estimates and default data *Where estimates or default data are used, these are validated and periodically evaluated to ensure their ongoing appropriateness and accuracy, particularly following changes to circumstances, equipment etc. The validation and periodic evaluation of this is documented.*	Full	Following data are default values: • GWP • Methane Baseline destruction (50%) • Grid emission factor • Methane density
5.2. Guidance on checks and reviews *Guidance is provided on when, where and how checks and reviews are to be carried out, and what evidence needs to be documented. This includes spot checks by a second person not*	Partial	For a better performance of data collection, Santa Marta will perform Internal audits, to reduce any kind of error in the manual data transferring to excel sheets calculations, all aiming to reduce data management risk. Monitoring Devices

Expectations for GHG data management system/controls	Score	Verifiers Comments (including *Forward Action Requests*)
performing the calculations over manual data transfers, changes in assumptions and the overall reliability of the calculation processes.		Errors were not considered. Also on the spot check the methane calculation in some period of time was 0. The project proponent to avoid the loss of emission reduction considers an average of historical data to complete the missing data. For the audit team this could be not occur. **Corrective Action Request No.7.** A signature should be included in the new version of the Monitoring Report and coming ones. **Clarification Request No. 5** Project proponent should explain the reason to consider an average value of methane on the Monitoring Report and why they claim non existing values or monitored values.
5.3. Internal verification *Internal verifications include the GHG data management systems, to ensure consistent application of calculation methods.*	Partial	As mentioned above a periodic review of the calculations were performed every time when data is transferred to an excel sheet. Equations are clearly defined as stated on the methodology and the PDD. As indicated above internal audits will be performed to assure data quality. **See Corrective Action Request No.6**
5.4. Internal validation *Data reported from internal departments should be validated visibly (by signature or electronically) by an employee who is*	Partial	Data reported from the facility are finally validated internally and the Monitoring Report for the project activity was developed by Mrs. Andrea Viglino, from Santa Marta Landfill. Nonetheless a signature of the MR should be provided to

Expectations for GHG data management system/controls	Score	Verifiers Comments (including *Forward Action Requests*)
able to assess the accuracy and completeness of the data. Supporting information on the data limitations, problems should also be included in the data trail.		assure origin and responsibilities. **Corrective Action Request No.8.** Error of devices should be included in the calculation of CER's
5.5. Data protection measures *Data protection measures for databases/spreadsheets should be in place (access restrictions and editor rights).*	Partial	The system provides data security due many lines of software firewalls, which are included on the project design. Only defined persons could access to the data bases of the system. **Forward Action Request No. 3** In the new revision of the Monitoring Report (actual period), and in the next one, the names of the person in charge of the Data system, and the person who has access to external values should be informed.
5.6. IT systems *IT systems used for GHG monitoring and reporting should be tested and documented.*	Full	All the Information is reported directly to the managers and consolidated directly in the Headquarters on Santa Marta Transfer Station. Backup were generated periodically with all the information collected accumulated on it. Nonetheless is a duty from the project proponent the constant improvement of this issue, to reduce risk of data loss. A procedure was performed to avoid this.

Table 2: GHG calculation procedures and management control testing

Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks
Based on an assessment of the emission calculation procedures potential reporting risks are: • Technical failures in metering devices not being realized by the operation team. • Human failures in reporting exceptional events. • Human errors in reporting data included in the Software provided by the system. •	• Technical failures could be appear during energy blackouts in the future. But this issue is controlled due to the installation of an diesel generator and UPS. • Human failures are regarding to reporting procedures which are checked internally. • Human errors by manipulation of data obtained by the collection software could not be performed due to security process which avoids risk of inner collected data management.	• Record of manually data collection appears as the major risk only in case of failure of measurement devices. • Wrong operation of the Software could be performed by a non capable operator or media failure. • Wrong data for emissions reductions calculations using wrong data transferred.

Table 3: Detailed audit testing of residual risk areas and random testing

Areas of residual risks	Additional verification testing performed	Conclusions and Areas Requiring Improvement
• Record of manually data collection appears as the major risk only in case of failure of measurement devices.	Every data transferring should be verified by a second part as part of a quality control check. Those errors are more controlled since the data is transferred directly from the software to an excel sheet.	Errors are being controlled, due to a direct and controlled transferring of data. Risk is reduced, but not impossible. See FAR 1.
• Wrong operation of the Software could be performed by a non capable operator or media failure.	Workers skill preparation on the system software will be a solution to avoid risk in the data collection.	A list of worker skill training should be evidenced, to certify the quality of collected data. See OI 1 .
• Wrong data for emissions reductions calculations using wrong data transferred.	Data should be confirmed every time when they are transferred to an excel sheet.	A procedure for data collection is performed to avoid any risk of error.

Table 4: Compilation of open issues from Initial verification and periodic verification checklists

Corrective and Forward Action Requests by audit team	Summary of project owner response	Audit team conclusion
Corrective Action Request No. 1 Project proponent should provide physical evidence from the trainings from the CDM Monitoring team even though they appear on the MR	Physical evidence from the trainings from the CDM Monitoring team was provided to the audit team. *See file "capacitacion"*	Ok. CAR closed. Evidence was provided to the audit team
Corrective Action Request No. 2 An organizational chart should be included on the above mentioned procedure.	An organizational chart and job description for the monitoring plan is attached as an Annex to the Monitoring Report (Version 2, October 29, 2007).	Ok, CAR closed.
Corrective Action Request No. 3 No Emission factor of the Grid appears on the MR as stated on the PDD for imported electricity calculations	The emission factor of Chilean grid will be taken as 1 tCO_2/MWh as stated in section D 2.2.2 of the PDD.	Ok. CAR closed. The value 1 is stated on the PDD, and this was considered as a conservative value for calculations.
Corrective Action Request No. 4 A risk was identified as the Flare provider defines their devices values with a function with low flare temperature (near 500°C). Project proponent must include more information of how the CH4 fraction in the exhaust gases will be reduced totally.	Attached the result of the measurement performed on the torch burners, which indicates the burning temperature. *See file "Medicion Isocinetica y de Gases-Octubre de 2007"*	OK. CAR closed. The temperature of 500° corres-pond's to the ex-haust gas

Corrective and Forward Action Requests by audit team	Summary of project owner response	Audit team conclusion
		temperature. The combustion temperature has an average of 967°, as stated in the report made by an independent third party (SERPRAM S.A.)
Corrective Action Request No.5 Raw data should include the hour when data cut acquisition takes place.	Effectively, for the first verification period there is a difference between the RCC and RCD files, however this was corrected and from October 24 both files cut data acquisition at the same time. Attached you will find an annex with evidence. *See file "RCC_RCD"*	Ok. CAR solved, evidence was submiteed to the audit team explaining clearly this correction.
Corrective Action Request No. 6 Data in the Monitoring Report should be revised and changed in a new version of this document.	Data in the Monitoring Report was revised and changed in the new version of this document (version 2, October 29, 2007) *See file "Monitoring_report_1verificacion_version_ 2"*	Ok. CAR solved. A new version (3) of the MR was submitted to the audit team.
Corrective Action Request No. 7	Monitoring report was amended, including the signatures	Ok. CAR solved.

Corrective and Forward Action Requests by audit team	Summary of project owner response	Audit team conclusion
A signature should be included in the new version of the Monitoring Report and coming ones.	of approval and review. (version 2, October 29, 2007)	
Corrective Action Request No. 8 Error of devices should be included in the calculation of CER's	Error of devices was included in the calculation of CER's. This information is included in the procedure for obtaining, processing and control of data monitoring plan burning biogas (P-MB-001, Version 4 of the October 24, 2007)	Ok. CAR solved.
Forward Action Request No. 1 The Monitoring Report should be checked under internal procedures before sending it to the audit team using the new improved procedure to take data from the monitoring devices to reduce data transferring errors or misused data.	An internal procedure for monitoring report preparation and quality control was prepared (Procedure for the preparation of the monitoring report, version 0, October 05, 2007). Procedures to take data from de monitoring devices have been prepared and included to internal procedures. (P-MB-001 Version 4, October 24, 2007)	Ok. FAR solved during the verification process. Evidence (as indicated) was submitted to the audit team.
Forward Action Request No. 2 New procedures should be informed during this audit or, on the next on site audit, evidence should be shown.	"Procedure for obtaining, processing and control of data monitoring plan burning biogas" (P-MB-001) and "Procedure of losses of information" (P-MB-005) were modified considering verification outputs. A procedure (P-MB-011) "Procedure for the preparation of monitoring reports" was prepared to address verification findings.	Ok FAR solved. Evidence was submitted to the audit team.

Corrective and Forward Action Requests by audit team	Summary of project owner response	Audit team conclusion
Forward Action Request No. 3 In the new revision of the Monitoring Report (actual period), and in the next one, the names of the person in charge of the Data system, and the person who has access to external values should be informed.	The names of the person in charge of the Data system, and the person who has access to external data were included in the new version of the Monitoring Report (Version 2, October 29, 2007).	Ok. This should be scrutinized on the next verification.
Clarification Request No. 1 The MR includes the parameter of Biogas flared. Please clarify if this corresponds to the gas sent to the Flares or is the fraction in the exhaust emissions	The biogas flared corresponds to the gas sent to the flares.	Ok, CR solved during audit activities.
Clarification Request No. 2: Evidence of Environmental measures applied should be provided to the audit team.	Evidence of Environmental measures applied was provided to the audit team. The annexes of a report from an independent environmental audit are enclosed, including the results of measurements performed at the exhaust gas of each biogas flare. *See files Medicion Isocinetica y de Gases-Octubre de 2007" and "Informe 52 RSSM Mayo 2007.zip" –""Anexos informe 52.zip"*	Ok, OI closed, and evidence was submitted to the audit team.
Clarification Request No. 3 Calibration certificates for all monitoring devices, with date issuance and period should be provided to the audit team as indicated on the procedure P-MB-006	Calibration certificates for all monitoring devices were provided to the audit team. Regarding "Electricity meter" calibration frequency, manufacturer's recommendation was attached. *See file "calibracion"*	Ok. CAR solved. Evidence was provided by the project proponent.

Corrective and Forward Action Requests by audit team	Summary of project owner response	Audit team conclusion
Clarification Request No. 4 The monitoring report refers in Section D.5 to B.2. This statement is not in line with the MR. This should be clarify.	This information was corrected in the new version the Monitoring Report. (Version 2, October 29, 2007).	Ok, CR solved. A new version of the MR was submitted.
Clarification Request No. 5 Project proponent should explain which is the reason t o consider an average value of methane on the Monitoring Report and why they claim non existing values or monitored values.	The only average value of methane was used to determine the baseline in terms of the ton CO_2/year. The value used (50%) is in line with resolution of environmental qualification N° 509/2005. The only non existing values included correspond to electricity consumption due to malfunction of the monitoring device. “Procedure of losses of information” (P-MB-005) was used to obtain these values (from March 11 to April 12).	Ok. CR Solved All data used for Monitoring purposes was acquired as informed by the project proponent and also checked by the audit team.

Annex 2: Information Reference List

Reference No.	Document or Type of Information
1	Document Review was performed before onsite visit by the audit team composed by: Mr. Victor Abarca TUV GHG Auditor Document review consisted on crosschecking of the PDD, validation protocol and other related documents. Onsite audit was performed in Santa Marta facility in which the initial verification and first periodic verification was developed in September 27, 2007 respectively, with the participation of following representatives of Santa Marta Landfill and DEUMAN (consultant): Mr. Richard Oyarce – Director Santa Marta Landfill Mrs. Andrea Viglino – QAT Santa Marta Landfill. Mr. Oscar Elliot – LFG Plant Manager Santa Marta Landfill Mr. Felipe Ortega – IT Manager Santa Marta Landfill Mr. Pedro Rivas – DRST Santa Marta Landfill Mr. Rodrigo Valenzuela – CDM Consultant DEUMAN
2	PDD “Santa Marta Landfill Gas (LFG) Capture Project”, ver 06, dated December 05th, 2006 registration number of the project activity 0799 on March 07th, 2007.
3	ACM0001 rev. 4 - Consolidated methodology for landfill gas project activities
4	Baseline and Monitoring Methodology ACM 0001, Rev4, dated July 28th, 2006.
5	Validation Report No. 2006-1533 performed by DNV, dated July 19th, 2006.
6	Monitoring Report ver. 01, dated September 07th, 2007.
7	Monitoring Report ver. 03, dated October 29th, 2007 and submitted to the audit team on November 06th, 2007
8	CO_2e calculations spradsheet for Monitoring activities
9	Baseline calculation spradsheet for the above mentioned Monitoring Report.
10	Spreadsheet with the determination of the efficiency, ver 02, dated July 12th, 2007
11	AAIR Environmental Report, dated Juni 29th, 2007 regarding to velocity and flow of gas to the flares.
12	Generation Data spreadsheet (KW_PQB.xls FILE)
13	PLC programming instructions (spanish) for project activities.

Reference No.	Document or Type of Information
14	GasValpo Laboratory Report of the exhaust gases of the flares.
15	Calibration report for the electricity measurement device issued by UNDERFIRE S.A. accredited entity on April 11th, 2007.
16	Calibration Certificate No. D.B. 7552, for the gas analyser issued by NOVA Analytical System Inc. dated January 4th, 2007, with an estimated new calibration June 2007.
17	Calibration Certificate issued on November 16th, 2006 by Yokogawa Corporation of America for the flowmeter No. DY200-EMBA1-2D/FS1
18	Calibration Certificates issued on November 27th, 2006 by Y.E.W. Chile Ltd. representative of Yokogawa Corporation of America in Chile for pressure transmitter No. EJA510-EAS7N-07EF/D3/FU1.
19	Calibration Certificates issued on November 27th, 2006 by Y.E.W. Chile Ltd. representative of Yokogawa Corporation of America in Chile for temperature transmitter No. YTA110-EA2DB/FU1.
20	Weekly Monitoring Reports of Biogas (22 reports) readings and issued by the project proponent.
21	Monthly Monitoring Reports of Biogas (05 reports) readings and issued by the project proponent.
22	Emission reductions report issued by the project proponent.
23	Procedures P-MB-001(Acquisition,proccesing, anda data controlling), P-MB-002(Internal audit procedure), P-MB-003 (Preventive and corrective actions and No conformity procedure), P-MB-004 (Emergency procedure in case of failure), P-MB-005 (Data Loss procedure), P-MB-006 (Calibration Procedure), P-MB-007 (Maintenance procedure), P-MB-008 (Evidence and documentation control procedure), P-MB-0010 (Efficiency determination procedure), regarding to Monitoring activities
24	Monitoring Report ver. 04, dated February 04th, 2008 and submitted to the audit team on February 05th, 2008
25	SERPRAM S.A., Report, “Medición de Gases Consorcio Santa Marta S.A.” October 2007
26	Santa Marta Landfill flaring plant, AS&D Consultores,
25	Monitoring Report ver. 05, dated March 12th, 2008 and submitted on March 12th, 2008