VALIDATION REPORT

CTRVV Central de Tratamento de Resíduos Ltda.

CTRVV Landfill Emission Reduction project

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Summary
This report summarizes the results of the validation of the project, performed on the basis of UNFCCC criteria. The validation has been performed as a desk review of the project documents presented by CTRVV Central de Tratamento de Resíduos Ltda. and a validation assessment to CTRVV Landfill emission reduction project, where staff from the company was interviewed. The Validation was performed on the basis of the UNFCCC criteria and host country criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting. Using a risk based approach; the review of the project design documentation and the subsequent follow-up interviews has provided SGS with sufficient evidence to determine the fulfilment of the stated criteria.
The emission reductions from CTRVV Landfill emission reduction project will be achieved through flaring the LFG collected.
Total estimated amount of emission reductions for the first crediting period (7 years) is 661,183 t CO_2e.
The SGS will request the registration of the CTRVV Landfill emission reduction project as a CDM project activity, once the written approval by the DNA of the participating Parties and the confirmation by the DNA of Brazil that the project assists in achieving sustainable development has been received.

Subject.:			
CDM validation			**Indexing terms**
Work carried out by			
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Technical review			
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Abbreviations

AM	Approved Methodology
CAR	Corrective Action Request
CER	Certified Emission Reduction
DNA	Designated National Authority
MP	Monitoring Plan
NIR	New Information Request
PDD	Project design Document
SGS	Société Générale de Surveillance
EF	Emission Factor

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1. Introduction

1.1 Objective

The CTRVV Central de Tratamento de Resíduos Ltda has commissioned SGS to perform the validation of the project: CTRVV Landfill emission reduction project with regard to the relevant requirements for CDM project activities. The purpose of a validation is to have an independent third party assess the project design. In particular, the project's baseline, the monitoring plan (MP) and the project's compliance with relevant UNFCCC and host country criteria are validated in order to confirm that the project design as documented is sound and reasonable and meets the stated requirements and identified criteria. Validation is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of Certified Emission Reduction (CER). UNFCCC criteria refer to the Kyoto Protocol criteria and the CDM rules and modalities and related decisions by the COP/MOP and the CDM Executive Board.

1.2 Scope

The scope of the validation is defined as an independent and objective review of the project design document, the project's baseline study and monitoring plan and other relevant documents. The information in these documents is reviewed against Kyoto Protocol requirements, UNFCCC rules and associated interpretations. SGS has employed a risk-based approach in the validation, focusing on the identification of significant risks for project implementation and the generation of CERs.

The validation 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 GHG Project Description

The purpose of the project activity is to collect landfill gas (LFG) at the Vila Velha Landfill and combust the extracted LFG over a seven years period utilizing a high efficiency enclosed flare, thereby reducing greenhouse gas (GHG) emissions and generating tons of Certified Emissions Reductions (CER).

The Vila Velha Landfill is located in the city of Vila Velha, Espírito Santo, Brazil. The Vila Velha landfill attends five cities (Guarapari, Anchieta, Iconha, Piúma and Cachoeira de Itapemirim), achieving a total of amount 500 tons of the waste per day, and is projected to receive around 4,5 million tons of waste until 2031.

The project will involve the construction of a landfill gas collection system consisting of collection pipeline, transportation pipeline, manifolds, blowering system, flaring system with a capacity of 3,500m³/h in 2007 expanding to 5,000m³ in 2031. To combust the LFG collected from the site, an enclosed flare with full process controls and instrumentation will also be constructed and operated.

The emission reductions from Vila Velha landfill will be achieved through flaring the LFG collected.

Total estimated amount of emission reductions for the first crediting period (7 years) is 661,183 t CO_2e.

Baseline Scenario:
The project baseline is total atmospheric release of the landfill gas.

With-project scenario:

Construction of a landfill gas collection system and flaring/destruction of captured landfill gas.

Leakage:
No leakage needs to be accounted in this project. However, the methodology ACM0001 requires that quantities of electricity or any other fuels required for operating the landfill gas project, including the pumping equipment for the collection system and energy required to transport heat, should be monitored.

Project Emissions:
In the project activity, electricity consumption is associated with the blower system used to draw landfill gas to the enclosed drum flare, and the total emission resulting from electricity consumption is considered in the total project emissions. Emissions from electricity consumption over the crediting period will be 463.278 tCO_2 e.

Environmental and social impacts:

No significant environmental impacts are expected due to the project activity. A system for collection and treatment of the condensate generated will be installed. The sanitary water will be properly collected and treated to comply with local environmental regulations. The carbon dioxide component of landfill gas is considered to be a natural product of the carbon cycle. In the combustion of landfill gas, carbon dioxide is additionally produced, but this is also considered to be part of the natural carbon cycle and not of anthropogenic origin. There is minimal visual impact from the flare. Other potential impacts, such as noise and vibration from the blower and flare will be limited to site.

Positive environmental impacts are expected, as decreasing of landfill gas emissions and odour and reduction of leachate accumulation.

1.4 The names and roles of the validation team members

Name	***Role***
Fabian Gonçalves – SGS Brazil	*Lead assessor*
Geisa Principe – SGS Brazil	*Lead assessor trainee*
Irma Lubrecht – SGS NL *Sanjeev Kumar – SGS IN*	*Technical reviewer*

2. Methodology

2.1 Review of CDM-PDD and additional documentation

The validation is performed primarily as a document review of the publicly available project documents. The assessment is performed by trained assessors using a validation protocol.

A site visit is usually required to verify assumptions in the baseline. Additional information can be required to complete the validation, which may be obtained from public sources or through telephone and face-to-face interviews with key stakeholders (including the project developers and Government and NGO representatives in the host country). These may be undertaken by the local SGS affiliate. The results of this local assessment are summarized in Annex 1 to this report.

2.2 Use of the validation protocol

The validation protocol used for the assessment is partly based on the templates of the IETA / World Bank Validation and Verification Manual and partly on the experience of SGS with the validation of CDM projects. It serves the following purposes:

- § it organises, details and clarifies the requirements the project is expected to meet; and
- § it documents both how a particular requirement has been validated and the result of the validation.

The validation protocol consists of several tables. The different columns in these tables are described below.

Checklist Question	***Means of verification (MoV)***	***Comment***	***Draft and/or Final Conclusion***
The various requirements are linked to checklist questions the project should meet.	*Explains how conformance with the checklist question is investigated. Examples of means of verification are document review (DR) or interview (I). N/A means not applicable.*	*The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is further used to explain the conclusions reached.*	*This is either acceptable based on evidence provided (**Y**), or a **Corrective Action Request (CAR)** due to non-compliance with the checklist question (See below). **New Information Request (NIR)** is used when the validation team has identified a need for further clarification.*

The completed validation protocol for this project is attached as Annex 2 to this report

2.3 Findings

As an outcome of the validation 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 Assessor shall raise a **New Information Request (NIR)** specifying what additional information is required.

Where a non-conformance arises the Assessor shall raise a **Corrective Action Request (CAR).** A CAR

is issued, where:

I. mistakes have been made with a direct influence on project results;

II. validation protocol requirements have not been met; or

III. there is a risk that the project would not be accepted as a CDM project or that emission reductions will not be verified.

The validation 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 or validation actors. These have no impact upon the completion of the validation or verification activity.

Corrective Action Requests and New Information Requests are raised in the draft validation protocol and detailed in a separate form (Annex 3). In this form, the Project Developer is given the opportunity to "close" outstanding CARs and respond to NIRs and Observations.

2.4 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. Determination Findings

3.1 Participation requirements

Host Party: Brazil is listed as the host Party. Brazil ratified the Kyoto Protocol on 23rd August 2002. (http://unfccc.int/files/essential_background/kyoto_protocol/application/pdf/kpstats.pdf).

At time of the validation, no Letter of Approval from the host country had been provided. The Letter of Approval will be signed when the DNA of Brazil has received and analyzed the validation report.

3.2 Baseline selection and additionality

The methodology applied to the project is the Approved Consolidated Baseline methodology ACM 0001 - "Consolidated baseline methodology for landfill gas project activities" and "Consolidated monitoring methodology for landfill gas project activities" (version 5).
ACM0001 is applicable to landfill gas capture project activities, where the baseline scenario is the partial or total atmospheric release of the gas (as verified in Vila Velha landfill, total release) and the project activities include the situation where the captured gas is flared.

Vila Velha project's boundary is the site of the project activity where the gas is captured and destroyed. It is consistent with ACM0001.
The methodology defines that project proponents should provide an ex-ante estimate of emissions reductions, by projecting the future GHG emissions of the landfill using verifiable methods.
The total methane emissions in the absence of the Vila Velha project activity were estimated based on the waste tonnage of the landfill using a United States Environmental Protection Agency (USEPA) first-order kinetic model for landfill gas.
The relevant information for the baseline analysis and additionality had been presented in the PDD.
The project demonstrated additionality discussing and presenting evidences for each condition required in ACM0001. The methodology requires the use of the "Tool for the demonstration and assessment of additionality, version 3".
The project is likely to mitigate GHG emissions by implementing a landfill gas collection system, generating less methane emissions than emitted under the baseline scenario, where the LFG is totally released to atmosphere.

The “Tool” sub-step 1a require to define alternatives scenarios available to the project participants or similar project developers that provide outputs or services comparable with the CDM project activity.

The “Tool” has options to define alternatives for the project. The project activity defined the continuation of the current situation as the only alternative for the project activity. There is no legal requirement that obligates the landfill to collect/destroy the methane.

Step 2 a: The destruction of methane via the project activity would not result in income other than that derived through CERs. The project is not financially attractive, only through registration as a CDM project. Verified that the implementation of the project require investment. The estimated financial analysis was presented.

Step 2, Investment analysis: as confirmed during validation assessment the only economic benefits are the CDM income, so the option I is applicable.

Sub-step 2b presents the costs to implement the project activity, to present the investment worksheet and a related document, NIR 4 was raised. Detailed data about the estimated investment necessary to implement the landfill project was provided (Projeto Conceitual Sistema de Captação e Queima de Biogás de Aterro Sanitário – P374/R01/V00/06, Declaração de Custos). NIR 4 was closed out.

In the Step 3, mention that the destruction of methane via the project activity would not result in income other than that derived through CERs. The project is not financially attractive, only through registration as a CDM project. The implementation of the project requires investment. Without incentives from carbon credits, the CTRVV landfill could not be implemented.

Regarding barriers that would not prevent the implementation, it was discussed some alternatives scenarios. The conclusion is the investment barrier does not prevent the scenario 1 because there is no legal requirement for collection and combustion of landfill gas. The information about no legal requirement was confirmed checking the environmental license and legal requirements in Brazil.

Step 4: It was verified that LFG recovery is not practiced in Brazil, except in those under CDM. There is no legal requirement for the collection and combustion of landfill gas.

The sub-step 4b discuss similar activities been carried out. This step was considered not applicable, according to the “Tool” similar options that are occurring needs to be explained or justified why it is not applicable. CAR 5 was raised. The discussions of similar options that are occurring were presented. There are no other similar projects being implemented without registration as a CDM. CAR 5 was closed out.

The issue related to legal requirements was verified by the local assessor. It was confirmed that there is no requirement for collection and flare of LFG in Vila Velha landfill.

It was confirmed that it’s not a business as usual (there are other landfill gas project in Brazil registered under CDM). CDM registration will facilitate and allow the implementation of the proposed project activity and ensure its financial viability.

3.3 Application of Baseline methodology and calculation of emission factors

As described in the PDD, the landfill gas not captured by the landfill gas collection and flaring system cannot be monitored, as this emission is diffused over the landfill. The amount of landfill gas collected and destroyed by combustion can be monitored using a flow meter. Project emissions are thus comprised of the quantity of methane collected and not flared due to flaring inefficiency, and this

amount is subtracted from the measured amount of collected methane (expected efficiency is upwards of 98%).

ACM0001 is applicable to landfill gas capture project activities, where the baseline scenario is the partial or total atmospheric release of the gas and the project activities include the situation where the captured gas is flared.

The project use an adjustment factor, to present how this fact was estimated, the method used.

The ex-ante estimation of emission reduction in section B.6.4 of the PDD presents some mistakes, verify values and provide copy of the worksheet with formula and data. NIR 2 was raised.

The worksheet with ex-ante estimation of the emission reduction was presented and the value is according to PDD, version 3. NIR 2 was closed out.

No leakage effects need to be accounted under ACM0001.

Project proponents will account for CO2 emissions by multiplying the quantity of electricity required with the CO2 emissions intensity of the electricity displaced. In CTRVV project, CO2 emissions resulting from electricity consumption will be deducted from the total emission reductions.

3.4 Application of Monitoring methodology and Monitoring Plan

The data that will be collected or used to monitor emissions from the project activity are defined according to the ACM0001 (version 5).

Some items were not according to methodology ACM0001:

- Data unit of the methane fraction in LFG;
- Data unit of the Landfill gas temperature;
- Data unit of the Landfill gas pressure;

There was no monitoring for item 14 of the methodology (Operation of the energy plant).
There was no QA/QC for item 14 of the methodology. CAR 6 was raised. The requested information was included in the PDD version 2 (landfill gas temperature and pressure, item 5 – temperature of the flare and item 1 is not applicable). All data of the PDD were revised according to methodology ACM0001, version 5. CAR 6 was closed out.

No monitoring of baseline emissions is required in the CTRVV landfill, as the baseline scenario is the total uncontrolled landfill gas releasing to atmosphere. Monitoring methodology is based on the direct measurement of the quantity of LFG captured, collected and destroyed by the LFG management system.
As defined in ACM0001, no leakage needs to be considered, but electricity required for the operation of the project activity should be accounted and monitored.

The project has not been implemented yet. There are no procedures. After registration all procedures will be described and available to the Verification Team.

The information available is that responsible staff will be identified and adequately trained in compliance with Operational Manual. To provide copy of the Operational Manual and describe in the PDD the authority and responsibility of project management, NIR 8 was raised. The project was not implemented yet and there is no Operation Manual available. It was presented Conceptual Design which describes all staff to operate the landfill. The authority and responsibility for the project is described in Annex 4. NIR 8 was closed out.

3.5 Project design

The crediting period dates are not correct in the PDD.
To correct the ending crediting period in section A.4.4 of the PDD.
To correct the starting date in section C.1.1 of the PDD according to template (DD/MM/YYYY).

Section E.2 and E.3 of the PDD do not present information about comments received, CAR 1 was raised. The starting date was corrected in the revised version of the PDD. The information about all stakeholders was inserted in the PDD. Revised PDD, version 2 was presented. CAR 1 was closed out.

The project use an adjustment factor, to present how this fact was estimated, and the method used.

The ex-ante estimation of emission reduction in section B.6.4 of the PDD presents some mistakes, verify values and provide copy of the worksheet with formula and data, NIR 2 was raised. The worksheet with ex-ante estimation of the emission reduction was presented and the value is according to PDD, version 3. NIR 2 was closed out.

It was provided an ex-ante estimate of emissions reductions based on the USEPA first order decay model.

The reference cited in the PDD to determine the Potential methane generation capacity of waste (Lo) and Rate of methane generation (k) do not correspond. The PDD mention that “EPA” from 2005 and 1991 was used. To provide the correct value and reference used, NIR 3 was raised. The reference about the waste (Lo) and Rate of the methane generation (k) was revised (PDD, version 3) and included correctly in the PDD. NIR 3 was closed out.

3.6 Environmental Impacts

No significant adverse environmental impact due to the project activity is expected.

During desk study and validation assessment, the landfill environmental license was available to confirm that the project is in compliance with national environmental legal requirements. It was provided Installation license for the Landfill, LI Nº 047/2007, issued by IEMA (Instituto Estadual do Meio Ambiente e Recursos Hídricos). Copy of the document was provided to SGS.

The monitoring plan does not present sustainable development indicators, NIR 7 was raised. Sustainable development indicators had not been implemented yet. All indicators will be available before crediting period. NIR 7 was close out.

3.7 Local stakeholder comments

The local stakeholder consultation is required by Brazilian DNA. It is necessary to invite the relevant stakeholders, before the validation process starts. During the site visit, it was provided documented evidences indicating that consultation was carried out in October 2006. Copies of the letters sent to the stakeholders and receipts of mailing were available. The following stakeholders were invited by letters to comment on the project:

- Municipal Governments and City Councils of the Vila Velha - ES
- Municipal Environmental Agency of the Vila Velha
- State Enviromental Agency, issued by IEMA
- Brazilian Forum of NGOs and Social Movements for Environmental and Development
- Community associations (Associação de Moradores de Bairros (Xuri and Camboapina)

§ State Attorney of the Espiríto Santo – ES

4. Comments by Parties, Stakeholders and NGOs

In accordance with sub-paragraphs 40 (b) and (c) of the CDM modalities and procedures, the project design document of a proposed CDM project activity shall be made publicly available and the DOE shall invite comments on the validation requirements from Parties, stakeholders and UNFCCC accredited non-governmental organizations and make them publicly available. This chapter describes this process for this project.

4.1 Description of how and when the PDD was made publicly available

The PDD and the monitoring plan for this project were made available on the SGS website http://cdm.unfccc.int/Projects/Validation/DB/RAAXO4G4YXTUH9VZ3IE1G1IJSLT1B3/view.html and were open for comments from 30 September until 29 October 2006. Comments were invited through the UNFCCC CDM homepage.

4.2 Compilation of all comments received

Comment number	*Date received*	*Submitter*	*Comment*

No comment was received to the DOE during the 30 days commenting period.

4.3 Explanation of how comments have been taken into account

No comments received.

5. Validation opinion

Steps have been taken to close out 8 findings.
SGS has performed a validation of the project: CTRVV Landfill emission reduction project.
The Validation was performed on the basis of the UNFCCC criteria and host country criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting. Using a risk based approach, the review of the project design documentation and the subsequent follow-up interviews have provided SGS with sufficient evidence to determine the fulfilment of the stated criteria.

By collecting landfill gas (LFG), the project results in reductions of greenhouse gas emissions that are real, measurable and give long-term benefits to the mitigation of climate change. A review of the financial analysis and barriers presented demonstrates that the proposed project activity is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity. If the project is implemented as designed, the project is likely to achieve the estimated amount of emission reductions.

The validation is based on the information made available to SGS and the engagement conditions detailed in the report. The validation has been performed using a risk based approach as described above. The only purpose of this report is its use during the registration process as part of the CDM project cycle. Hence SGS can not be held liable by any party for decisions made or not made based on the validation opinion, which will go beyond that purpose.

6. List of persons interviewed

Date	***Name***	***Position***	***Short description of subject discussed***
9 November 2006	Raimundo menezes - CTRVV	Civil Engineer	Technical issues
9 November 2006	Erika da Silva Lorandes – Arquipélago	Consultant	Environmental licenses, environmental indicators.
9 November 2006	Amauri Rodrigues – Arquipélago	Consultant	Validation process and findings.

7. Document references

Category 1 Documents (documents provided by the Client that relate directly to the GHG components of the project, (i.e. the CDM Project Design Document, confirmation by the host Party on contribution to sustainable development and written approval of voluntary participation from the designated national authority):

/1/ Project Design Document, PROBIOGAS - JP, version 01, August 2006; version 02, February 2007; version 03, May 2007.

/2/ Approved consolidated baseline methodology ACM0001 - “Consolidated baseline methodology for landfill gas project activities” (Version 5, 22 December 2006).

/3/ Approved consolidated monitoring methodology ACM0001 - “Consolidated methodology for grid-connected electricity generation from renewable sources” (Version 5, 19 May 2006).

/4/ Tool for the demonstration and assessment of additionality, version 3.

/5/ Tool to determine project emissions from flaring gases containing methane.

Category 2 Documents (background documents used to check project assumptions and confirm the validity of information given in the Category 1 documents and in validation interviews):

/6/ Installation License.

/7/ Simple cost analysis.

/8/ Executive project.

/9/ CERs worksheet

/10/ Flow chart