

VALIDATION REPORT

TERRESTRE AMBIENTAL LANDFILL GAS PROJECT IN BRAZIL

REPORT NO. 2006-1176 Revision No. 02

DET NORSKE VERITAS



VALIDATION REPORT

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Summary:

Det Norske Veritas Certification Ltd. (DNV) has performed a validation of the "Terrestre Ambiental Landfill Gas Project" in Brazil on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures and the subsequent decisions by the CDM Executive Board. This validation report summarizes the findings of the validation.

The validation consisted of the following three phases: i) a desk review of the project design, baseline and monitoring plan, ii) follow-up interviews with project stakeholders and iii) the resolution of outstanding issues and the issuance of the final validation report and opinion.

In summary, it is DNV's opinion that the "Terrestre Ambiental Landfill Gas Project" as described in the revised PDD of 20-07-2006 meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the baseline and monitoring methodology ACM0001. Hence, DNV will request the registration of the "Terrestre Ambiental Landfill Gas Project" as a CDM project activity.

Prior to the submission of this validation report to the CDM Executive Board, DNV will have to receive the written approval of voluntary participation from the DNA of Brazil, including the confirmation that the project assists it in achieving sustainable development

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Abbreviations

Corrective Action Request
Clean Development Mechanism
Carbon Emission Factor
Certified Emission Reduction
Methane
Clarification request
State of Sao Paulo Environmental Agency
Carbon dioxide
Carbon dioxide equivalent
Det Norske Veritas
Designated National Authority
Departmento de Avaliacao de Impacto Ambiental
Greenhouse gas(es)
Global Warming Potential
Intergovernmental Panel on Climate Change
Land fill gas
Monitoring Plan
Monitoring and Verification Plan
Non-governmental Organisation
Official Development Assistance
Project Design Document
State Secretary of Environment (Sectretaria de Estado Meio Ambiental
United Nations Framework Convention on Climate Change
United States Environment Protection Agency





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1 INTRODUCTION

Terrestre Ambiental Ltda has commissioned Det Norske Veritas Certification Ltd. (DNV) to perform a validation of the "Terrestre Ambiental Landfill Gas Project" in Brazil. This report summarises the findings of the validation of the project, performed on the basis of UNFCCC criteria for CDM projects, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The validation team consisted of the following personnel:

Ms Cintia Dias Mr Luis Filipe Tavares Mr Raphael de Souza Mr K.Venkata Raman Mr Soumik Biswas DNV Rio de Janeiro DNV Rio de Janeiro DNV Rio de Janeiro DNV Bangalore DNV India Team Leader, GHG auditor Waste sector expert GHG auditor GHG auditor Technical reviewer

1.1 Validation Objective

The purpose of a validation is to have an independent third party assess the project design. In particular, the project's baseline, monitoring plan, and the project's compliance with relevant UNFCCC and host Party criteria are validated in order to confirm that the project design, as documented, is sound and reasonable and meets the identified criteria. Validation is a requirement for all CDM projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of certified emission reductions (CERs).

1.2 Scope

The validation scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords and the relevant decisions by the CDM Executive Board, including the approved baseline and monitoring methodology ACM0001. The validation team has, based on the recommendations in the Validation and Verification Manual /6/ employed a risk-based approach, 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 project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the project design.

1.3 Description of Proposed CDM Project

The objective of the "Terrestre Ambiental Landfill Gas Project" is to capture and flare the landfill gas produced at the CGR Piacaguera landfill site owned by the project proponent Terrestre Ambiental Ltda and located in Santos, Sao Paulo State, Brazil. The project activity thereby avoids emissions of methane to the atmosphere.

The CGR Piacaguera landfill has the capacity to receive 3 million tons of waste. The starting date of the project is 01-01-2007.



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The current practise at the landfill is to collect and burn the gas only through a passive system, with no systematic and monitored flare. Methane is emitted naturally to the atmosphere through the existing wells, and part of the gas is burned due to safety and odour reasons.

The project involves the development of a collection pipeline network and a flaring system. The collection system will be built using the existing wells. The wells will be connected to a main pipeline to transport the landfill gas to the flare. A blower will be installed in order to increase the amount of landfill gas collected.

The forecast amount of GHG emission reductions from the project is 1 644 809 tonnes CO₂ equivalents (tCO₂e) during the first 7-years renewable crediting period resulting in a forecast average annual emission reductions of 234 972 tCO₂e. Considering the amount of uncertainty related to the methane generation and collection efficiency, which depends on the actual design and engineering of the project, this might be achievable if the project is implemented suitably. However, experiences with other landfills have shown that the methane generation and collection efficiency of the landfills projected by the first order decay model has an inherent uncertainty of almost 50% and hence the amount of CERs, which will be monitored ex-post, might vary from the projected amount.



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2 METHODOLOGY

The validation consisted of the following three phases:

- I a desk review of the project design, baseline and monitoring plan
- II follow-up interviews with project stakeholders
- III the resolution of outstanding issues and the issuance of the final validation report and opinion.

In order to ensure transparency, a validation protocol was customised for the project, according to the Validation and Verification Manual /6/. The protocol shows in transparent manner criteria (requirements), means of verification and the results from validating the identified criteria. The validation protocol serves the following purposes:

- It organises, details and clarifies the requirements a CDM project is expected to meet;
- It ensures a transparent validation process where the validator will document how a particular requirement has been validated and the result of the validation.

The validation protocol consists of three tables. The different columns in these tables are described in Figure 1.

The completed validation protocol for the "Terrestre Ambiental Landfill Gas Project" is enclosed in Appendix A to this report.

Findings established during the validation can either be seen as a non-fulfilment of validation protocol criteria or where a risk to the fulfilment of project objectives is identified. Corrective action requests (CAR) are 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 certified.

The term clarification may be used where additional information is needed to fully clarify an issue.



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Validation Protocol Table 1: Mandatory Requirements for CDM Project Activities						
Requirement	Reference	Conclusion	Cross reference			
The requirements the project must meet.	Gives reference to the legislation or agreement where the requirement is found.	This is either acceptable based on evidence provided (OK), a Corrective Action Request (CAR) of risk or non- compliance with stated requirements or a request for Clarification (CL) where further clarifications are needed.	Used to refer to the relevant checklist questions in Table 2 to show how the specific requirement is validated. This is to ensure a transparent Validation process.			

Validation Protocol Table 2: Requirement Checklist						
Checklist Question	Reference	Means of verification (MoV)	Comment	Draft and/or Final Conclusion		
The various requirements in Table 1 are linked to checklist questions the project should meet. The checklist is organised in seven different sections. Each section is then further sub-divided. The lowest level constitutes a checklist question.	Gives reference to documents where the answer to the checklist question or item is found.	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 (OK), or a Corrective Action Request (CAR) due to non- compliance with the checklist question (See below).A request for Clarification (CL) is used when the validation team has identified a need for further clarification.		

Validation Protocol Table 3: Resolution of Corrective Action Requests and Requests for Clarification						
Draft report corrective action requests and requests for clarifications		Summary of project participants' response	Final conclusion			
If the conclusions from the draft Validation are either a Corrective Action Request or a Clarification Request, these should be listed in this section.	Reference to the checklist question number in Table 2 where the Corrective Action Request or Clarification Request is explained.	The responses given by the project participants during the communications with the validation team should be summarised in this section.	This section should summarise the validation team's responses and final conclusions. The conclusions should also be included in Table 2, under "Final Conclusion".			

Figure 1	Validation protocol tables	5



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2.1 Review of Documents

The PDD version 01 dated 24-04-2006 /1/, version 2 dated 07-06-2006 and version 3 dated 20-07-2006 submitted by Terrestre Ambiental Ltda and Econergy and additional background documents related to the project design and baseline /4/ - /9/ were assessed during the validation.

2.2 Follow-up Interviews

On 11-04-2006, DNV performed interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. Representatives of Econergy Brasil were interviewed. The main topics of the interviews are summarised in Table 1.

Interviewed organisation	n Interview topics	
ECONERGY	Baseline emission calculations	
Eduardo Cardoso Filho -	Project technology	
virginia Gante	Project emission calculations	
	Management structure and procedures	
	Current practice of venting and flaring and AF factor.	

2.3 Resolution of Clarification and Corrective Action Requests

The objective of this phase of the validation was to resolve any outstanding issues which needed to be clarified for DNV's positive conclusion on the project design. The Corrective Action Requests and requests for Clarification raised by DNV, presented to the project participants in DNV's draft validation report of 31-05-2006 (rev. 0), were resolved during communications between the project participants and DNV. To guarantee the transparency of the validation process, the concerns raised and responses given are documented in the validation protocol in Appendix A.

Since modifications to the project design were necessary to resolve DNV's concerns, the project participants decided to revise the PDD and resubmitted a final revised PDD on 20-07-2006. After reviewing the revised PDD, DNV issued this final validation report and opinion.



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3 VALIDATION FINDINGS

The findings of the validation of the "Terrestre Ambiental Landfill Gas Project" are stated in the following sections. The validation criteria (requirements), the means of verification and the results from validating the identified criteria are documented in more detail in the validation protocol in Appendix A.

The final validation findings relate to the project design as documented and described in the revised PDD of 20-07-2006.

3.1 Participation Requirements

The project participants are Terrestre Ambiental Ltda and Econergy Brasil Ltda of Brazil. The host Party Brazil meets all relevant participation requirements. No participating Annex I Party has been identified yet.

Prior to the submission of this validation report to the CDM Executive Board, DNV will have to receive the written approval of voluntary participation from the DNA of Brazil, including the confirmation that the project assists in achieving sustainable development.

3.2 **Project Design**

The objective of the project is to capture and flare the landfill gas produced at the CGR Piacaguera landfill (which is owned by the project proponent Terrestre Ambiental Ltda) to avoid emissions of methane to the atmosphere. The technology to be employed will involve the improvement of the landfill gas collection and flaring system through the installation of an active recovery system composed by a collection and transportation pipeline network and a flaring system. The project will make use of the existing wells that have been installed for venting LFG. The wellheads will be connected to a collecting pipeline and to the manifolds which will be connected to a blower that sends the gas to the flare.

A renewable 7-year crediting period (with the potential of being renewed twice) starting on 01-01-2007 has been selected. The starting date of the project activity is forecast to be on 01-01-2007, and the expected operational lifetime of the project is 21 years.

The project is expected to bring improvement on sustainable development through reducing methane emissions and minimizing the risk of explosions at the site. The project involves the transfer of technology, which has a positive impact on employment and construction capacity skills.

There is no public funding involved in the project, and the validation did not reveal any information that indicates that the project can be seen as a diversion of ODA funding towards Brazil.

3.3 Baseline Determination

The project applies the approved baseline methodology ACM0001 – "Consolidated baseline methodology for landfill gas project activities", version 3. This methodology is applicable to project activities that reduce greenhouse gas emissions through landfill gas capture and destruction of the methane by flaring and/or generation of electricity. In the case of the



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"Terrestre Ambiental Landfill Gas Project", the destruction of methane will be done through flaring only.

The selected baseline scenario is the partial atmospheric release of the landfill gas. As the "Terrestre Ambiental Landfill Gas Project" does not have any contractual obligations to burn methane, the methane that would have been destructed in the baseline has been calculated using an "Adjustment Factor". The "Adjustment Factor" has been estimated to be 20% of the total methane destructed under the project activity. The "Adjustment Factor" of 20% allows for the destruction of LFG in the baseline scenario which would have occurred as a result of the continuation of the current practise of passive venting and unsystematic burning of LFG. Since the Brazilian landfill regulations do not mandate LFG collection and destruction and only a small amount of the methane generated is currently burned due to safety and odour reasons, an "Adjustment Factor" of 20% is deemed appropriate.

3.4 Additionality

In accordance with ACM0001, the additionality of the project is demonstrated through the *Tool for the demonstration and assessment of additionality*, which includes the following steps:

Step 0 -Preliminary screening based on the starting date of the project activity: As the starting date of the crediting period is after the expected date of registration of the project, this step is not applicable.

Step 1 - Identification of alternatives to the project activity consistent with current laws and regulations: The possible baseline scenarios are: a) LFG would continue to be released to the atmosphere and only small amounts of LFG would be burned due to safety and odour reasons and b) the project of capturing and flaring of LFG would be implemented without CDM incentives. There is no legislation in Brazil obliging landfills to flare the collected gas. Both scenarios are thus in compliance with all applicable legal and regulatory requirements. Since the project activity does not have any other incentives from the capturing and flaring of the methane, the current scenario of continued release of methane to the atmosphere with partial flaring due to safety reasons has been selected as the baseline and this baseline scenario is further justified through the next steps of the additionality tool.

Step 2 - Investment analysis: As the CDM project activity does not generate any financial or economic benefits other than CDM related income, the simple cost analysis scenario is applied. Considering the additional costs necessary for increasing the LFG capture capacity, without having any revenues, the project is not a likely baseline scenario.

Step 3 - Barrier analysis: Not selected (Step 2 is selected only)

Step 4 - Common practice analysis: DNV was able to confirm that any legislation that requires landfills to quantify and flare a certain amount of the gas produced is not likely to be implemented in the near future. It has been observed from official data (Pesquisa Nacional de Saneamento Basico 2000 document) that nearly 53% of waste produced in Southeast of Brazil is disposed as dump and only about 12% is destined to sanitary landfill. Controlled landfills comprise only 16 % of the total waste disposed. A major environmental problem related to domestic waste in Brazil is the lack of waste disposal to sanitary landfills. DNV was able to confirm that the investment to install systems to capture and flare methane is not common practice in Brazil.



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Step 5 - Impact of CDM registration: As there is no income from the project, the sale of CERs will present the only revenue for the project and will significantly alleviate the economic and financial hurdles of the project.

3.5 Monitoring Plan

The project correctly applies the approved monitoring methodology ACM0001 - "Consolidated monitoring methodology for landfill gas projects activities", version 3.

The following parameters will be monitored during the crediting period for calculation of the GHG emission reductions:

- The total amount of LFG generated
- LFG sent to the flare
- Fraction of methane in landfill gas
- Density of methane
- Electricity consumed by the landfill gas capture equipment
- Flare efficiency

The regulatory requirements regarding landfills and the CO_2 emission factor of the grid will also be monitored for updating of the baseline at renewal of the crediting period.

The Quality Control and Quality Assurance datasheet for the project identifies several monitoring routines. As the project is not yet implemented, the responsibilities for project operation and monitoring and reporting have not yet been developed. These procedures will be developed with the start of the project activity and hence need to be verified during the first verification of the project's emission reductions.

3.6 Calculation of GHG Emissions

Emission reductions are directly monitored and calculated *ex-post*, using the approach indicated in ACM0001.

For the *ex-ante* estimation of emission reductions, the expected LFG generation of the landfill is determined using the IPCC first order decay model. GHG emission reductions were estimated using IPCC's guidelines and the first order decay model approach considering values of $L_0 = 70$ m³CH₄/ton waste, k = 0.15 and a collection efficiency of 75%. The assumptions used to estimate LFG generation seem appropriate and are based on the IPCC Good Practice Guidance and Brazilian conditions.

The collection efficiency used for the *ex-ante* estimates has been selected from a study by the US EPA. The 75% collection efficiency provided by US EPA have been checked and found to be correct. The project activity is projected to reduce 234 972 t CO_2e yearly. Considering the amount of uncertainty related to the methane generation and collection efficiency, which depends on the actual design and engineering of the project, this might be achievable if the project is implemented suitably. However, experiences with other landfills have shown that the methane generation and collection efficiency of the landfills projected by the first order decay model has an inherent uncertainty of almost 50% and hence the amount of CERs, which will be monitored ex-post, might vary from the projected amount.



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For the calculation of project emissions due to the import of electricity used to pump the LFG, the Brazilian South-Southeast-Midwest interconnected grid CO₂ emission coefficient has been calculated *ex-ante* for the first 7-year crediting period and is calculated to be 0.2647 tCO₂e/MWh (weighted average of the build margin (BM) and operating margin (OM) emission coefficients). The calculation conform to the procedure given in ACM0002 version 6 and the calculations were based on electricity generation data provided by National Electricity System Operator (ONS) for the electricity generated in the South-Southeast-Midwest (S-SE-CO) grid in the years 2002-2004. Data for the years 2002-2004 were the most recent statistics available during PDD submission.

3.7 Environmental Impacts

The CGR Piaçaguera's Working License (n°18000614) was issued by CETESB. The "Terrestre Ambiental Landfill Gas Project" does not have any significant environmental impacts. The project has not yet obtained a licence for flaring landfill gas and such a licence must be applied for when the project is implemented. Given that the flaring of landfill gas has little adverse environmental impacts, it is likely that the licence will be obtained when the project is implemented. During the first verification of the project's emission reductions, it must be confirmed that this licence was eventually obtained.

3.8 Comments by Local Stakeholders

Local stakeholders, such as the Municipal administration of Santos – SP, Municipal Secretariat of Environment, Municipal Legislation Chamber, Environmental Secretariat of Sao Paulo state, State of Sao Paulo Environmental Agency (CETESB), Rotary Club de Santos, Public Ministry of Sao Paulo State and the Brazilian NGO forum were invited to comment on the project, in accordance with the requirements of Resolution 1 of the Brazilian DNA. Copies of the letters sent to the local stakeholders were verified during the follow up interviews. One comment was received, supporting the project and a suggestion of application of sustainability criteria in order to evaluate the project's real impact on sustainable development. The project proponent has addressed the comment replying that the CDM verification procedure already includes the assessment of such criteria.

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

The PDD of 24-04-2006 was made publicly available on DNV's climate change website (<u>www.dnv.com/certification/climatechange</u>) and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 29.04-2006 to 28-05-2006. No comments were received.



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5 VALIDATION OPINION

Det Norske Veritas Certification Ltd. (DNV) has performed a validation of the "Terrestre Ambiental Landfill Gas Project", at City of Santos, Sao Paulo State in Brazil. The validation was performed on the basis of UNFCCC criteria for CDM project activities and relevant Brazilian criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The project participants are Terrestre Ambiental Ltda and Econergy Brasil Ltda of Brazil. The host Party Brazil meets all the relevant participation requirements. No participating Annex I Party is yet identified.

The objective of the project is to capture and flare the landfill gas produced at the CGR Piacuguera landfill (owned by the project participant Terrestre Ambiental Ltda), to avoid emissions of methane to the atmosphere. The technology to be employed will involve the improvement of landfill gas collection and flaring through the installation of an active recovery system composed by a collection and transportation pipeline network and a flaring system.

The project applies the approved baseline and monitoring methodology ACM0001, i.e. "Consolidated baseline and monitoring methodology for landfill gas project activities". The baseline methodology has been correctly applied and the assumptions made for the selected baseline scenario are sound. It is sufficiently demonstrated that the project is not a likely baseline scenario and that emission reductions attributable to the project are additional to any that would occur in the absence of the project activity.

The monitoring methodology has been correctly applied. The monitoring plan sufficiently specifies the monitoring requirements. As the project is not yet implemented, the responsibilities for project operation and monitoring and reporting have not yet been developed. These procedures will be developed within the start of the project activity and need to be verified during the first verification of the project's emission reductions.

By flaring landfill gas the project results in reductions of methane emissions that are real, measurable and give long-term benefits to the mitigation of climate change. Given that the project is designed and operated with a collection efficiency of 75%, the project is likely to achieve the estimated amount of emission reductions. However, experiences with other landfills have shown that the methane generation and collection efficiency of the landfills projected by the first order decay model has an inherent uncertainty of almost 50% and hence the amount of CERs, which will be monitored ex-post, might vary from the projected amount.

Local stakeholders, such as the Municipal Government, the state and municipal agencies, the Brazilian forum of NGOs, were invited to comment on the project, in accordance with the requirements of Resolution 1 of the Brazilian DNA. One positive comment was received. Copies of the letters sent to the local stakeholders were verified during the follow up interview.

In summary, it is DNV's opinion that the "Terrestre Ambiental Landfill Gas Project", as described in the revised and resubmitted project design document of 20-07-2006, meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the baseline and monitoring methodology ACM0001. Hence, DNV will request the registration of the "Terrestre Ambiental Landfill Gas Project" as CDM project activity.



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Prior to the submission of this validation report to the CDM Executive Board, DNV will have to receive the written approval of voluntary participation from the DNA of Brazil, including the confirmation that the project assists in achieving sustainable development.



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REFERENCES

Documents provided by the project proponent that relate directly to the project:

- /1/ Econergy Brasil Ltda: *Project Design Document for the Terrestre Ambiental Landfill Gas Project*, Version 1 (24-04-2006);
- /2/ Econergy Brasil Ltda: Project Design Document for the Terrestre Ambiental Landfill Gas Project, Version 2 (07-06-2006);
- Econergy Brasil Ltda: Project Design Document for the Terrestre Ambiental Landfill Gas Project, Version 3 (20-07-2006);
- /4/ Spreadsheets for the calculation of the combined margin emission Coefficient (BR SSECO 2002-2004-2006.05.23.xls).
- /5/ Econergy Brasil Ltda: Spreadsheets for the calculation of the emission reductions from the Terrestre Ambiental Landfill Gas Project

Background documents related to the design and/or methodologies employed in the design or other reference documents:

- /6/ International Emission Trading Association (IETA) & the World Bank's Prototype Carbon Fund (PCF): *Validation and Verification Manual*. <u>http://www.vvmanual.info</u>
- /7/ Approved Baseline and Monitoring Methodology ACM0001: "Consolidated baseline and monitoring methodology for landfill gas project activities". Version 03 of 19 May 2006.
- /8/ Approved Baseline and Monitoring Methodology ACM0002: "Consolidated methodology for grid-connected electricity generation from renewable sources" version 6 of 19 May 2006.
- /9/ CDM Executive Board: *Tool for the demonstration and assessment of additionality*. Version 02 of 28 November 2005

Persons interviewed during the validation, or persons who contributed with other information that are not included in the documents listed above:

- /10/ Eduardo Cardoso Filho Econergy
- /11/ Virginia Gante Econergy

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APPENDIX A

CDM VALIDATION PROTOCOL

Table 1	Mandatory Requirement for	Clean Development Mechanism	(CDM) Project Activities
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	Requirement	Reference	Conclusion	Cross Reference / Comment
1.	The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3	Kyoto Protocol Art.12.2	N/A	No participating Annex I Party has been identified yet.
2.	The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof	Kyoto Protocol Art. 12.2, CDM Modalities and Procedures §40a		Table 2, Section A.3Prior to the submission of this validation report to the CDM Executive Board, DNV will have to receive the written approval of voluntary participation from the DNA of Brazil, including the confirmation that the project assists in achieving sustainable development.
3.	The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC	Kyoto Protocol Art.12.2.	ОК	Table 2, Section E.4.1 The reduction in GHG emissions will contribute to the objective of UNFCCC.
4.	The project shall have the written approval of voluntary participation from the designated national authority of each party involved	Kyoto Protocol Art. 12.5a, CDM Modalities and Procedures §40a		Prior to the submission of this validation report to the CDM Executive Board, DNV will have to receive the written approval of voluntary participation from the DNA of Brazil.
5.	The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change	Kyoto Protocol Art. 12.5b	OK	Table 2, Section E
6.	Reduction in GHG emissions shall be additional to any that would occur in absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of	Kyoto Protocol Art. 12.5c, CDM Modalities and	ОК	Table 2, Section B.2

Requirement	Reference	Conclusion	Cross Reference / Comment
greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity	Procedures §43		
7. In case public funding from Parties included in Annex I is used for the project activity, these Parties shall provide an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of these Parties.	Decision 17/CP.7, CDM Modalities and Procedures Appendix B, § 2	ОК	The project activity does not involve any funding from an Annex-I country.
 Parties participating in the CDM shall designate a national authority for the CDM 	CDM Modalities and Procedures §29	ОК	TheBraziliandesignatednational authority for the CDMistheComissãoInterministerialdeMudançaGlobal do Clima.
 The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol 	CDM Modalities §30/31a	ОК	Brazil has ratified the Kyoto Protocol on 23 August 2002.
10. The participating Annex I Party's assigned amount shall have been calculated and recorded	CDM Modalities and Procedures §31b	N/A	No participating Annex I Party is yet identified.
11. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7	CDM Modalities and Procedures §31b	N/A	No participating Annex I Party is yet identified.
12. Comments by local stakeholders shall be invited, a summary of these provided and how due account was taken of any comments received	CDM Modalities and Procedures §37b	ОК	Table 2, Section G
13. Documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts, shall be submitted, and, if those impacts are considered significant by the project participants or the Host Party, an environmental impact assessment in accordance with procedures as required by the Host Party shall be carried out.	CDM Modalities and Procedures §37c	OK	Table 2, Section F
14. Baseline and monitoring methodology shall be previously approved by the CDM Executive Board	CDM Modalities and Procedures §37e	ОК	Table 2, Section B.1.1 and D.1.1

Requirement	Reference	Conclusion	Cross Reference / Comment
15. Provisions for monitoring, verification and reporting shall be in accordance with the modalities described in the Marrakech Accords and relevant decisions of the COP/MOP	CDM Modalities and Procedures §37f	ОК	Table 2, Section D
16. Parties, stakeholders and UNFCCC accredited NGOs shall have been invited to comment on the validation requirements for minimum 30 days, and the project design document and comments have been made publicly available	CDM Modalities and Procedures §40	ОК	The PDD of 24-04-2006 was made publicly available on DNV's climate change website and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 29-04-2006 to 28- 052006. No comments were received.
17. A baseline shall be established on a project-specific basis, in a transparent manner and taking into account relevant national and/or sectoral policies and circumstances	CDM Modalities and Procedures §45c,d	ОК	Table 2, Section B.2
 The baseline methodology shall exclude to earn CERs for decreases in activity levels outside the project activity or due to force majeure 	CDM Modalities and Procedures §47	ОК	Table 2, Section B.2
19. The project design document shall be in conformance with the UNFCCC CDM-PDD format	CDM Modalities and Procedures Appendix B, EB Decision	ОК	The project design document conforms to the UNFCCC- CDM-PDD format.

Table 2Requirements Checklist

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
A. General Description of Project Activity The project design is assessed.					
A.1. Project Boundaries Project Boundaries are the limits and borders defining the GHG emission reduction project.					
A.1.1. Are the project's spatial (geographical) boundaries clearly defined?	/1/	DR	The project is located at the CGR Piacaguera landfill located in the city of Santos, about 60 Km south of Sao Paulo in Brazil.		ОК
A.1.2. Are the project's system (components and facilities used to mitigate GHGs) boundaries clearly defined?	/1/	DR/I	The project engineering consultants and details have not been finalised. However, it is indicated that the project proponent will install wellheads at the existing concrete wells. The wellheads will be connected to a manifold. All the individual manifolds will be connected to the main transmission pipeline going to the flare system through a blower and a dewatering system. The system for the removal of leachate and its treatment prior to discharge will be as per the regulations specified in the operating licence.		ОК

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
A.2. Technology to be employed Validation of project technology focuses on the project engineering, choice of technology and competence/ maintenance needs. The validator should ensure that environmentally safe and sound technology and know-how is used.					
A.2.1. Does the project design engineering reflect current good practices?	/1/	DR	The landfill gas collection system and transmission pipelines are all standard equipment available in Brazil. The flare system technology and flare equipment will be imported. It can be concluded that the project design engineering reflects current good practice.		ОК
A.2.2. Does the project use state of the art technology or would the technology result in a significantly better performance than any commonly used technologies in the host country?	/1/	DR	The project uses standard technology available. The flare system which is the most critical part of the system is imported.		ОК
A.2.3. Is the project technology likely to be substituted by other or more efficient technologies within the project period?	/1/	DR	No, the project technology is not likely to be substituted by other or more efficient technologies at least within the first crediting period.		ОК
A.2.4. Does the project require extensive initial training and maintenance efforts in order to work as presumed during the project period?	/1/	DR	Yes, the project will require extensive initial training in the operation and maintenance of the flaring systems, in order to work as presumed during the project period.		ОК
A.2.5. Does the project make provisions for meeting training and maintenance needs?	/1/	DR/I	It was verified during the site visit that the training needs will be specified and provided for within the start of the project activity.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
A.3. Contribution to Sustainable Development The project's contribution to sustainable development is assessed.					
A.3.1. Is the project in line with relevant legislation and plans in the host country?	/1/	DR/I	The host country Brazil has no legislation regarding the collection and flaring of landfill gas. The project proponent has all the pertinent licence for the CGR Piacaguera landfill. The working licence is to be evidenced. It was confirmed during the site visit that the CGR Piaçaguera's Working License (nº18000614) was issued by CETESB. The project proponent is to obtain the operating licence for the project activity of capturing and flaring of LGF, prior to the start of the project and this is to be evidenced during the first verification.	CAR 1	ОК
A.3.2. Is the project in line with host-country specific CDM requirements?	/1/	DR	The project is in line with host country specific requirements. Prior to the submission of this validation report to the CDM Executive Board, DNV will have to receive the written confirmation by the DNA of Brazil that the project is in line with the host country specific CDM requirements.		
A.3.3. Is the project in line with sustainable development policies of the host country?	/1/	DR	The project is in line with current sustainable development priorities in Brazil. Prior to the submission of this validation report to the CDM Executive Board, DNV will have to receive the written confirmation by the DNA of Brazil that the project assists in achieving sustainable development.		
A.3.4. Will the project create other environmental or	/1/	DR	The project activity will create additional		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
social benefits than GHG emission reductions?			employments.		
B. Project Baseline The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.					
B.1. Baseline Methodology It is assessed whether the project applies an appropriate baseline methodology.					
B.1.1. Is the baseline methodology previously approved by the CDM Executive Board?	/1/	DR	Yes, the baseline methodology ACM0001, version 3, "Consolidated baseline methodology for landfill gas project activities" is approved by the CDM Executive Board.		ОК
B.1.2. Is the baseline methodology the one deemed most applicable for this project and is the appropriateness justified?	/1/	DR	The baseline methodology is applicable to the project activity as the project envisages the capture and flaring of the landfill gas and the baseline scenario is the partial or total release of the landfill gas to the atmosphere.		ОК
B.2. Baseline Determination The choice of baseline will be validated with focus on whether the baseline is a likely scenario, whether the project itself is not a likely baseline scenario, and whether the baseline is complete and transparent.					
B.2.1. Is the application of the methodology and the discussion and determination of the chosen	/1/	DR	The application of the methodology is correct and the baseline determination is		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
baseline transparent?			transparent. The baseline is that in the absence of the project activity the landfill gas would be released to the atmosphere, except of a small quantity which is captured and burnt to address safety and odour concerns.		
B.2.2. Has the baseline been determined using conservative assumptions where possible?	/1/	DR	Yes the baseline emissions are determined using conservative estimates. In the absence of any contractual/regulatory obligations to flare the landfill gas, "Adjustment Factor" of 20% of total methane destructed under the project has been used. The project proponent is requested to justify the selection of 20% for the adjustment factor.	CL-1	ОК
B.2.3. Has the baseline been established on a project- specific basis?	/1/	DR	Yes.		OK
B.2.4. Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	/1/	DR/I	The National Waste Management Policy is under discussions and there is enough evidence to conclude that it will result only in requirements for LFG collection but no requirements for LFG destruction of more than 20 %.		ОК
B.2.5. Is the baseline determination compatible with the available data?	/1/	DR	Yes		OK
B.2.6. Does the selected baseline represent the most likely scenario among other possible and/or discussed scenarios?	/1/	DR	Yes, the selected baseline represents the most likely scenario. The common practice in Brazil is to dispose waste in open dumps. None of these landfills have any structure to collect and flare the methane generated. In some case passive venting and flaring is done only due to safety reasons. Controlled		ОК

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			landfills with gas collection and minimum flaring comprise of only 16 % (as per PNSB 2000 data). Most of the landfills which are equipped with active collection and flaring system have been developed as CDM projects.		
B.2.7. Is it demonstrated/justified that the project activity itself is not a likely baseline scenario?	/1/	DR	In accordance with, the methodology, additionality of the project is demonstrated through the Tool for the demonstration and assessment of additionality. Step 0: This step is not required as the project starting date is 01/04/2007 and is not a prompt start project, Step 1: The following are the possible alternatives to the project activity: a) LFG release to the atmosphere with only small amounts being burnt for safety and odour reasons (continuation of present practise) and, b) Implementation of project activity without CDM incentives. As there is no legislation in Brazil for landfills to flare the collected gas, both alternatives are in compliance with the applicable legal and regulatory requirements. Since the project activity does not have any other incentives from the capturing and flaring of the methane, the current scenario of continued release of methane to the atmosphere with partial flaring due to safety reasons has been selected as the baseline and this selection	CL-2	ОК

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			is further justified through the next steps of the additionality tool. Step 2: The project activity generates no electricity and will only flare the LFG captured. Considering that the additional investment costs necessary for increasing the LFG capture and flaring capacity, will not generate any revenues, the project is not financially viable. Step -3: Barrier analysis has not been considered. Step -4: Common practice analysis: It is established with evidence that the common practice in Brazil is dumping of MSW in open dumps (53.28%), without any infrastructure. The controlled landfill sites account for only 16 % and clearly not a common practice. DNV was also able to confirm that incurring investments to install systems to capture and flare LFG is not a common practice in Brazil. The source of the document is to be verified as the total of the pie chart adds up to more than 100. Step -5: The revenues from the CDM will reduce the financial barrier to the project activity. Hence it is established that the project activity itself is not a likely baseline scenario and the project proponent would have continued with the BAU of limited collection and flaring in the absence of the project activity.		

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
B.2.8. Have the major risks to the baseline been identified?	/1/	DR	The risk to the baseline would be the introduction of laws/regulations requiring the capturing and flaring of landfill gases. This has been identified and will be tracked as per the methodology. Another risk to the baseline is the premature closure of the landfill due to unavailability of sufficient quantities of waste. The project proponent is requested to confirm that the amount of wastes used in the calculations will be available for the landfill during the project lifetime.	CL 3	OK
B.2.9. Is all literature and sources clearly referenced?	/1/	DR	Yes.		OK
C. Duration of the Project/ Crediting Period It is assessed whether the temporary boundaries of the project are clearly defined.					
C.1.1. Are the project's starting date and operational lifetime clearly defined and reasonable?	/1/	DR	The project starting date is 01/01/2007 and the operational lifetime is indicated as 21 years, which is reasonable.		OK
C.1.2. Is the assumed crediting time clearly defined (renewable crediting period of seven years with two possible renewals or fixed crediting period of 10 years with no renewal)?	/1/	DR	A renewable crediting period has been selected with the first seven year period starting on 01/01/07.		ОК

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
D. Monitoring Plan The monitoring plan review aims to establish whether all relevant project aspects deemed necessary to monitor and report reliable emission reductions are properly addressed ((Blue text contains requirements to be assessed for optional review of monitoring methodology prior to submission and approval by CDM EB).					
D.1. Monitoring Methodology It is assessed whether the project applies an appropriate baseline methodology.					
D.1.1. Is the monitoring methodology previously approved by the CDM Executive Board?	/1/	DR	Yes the monitoring methodology ACM0001 version 3 has been approved by the CDM Executive Board.		OK
D.1.2. Is the monitoring methodology applicable for this project and is the appropriateness justified?	/1/	DR	 The monitoring methodology is applicable for the project as the project is a landfill gas capture and flaring project. In line with the methodology the following parameters will be monitored. Quantity of LFG captured- measured LFG flared - measured Methane fraction in LFG being flared-analyser Flare efficiency Temperature of LFG – measured Pressure of LFG – measured Electricity consumption – measured Hours of blower operation 		ОК

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			 CO₂ emission intensity of grid. Regulatory requirements 		
D.1.3. Does the monitoring methodology reflect good monitoring and reporting practices?	/1/	DR/I	 The monitoring methodology reflects good monitoring practices. The following need to be corrected in table D.2.2.1 in line with the monitoring methodology. Flare efficiency- the comments have got reversed 1) should be continuous measurement of the operation time of flare and (2) periodic measurement of methane in flared gas. CO₂ intensity of grid electricity is the estimation "at the validation and yearly after registration". However, since the project adopts the selected emission factor ex-ante, the project proponent is requested to modify this. 	CAR-2	ОК
D.1.4. Is the discussion and selection of the monitoring methodology transparent?	/1/	DR	The discussion and selection of the monitoring methodology is as per the approved methodology and transparent.		OK
D.2. Monitoring of Project Emissions It is established whether the monitoring plan provides for reliable and complete project emission data over time.					
D.2.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas emissions within the project boundary during the crediting period?	/1/	DR	Yes, in line with the methodology, the monitoring plan provides for the collection and archiving of all necessary data. The Adjustment factor has been selected at 20% and needs to be justified. The grid emission factor has been	GL-4	ОК

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			estimated at 0.2647 considering generation data for the years 2002 -2004 in the South- Southeast-Midwest grid. The factor is estimated as per the guidelines of the ACM0002 version 6. The Operating margin was calculated using the simple adjusted OM, with the vintage data of 2002 to 2004 from the Brazilian Electricity System Manager (ONS). The build margin BM has been calculated using the 20% of the total generation of the year 2004 as the generation of the 5 most recent plants is less than the 20%. It is to be clarified in the monitoring plan in the PDD if the electricity grid emission factor of 0.2647 t CO2e/MWh is calculated ex-ante or will be calculated every year.		
D.2.2. Are the choices of project GHG indicators reasonable?	/1/	DR	The choice of project GHG indicator CO_2 is reasonable.		OK
D.2.3. Will it be possible to monitor / measure the specified project GHG indicators?	/1/	DR	Yes.		OK
D.2.4. Will the indicators give opportunity for real measurements of project emissions?	/1/	DR	Yes.		OK
D.2.5. Will the indicators enable comparison of project data and performance over time?	/1/	DR	Yes.		OK
D.3. Monitoring of Leakage It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.					
D.3.1. Does the monitoring plan provide for the collection and archiving of all relevant data	. /1/	DR	As per the ACM0001 methodology, leakage effects need not be accounted.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
necessary for determining leakage?					
D.4. Monitoring of Baseline Emissions It is established whether the monitoring plan provides for reliable and complete project emission data over time.					
D.4.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining baseline emissions during the crediting period?	/1/ DR The baseline emissions of GHG have been estimated prior to the project start, by the 1 st order decay model using the IPCC guidelines.			ОК	
D.4.2. Is the choice of baseline indicators, in particular for baseline emissions, reasonable?	/1/	/1/ DR The choice of CH ₄ as the baseline indicator is reasonable.			OK
D.4.3. Will it be possible to monitor / measure the specified baseline indicators?	/1/	DR	R Yes.		OK
D.4.4. Will the indicators give opportunity for real measurements of baseline emissions?	/1/	DR	Yes.		OK
D.5. Monitoring of Sustainable Development Indicators/ Environmental Impacts It is checked that choices of indicators are reasonable and complete to monitor sustainable performance over time.					
D.5.1. Does the monitoring plan provide the collection and archiving of relevant data concerning environmental, social and economic impacts?	/1/	DR/I	Neither ACM0001 nor Resolution 1 of the Brazilian DNA requires the monitoring of social or environmental indicators.		ОК
D.6. Project Management Planning It is checked that project implementation is properly prepared for and that critical arrangements are addressed.					
D.6.1. Is the authority and responsibility of project	/1/	DR/I	The PDD mentions a team to be assigned	CL 5	OK

Checklist Question	Ref.	ef. MoV* Comments		Draft Concl	Final Concl
management clearly described?			to monitor emission reductions. The details are not available and need to be provided.		
D.6.2. Is the authority and responsibility for registration, monitoring, measurement and reporting clearly described?	/1/	DR/I	This is not mentioned in the PDD and needs clarification.	CL-5	OK
D.6.3. Are procedures identified for training of monitoring personnel?	/1/	DR/I	This is not mentioned in the PDD and needs clarification	CL 5	ОК
D.6.4. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/	DR/I	This is not mentioned in the PDD and needs clarification	CL 5	ОК
D.6.5. Are procedures identified for calibration of monitoring equipment?	/1/	DR/I	This is not mentioned in the PDD and needs clarification	CL 5	OK
D.6.6. Are procedures identified for maintenance of monitoring equipment and installations?	/1/	DR/I	This is not mentioned in the PDD and needs clarification	CL 5	OK
D.6.7. Are procedures identified for monitoring, measurements and reporting?	/1/	DR/I	This is not mentioned in the PDD and needs clarification	CL 5	OK
D.6.8. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	/1/	DR/I	This is not mentioned in the PDD and needs clarification	CL 5	ОК
D.6.9. Are procedures identified for dealing with possible monitoring data adjustments and uncertainties?	/1/	DR/I	This is not mentioned in the PDD and needs clarification	CL-5	OK
D.6.10. Are procedures identified for review of reported results/data?	/1/	DR/I	This is not mentioned in the PDD and needs clarification	CL 5	ОК
D.6.11. Are procedures identified for internal audits of GHG project compliance with operational requirements where applicable?	/1/	DR/I	This is not mentioned in the PDD and needs clarification	CL 5	ОК
D.6.12. Are procedures identified for project performance reviews before data is submitted for verification, internally or externally?	/1/	DR/I	This is not mentioned in the PDD and needs clarification	CL 5	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
D.6.13. Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting?	/1/	DR/I	This is not mentioned in the PDD and needs clarification	CL-5	ОК
<i>E. Calculation of GHG Emissions by Source</i> It is assessed whether all material GHG emission sources are addressed and how sensitivities and data uncertainties have been addressed to arrive at conservative estimates of projected emission reductions.					
E.1.Project GHG Emissions The validation of ex-ante estimated project GHG emissions focuses on transparency and completeness of calculations.					
E.1.1. Are all aspects related to direct and indirect GHG emissions captured in the project design?	/1/	DR	Yes, all aspects related to direct GHG emissions have been captured in the project design. The direct project emissions result from the electricity consumption of the blower. There are no indirect emissions from the project.		ОК
E.1.2. Are the GHG calculations documented in a complete and transparent manner?	/1/	DR	The calculations are documented in a transparent manner.		OK
E.1.3. Have conservative assumptions been used to calculate project GHG emissions?	/1/	DR	Yes, conservative assumptions have been used to estimate the project GHG emissions.		ОК
E.1.4. Are uncertainties in the GHG emissions estimates properly addressed in the documentation?	/1/	DR	Yes.		OK
E.1.5. Have all relevant greenhouse gases and source categories listed in Kyoto Protocol Annex A	/1/	DR	Yes.		ОК

Checklist Question	Ref.	Ref. Mo	oV* Comments		Draft Concl	Final Concl
been evaluated?						
E.2.Leakage It is assessed whether there leakage effects, i.e. change of emissions which occurs outside the project boundary and which are measurable and attributable to the project, have been properly assessed and estimated ex-ante.						
E.2.1. Are potential leakage effects beyond the chosen project boundaries properly identified?	/1/ DR As per the ACM0001 methodology, leakage effects need not be accounted.		As per the ACM0001 methodology, leakage effects need not be accounted.		OK	
E.3.Baseline Emissions The validation of ex-ante estimated baseline GHG emissions focuses on transparency and completeness of calculations.						
E.3.1. Have the most relevant and likely operational characteristics and baseline indicators been chosen as reference for baseline emissions?	/1/	/1/ DI	R	 The baseline GHG emissions have been estimated ex-ante following the IPCC guidelines and the first order decay model. In line with the guidelines, the following constants were assumed. k - decay constant - 0.15 (1/year) L_o- methane generation potential - 0.07 m3 methane/ Kg waste F - fraction of methane in landfill gas Collection efficiency - 80 %. The values of k and Lo have been taken from the United States Environmental Protection Agency (US EPA) and are deemed reasonable. The project proponent is requested to justify the collection efficiency of 80% which is 	CL-6 CAR-3	ОК

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			 quite high and cannot be deemed as conservative. The detailed worksheet for the baseline emission needs clarification on the following aspects. The baseline emission data in the PDD (page 21) does not tally with the figures given in the excel worksheet. The emission reductions also do not tally. 		
E.3.2. Are the baseline boundaries clearly defined and do they sufficiently cover sources and sinks for baseline emissions?	/1/	DR	Yes		ОК
E.3.3. Are the GHG calculations documented in a complete and transparent manner?	/1/	DR	Yes, the GHG calculations are documented in a transparent manner		
E.3.4. Have conservative assumptions been used when calculating baseline emissions?	/1/	DR	Yes.		OK
E.3.5. Are uncertainties in the GHG emission estimates properly addressed in the documentation?	/1/	DR	The baseline emissions have been calculated using the first order decay model which has an inherent uncertainty of almost 50%.		ОК
E.3.6. Have the project baseline(s) and the project emissions been determined using the same appropriate methodology and conservative assumptions?	/1/	DR	Yes.		ОК
E.4.Emission Reductions					
valuation of ex-arite estimated emission reductions.					
E.4.1. Will the project result in fewer GHG emissions than the baseline scenario?	/1/	DR	The project is expected to result in average of 1 644 809 t CO ₂ e/year during the first		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			crediting period of seven years.		
<i>F. Environmental Impacts</i> Documentation on the analysis of the environmental impacts will be assessed, and if deemed significant, an EIA should be provided to the validator.					
F.1.1. Has an analysis of the environmental impacts of the project activity been sufficiently described?	/1/	/1/ DR/I The project proponent has the pertinent licenses for the CGR Piacaguera landfill. The analysis of the environmental impacts for the flaring project is to be conducted by the State Secretary of Environment (SMA), through the Environment Impact Assessment Department (DAIA) and the State of Sao Paulo Environmental Agency (CETESB). It was confirmed during the site interview that the EIA that refers to this project activity isn't developed yet because the project participants are waiting for the registration of the project to start. Given that the flaring of landfill gas has little adverse environmental impacts, it is likely that the licence will be obtained when the project is implemented. At the first verification of the project's emission reductions it must be confirmed that this licence was eventually		CL 7	OK
F.1.2. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved?	/1/	DR/I	Same as F.1.1	CL 7	OK
F.1.3. Will the project create any adverse environmental effects?	/1/	DR/I	Since the project is for the capture and flaring of landfill gas, there will be no adverse environmental effects on the		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			atmosphere. However, the leachate from the landfill is to be treated to the specification of Brazilian laws and regulations before discharge.		
F.1.4. Are transboundary environmental impacts considered in the analysis?	/1/	/1/ DR The project will have no trans-boundary impacts.			OK
F.1.5. Have identified environmental impacts been addressed in the project design?	/1/	DR	The environmental impacts are to be identified in the EIA.	CL 7	OK
F.1.6. Does the project comply with environmental legislation in the host country?	/1/	DR/I	DR/I The project is yet to obtain the working licence for the flaring facility. The status of the same is to be clarified during the follow up interview.		ОК
G. Stakeholder Comments					
The validator should ensure that a stakeholder comments have been invited and that due account has been taken of any comments received.					
G.1.1. Have relevant stakeholders been consulted?	/1/	DR/I	Yes, relevant stakeholders were identified for the project activity.		ОК
G.1.2. Have appropriate media been used to invite comments by local stakeholders?	/1/	DR/I	DR/I As per the requirement of the DNA of Brazil, letters and executive summary of the project activity were sent to all the stakeholders identified.		ОК
G.1.3. If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	/1/	DR/I A stakeholder consultation process is required as per the Resolution 1 of the Brazilian DNA. The stakeholder consultation process has been carried out in accordance with these regulations by sending letters containing an executive summary of the project activity to all the stakeholders and by inviting comments			ОК

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
G.1.4. Is a summary of the stakeholder comments received provided?	/1/	/1/ DR/I Only one comment was received from Forum Brasileiro de ONGs, an NGO. The comment suggests the application of sustainability criteria in order to evaluate the project's real impact on sustainable development.			OK
G.1.5. Has due account been taken of any stakeholder comments received?	/1/	DR/I	development.DR/IThe project proponent has replied that they might study the adoption of a sustainability criteria certification, but recognises that the CDM verification procedure already include the assessment of such criteria.		ОК

Table 3Resolution of Corrective Action and Clarification Requests

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
CAR 1 The licences for the CGR Piacaguera landfill are to be evidenced during the site visit.	A.3.1	The CGR Piaçaguera's operation license nº 18000614 issued on 21/06/04 was added to the PDD version 2.	OK. The licences have been attached to the PDD version 2 and have been found to be in order. However, the operational licence of the landfill gas capture and flaring project are in the process and need to be verified during the first verification of emission reductions.
CAR 2 Flare efficiency- the comments have got reversed 1) should be continuous measurement of the operation time of flare and (2) periodic measurement of methane in flared gas. CO ₂ intensity of grid electricity is the estimation "at the validation and yearly after registration". However, since the project adopts the selected emission factor ex-ante, the project proponent is requested to modify this.	D.1.3	The section D.2.2.1 of the PDD was updated according to the ACM0001 version 3. The emission factor is calculated based on ex-ante data, which means that it will only be revised at the renewal of the crediting period.	The table in D.2.2.1 has been modified regarding the flare efficiency monitoring. However, the table still says that the CO ₂ emission factor, which is fixed exante, will be measured yearly. The project proponent is requested to modify the table.
CAR 2 (Continued) The table still says that the CO ₂ emission factor, which is fixed ex-ante, will be measured yearly. The project proponent is requested to modify the table.	D.1.3	Table D.2.2.1 was corrected on PDD version 3.	OK. The monitoring frequency has been corrected to 'during baseline renewal' and is in order now.
CAR 3 The baseline emissions calculation sheet is to be checked as the figures in the spreadsheet and the PDD do not tally.	E.3.1	The PDD version 2 was updated according to the spreadsheet version 2 for emission reduction calculation, considering the crediting period from	OK. The revised worksheets have been checked and found to be in order.

Draft report corrective action requests	Ref. to	Summary of project participants'	Final conclusion
		01/04/2007 to 31/03/2014.	
CL 1 Adjustment Factor" was estimated to be 20% of total methane produced. The justification for the selection of 20% for the adjustment factor is to be presented.	B.2.2	According to AM0003 version 3, the methane content of landfill gas captured can vary by more than 20% during a single day due to gas capture network conditions (dilution with air at wellheads, leakage on pipes, etc.). In Brazil there is no rule that obliges the landfill to burn the methane. In the baseline landfill burns a small part of the methane only for security reason and a conservative factor of 20% was adopted.	OK. Since the Brazilian landfill regulations do not mandate LFG collection and destruction and only a small amount of the methane generated is currently burned due to safety and odour reasons, an "Adjustment Factor" of 20% is deemed appropriate.
CL 2 The source of the document is to be verified as the total of the pie chart adds up to more than 100.	B.2.7	The pie chart was updated and the source was presented for verification.	OK. The data for the pie chart has been verified from the latest official statistics on urban solid waste and the same has been corrected in the PDD.
CL 3 Another risk to the baseline is the premature closure of the landfill due to unavailability of sufficient quantities of waste. The project proponent is requested to confirm that the amount of wastes used in the calculations will be available for the landfill during the project lifetime.	B.2.8	Terrestre Ambiental can assure that the amount of waste will be available once CGR Piaçaguera is the only landfill in the Baixada Santista Region that has an Operational Licence from CETESB. The construction of a new landfill might take a long time, once most of the Baixada Santista Region is located close to "Parque Estadual da Serra do Mar" (an area protected by the Environmental Secretariat of São Paulo, where no constructions can be	OK. Since Piacaguera is the only landfill in the region, it can be concluded that the landfill will receive the projected quantities of waste.

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
		made) and, though, the Licencing process might more bureaucratic and take a long time.	
CL 4 It is to be clarified if the electricity grid emission factor of 0.2647 t CO2e/MWh is be calculated ex-ante or will be calculated every year	D.2.1	The choice of the adjustment factor was clarified in CL 1. The emission factor is calculated ex- ante as mentioned in CAR 3.	OK. The emission factor is calculated ex-ante.
CL 5 Procedures in section D.6 are to be evidenced.	D.6	The Project Management Planning will be defined with the start of the project activity.	OK. Since the project is yet to be implemented, this is acceptable. However, the project management planning manual is to be verified during the first verification of emission reductions.
CL 6 The consideration of a collection efficiency of 80 % is to be justified for the project activity.	F.1.1	A document from USEPA presents a conservative value of collection efficiency of 75%. The source was sent to the validation team.	OK. The 75% collection efficiency has been obtained from an US EPA analysis for landfill gas capture systems. This has been checked and found to be correct. Considering the amount of uncertainty related to the collection efficiency, which depends on the actual design and engineering of the project, this is acceptable and might be achievable if the project is implemented suitably. The CERs will be claimed on the actual amount of LFG destructed which is measured ex-post.
CL 7 Status of EIA and the environmental impacts identified and how the leachate will be treated is to be clarified and included in the PDD.	E.3.1	All the rules to the treatment of the landfill's leachate are specified in the operation license n ^o 18000614. The Environmental Impact Study for the landfill is already concluded and was	OK. The leachate treatment is specified in the license. While the environmental impact study for the landfill is already completed and the operating licences obtained, the possible environmental

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		considered for the emission of the operational license by the environmental agency.	impacts of the flare are to be analysed by the SMA through the DAIA and CETESB. The working licence for the flare system is yet to be obtained. Given that the flaring of landfill gas has little adverse environmental impacts, it is likely that the licence will be obtained when the project is implemented. At the first periodic verification of the project's emission reductions it must be confirmed that this licence was eventually obtained.

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