



VALIDATION REPORT

ANACONDA LANDFILL GAS PROJECT IN BRAZIL

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DET NORSKE VERITAS



VALIDATION REPORT

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Client: Araúna Participações e Investimentos Ltda.	Client ref.: Maurício Maruca

DET NORSKE VERITAS AS

DNV Certification

Veritasveien 1,
1322 HØVIK, Norway
Tel: +47 67 57 99 00
Fax: +47 67 57 99 11
http://www.dnv.com
Org. No: NO 945 748 931 MVA

Summary:

Det Norske Veritas Certification Ltd. (DNV) has performed a validation of the “Anaconda Landfill Gas Project” (hereafter called “the 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 documentation, 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 “Anaconda Landfill Gas Project”, as described in the revised and resubmitted project design documentation of May 2005, meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the simplified baseline and monitoring methodology ACM0001. Hence, DNV requests the registration of the “Anaconda Landfill Gas Project” as 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 the participating Parties, including confirmation by the DNA of Brazil that the project assists in achieving sustainable development.

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Abbreviations

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
CH ₄	Methane
CL	Clarification request
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DNV	Det Norske Veritas
DNA	Designated National Authority
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
LCP	Logical Control of the Programming
LFG	Landfill gas
LPG	Liquefied Petroleum Gas
MP	Monitoring Plan
MVP	Monitoring and Verification Plan
N ₂ O	Nitrous oxide
NGO	Non-governmental Organisation
ODA	Official Development Assistance
PDD	Project Design Document
UNFCCC	United Nations Framework Convention on Climate Change



1 INTRODUCTION

Araúna Participações e Investimentos Ltda. (Araúna) has commissioned Det Norske Veritas Certification Ltd, (DNV) to validate the “Anaconda Landfill Gas Project” (hereafter called “the 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 consists of the following personnel:

Ms Cintia Dias	DNV Rio de Janeiro	Team leader, CDM validator
Mr Luis Filipe Tavares	DNV Rio de Janeiro	Waste management sector expert
Mr Michael Lehmann	DNV Oslo	Technical reviewer

1.1 Validation Objective

The purpose of a validation is to have an independent third party assessing 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. The validation team has, based on the recommendations in the Validation and Verification Manual /4/, 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 Anaconda landfill at Santa Isabel, São Paulo State, Brazil, started operation in 2000 and it is expected to be closed in 2030. The landfill receives an average of 419 tonnes/day of waste, resulting in 152 935 tonnes/year. Up to 2006, landfill gas (LFG) will be collected only through a passive system, and the collected LFG will be vented and occasionally flared at the head of the wells for safety and odour control.

The Anaconda Landfill Gas Project plans to install a LFG collection and flaring system. By connecting the existing vertical drains and by flaring the collected landfill gas, the project is expected to increase the LFG collection efficiency to 75% and to flare all LFG collected.



The project is thus expected to avoid methane emissions from the landfill managed by Anaconda Ambiental. The estimated amount of GHG reduction from the project is 812 374 tonnes of CO₂e during the first renewable crediting period of 7 years starting on 1 January 2006 (116 050 tonnes of CO₂e per year on the average).

2 METHODOLOGY

The validation consists of the following three phases:

- I a desk review of the project design documentation
- 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 /4/. The protocol shows, in a 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 “Anaconda Landfill Gas Project” is enclosed in Appendix A to this report.

**Validation Protocol Table 1: Mandatory Requirements for CDM Project Activities**

Requirement	Reference	Conclusion	Cross reference
<i>The requirements the project must meet.</i>	<i>Gives reference to the legislation or agreement where the requirement is found.</i>	<i>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.</i>	<i>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.</i>

Validation Protocol Table 2: Requirement Checklist

Checklist Question	Reference	Means of verification (MoV)	Comment	Draft and/or Final Conclusion
<i>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.</i>	<i>Gives reference to documents where the answer to the checklist question or item is found.</i>	<i>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.</i>	<i>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.</i>	<i>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.</i>

Validation Protocol Table 3: Resolution of Corrective Action Requests and Requests for Clarification

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

Figure 1 Validation protocol tables



2.1 Review of Documents

The initial PDD (version of April 2005) /1/ and the revised PDD (version of May 2005) /2/ submitted by Araúna were reviewed by DNV. Also complementary spreadsheets documenting the baseline calculations were reviewed /3/.

Other documents, such as the Environmental Impact Assessment, the Environmental Licences and licence requirements, were presented together with the PDD and reviewed.

2.2 Follow-up Interviews

On 24 May 2005, DNV performed interviews with representatives of Araúna and Anaconda Landfill to confirm and to resolve issues identified in the document review. The main topics of the interviews are summarised in Table 1.

Table 1 Interview topics

Interviewed organization	Interview topics
<ul style="list-style-type: none"> ➤ Anaconda Landfill ➤ Araúna Investimentos 	<ul style="list-style-type: none"> ➤ Amount of LFG burned before the implementation of the project. The present situation of LFG collection and occasional flaring. ➤ Comments received from local stakeholders and due account to them.

2.3 Resolution of Clarification and Corrective Action Requests

Findings established during the validation can either be seen as a non-fulfilment of validation 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) CDM or host Party 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.

The validation of the project identified four (4) *Corrective Action Requests* and two (2) requests for *Clarification*. These requests were presented to the project participants in DNV's draft validation report of 23 May 2005 (rev. 0). Additional information provided by the project participants resolved these requests to DNV's full satisfaction.

To guarantee the transparency of the validation process, the concerns raised by DNV and the response provided by the project participants are documented in Table 3 of the Validation Protocol in Appendix A to this report.



3 VALIDATION FINDINGS

The findings of the validation 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 validation findings relate to the project design as documented and described in the revised PDD of May 2005.

3.1 Participation Requirements

The project participants are Anaconda Ambiental Empreendimentos Ltda. of Brazil and Araúna Investimentos e Participações Ltda of Brazil. The host Party is Brazil. No Annex I Party has yet been identified. Brazil meets all relevant participation requirements. Annex I of the PDD of April 2005 also listed Herjack Engenharia e Serviços Ltda. However, it was clarified that this entity is not a project participant and the revised PDD of May 2005 does no longer list this entity as project participant.

3.2 Project Design

The project involves a reduction of emissions of greenhouse gases by avoiding methane emissions. This objective will be achieved through connecting the existing vertical drains, the installation of an active gas recovery system and the flaring of the collected landfill gas.

The project technology represents good practise and comprises the following aspects:

- Landfill cells covered by a compacted clay layer of about one meter thick;
- Residues of water will be canalized and treated at an used water treatment plant;
- Vertical drains will be used to extract gas;
- Spacing between drains will be adequate for a maximum gas collection, which minimizes costs;
- Gas bonnet will be projected as a looping system to allow that, in case of partial or total loss of bonnet function in one direction, the functionality of the gas system is not lost, and;
- Extraction and condensed storage system will be designed in low strategic points through the gas system.

The technology for the collection and flaring of landfill gas includes:

- Elevated biogas flare type for a continuous running;
- Continuous and automated pilot, using LPG/Biogas to start ignition of the flare;
- Ignition and control panel with LCP;
- Hydraulic seal in the base;
- Flaring monitored by flow through thermal-pairs which will measure the gas speed through temperature difference in the passage;
- Gas filtering and drying system through decanting or separation.

The project complies with the Brazilian policy for sustainable development. The project is expected to contribute to sustainable development in several ways:

- it is reducing methane emissions that would enhance climate change;



- it is minimizing the risk that any explosions happen on the site;
- specialized operators will be needed for project operation, resulting in employment and capacity building.

Moreover, the project foresees the donation of 2% of the value raised with the selling of the emission reduction units for activities which will benefit the local community, the environment and the economy, as part of the social responsibility programme of the company.

The project will be financed by Anaconda and Araúna and the validation did not reveal any information that indicates that the project can be seen as a diversion of ODA funding towards Brazil.

The forecasted operational lifetime of the landfill is 30 years (2000-2030) and of the Anaconda Landfill Gas Project is 21 years and the project applies for a renewable crediting period of 7 years starting on 1 January 2006.

3.3 Project Baseline and Additionality

The project applies the approved baseline methodology AMC0001 “Consolidated baseline methodology for landfill gas project activities” /5/. The methodology AMC0001 is applicable to project activities that reduce greenhouse gas emissions through landfill gas capture and destruction of the methane by flaring and/or generating electricity. In the case of the “Anaconda Landfill Gas Project”, such destruction will occur only through flaring of LFG.

As required by AMC0001, the project uses the “Tool for demonstration and assessment of additionality”.

- (0) Step 0 does not apply as the project’s crediting period is foreseen to start on 01 January 2006,
- (1) The two scenarios considered are i) the continuation of the situation prior to project implementation (limited LFG collection with passive system and flaring, i.e. the baseline scenario) and ii) the landfill operator would invest in LFG capture and flaring. It is demonstrated that there is no legislation in Brazil obliging landfills to collect and flare/use LFG. LFG collection and utilisation of LFG to produce electricity, another potential baseline scenario, is currently not discussed. Upon request by DNV, the PDD was revised to also consider a third possible baseline scenario, i.e. the landfill operator would invest in LFG capture and utilisation for electricity generation or other commercial purposes. Nonetheless, it was demonstrated that - due to many technical constraints - LFG capture and utilisation is not a likely baseline scenario.
- (2) As there are no economic benefits other than the CDM related incomes, a simple cost analysis was presented to document the costs associated with project. The analysis demonstrates that the proposed project is economically less attractive (without the revenue from the sale of CERs) than the continuation of the current practice (limited LFG collection with passive system and flaring).
- (3) No barrier analysis was carried out.
- (4) A common practice analysis demonstrates that collection and flaring of LFG is not common practice in Brazil (with the exception of some few projects proposed as CDM project activities).
- (5) 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.



Considering that LFG was passively collected and occasionally burnt at the head of the wells for safety and odour control prior to project implementation, it is assumed that 20% of the LFG collected and utilized by the project would also have been collected and flared in the absence of the project. The selected adjustment factor (AF) of 20% is deemed reasonable considering the project specific circumstances and considering that legislation that requires landfills to collect and flare a certain amount of the LFG produced is not likely to be implemented in the short term in Brazil. Nonetheless, the present situation of LFG collection and occasional flaring will be further investigated during follow up interviews.

3.4 Monitoring Plan

The project applies the approved monitoring methodology AMC0001 “Consolidated monitoring methodology for landfill gas project activities” /6/.

The methodology AMC0001 is applicable to project activities that reduce greenhouse gas emissions through landfill gas capture and destruction of the methane by flaring and/or generating electricity. In the case of the “Anaconda Landfill Gas Project”, such destruction will occur only through flaring.

The initial monitoring plan did not apply the relevant elements of the monitoring methodology ACM0001 that are used to determine the amount of methane to be destroyed, and DNV requested that the monitoring plan shall be revised to include all the relevant monitoring indicators of ACM0001. The revised monitoring plan appropriately considers all monitoring requirements as required by ACM0001 as well as general Quality Control and Quality Assurance procedures.

3.5 Calculation of GHG Emissions

The emission reductions for LFG combustion will be directly monitored and calculated *ex-post* using the approach of the approved methodology.

The *ex-ante* estimation of emission reductions are calculated using a first order decay model and based on the expected future waste amounts to be deposited on the landfill. The calculations are transparently presented in Spreadsheets and apply appropriate values for the methane generation rate constant k and the methane generation potential L_0 . The assumed LFG collection efficiency of 75% is deemed appropriate.

According to ACM0001, CO₂ emissions related to the electricity and/or other energy carriers used in the project for gas pumping shall be accounted for if the project does not involve electricity generation. However, the emissions related to the electricity required for gas pumping are expected to be insignificant since the electricity originates from a hydropower dominated electricity grid, as it is justified in section D.2.2.2 of the PDD. It is thus deemed appropriate to disregard these emissions, considering that the costs for determining an appropriate grid emission factor would be unreasonable high.

3.6 Leakage

In accordance with ACM0001, no leakage must be considered.



3.7 Environmental Impacts

Anaconda has all the environmental licenses legally required, including an Operational Environment License as well as an Installation Environment License. The project is not expected to cause any significant environmental impacts.

3.8 Comments by Local Stakeholders

Local stakeholders were invited to comment on the project in accordance with the requirements of Resolution 1 of the Brazilian DNA. Only supportive letters were received. The letters sent to local stakeholders and the comments received will be further investigated during the follow-up interviews.

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

The PDD of April 2005 was made publicly available on www.dnv.com/certification/climatechange and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during the period 30 April 2005 to 30 May 2005.

No comment was received.



5 VALIDATION OPINION

Det Norske Veritas Certification Ltd. (DNV) has performed a validation of the “Anaconda Landfill Gas Project”, 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 Anaconda Ambiental Empreendimentos Ltda. of Brazil and Araúna Investimentos e Participações Ltda of Brazil. The host Party is Brazil. Brazil meets all relevant participation requirements.

The project proposes collection and combustion or flaring of the landfill gas (LFG) captured at the Anaconda Landfill. By flaring landfill gas, the project results in the reduction of CH₄ emission, that is real, measurable and give long-term benefits and that are additional to what would have occurred in the absence of the project. Given that the project is implemented as designed, the project is likely to achieve the estimated amount of emission reductions.

The project is not expected to have considerable environmental impacts and the landfill has received an environmental licence by CETESB.

The project applies the baseline and monitoring methodology ACM0001: “Consolidated baseline methodology for landfill gas projects 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 absence of the project activity.

The monitoring plan sufficiently specifies the monitoring requirements of the main project indicators.

Local stakeholders’ comments were invited according Brazilian DNA Resolution 1.

In summary, it is DNV’s opinion that the “Anaconda Landfill Gas Project” in Brazil, as described in the PDD of May 2005, 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 requests the registration of the “Anaconda Landfill Gas Project” as 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 a confirmation that the project assists in achieving sustainable development.



REFERENCES

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

- /1/ Project Design Document for the Anaconda Landfill Gas Project, Version 0 (April 2005)
- /2/ Project Design Document for the Anaconda Landfill Gas to Energy Project, Version 1 (May 2005)
- /3/ Araúna and Anaconda Ambiental S/A: Datasheet to calculate the Baseline and Project Emissions, Excel spreadsheets, April 2005

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

- /4/ International Emission Trading Association (IETA) & the World Bank's Prototype Carbon Fund (PCF): *Validation and Verification Manual*. <http://www.vvmanual.info>
- /5/ Approved Baseline Methodology AMC0001: "Consolidated baseline methodology for landfill gas projects activities". Version 01 of 03 September 2004.
- /6/ Approved Monitoring Methodology ACM0001: "Consolidated monitoring methodology for landfill gas projects activities". Version 01 of 03 September 2004.

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

- /7/ Nino Sérgio Bottini – Araúna Participações e Investimentos Ltda
- /8/ Maurício Maruca – Araúna Participações e Investimentos Ltda
- /9/ Larry Stuber - Herjack Engenharia e Serviços Ltda

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APPENDIX A

CDM VALIDATION PROTOCOL

Table 1 Mandatory Requirements for Clean Development Mechanism (CDM) Project Activities

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	OK	Table 2, Section E.4.1 No participating Annex I Party is 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.3 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
3. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC	Kyoto Protocol Art.12.2.	OK	Table 2, Section E.4.1
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 greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity	Kyoto Protocol Art. 12.5c, CDM Modalities and Procedures §43	OK	Table 2, Section B.2
7. Potential public funding for the project from Parties in Annex I shall not be a diversion of official development assistance	Decision 17/CP.7	OK	The validation did not reveal any information that indicates that the project can be seen as a diversion of ODA funding towards Brazil.
8. Parties participating in the CDM shall designate a national	CDM Modalities and	OK	The Brazilian DNA is the "Comissão

Requirement	Reference	Conclusion	Cross Reference / Comment
authority for the CDM	Procedures §29		Interministerial de Mudança Global do Clima"
9. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol	CDM Modalities §30/31a	OK	Brazil 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 identified yet
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 identified yet
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	OK	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	OK	Table 2, Section B.1.1 and D.1.1
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	OK	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	OK	Presented for public comments in the period from 30 April 2005 to 30 May 2005 on climatechange.dnv.com and comments were invited via the UNFCCC CDM website. 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 sectorial policies and circumstances	CDM Modalities and Procedures §45c,d	OK	Table 2, Section B.2

Requirement	Reference	Conclusion	Cross Reference / Comment
18. 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	OK	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	OK CAR-1 CL-1	PDD is in accordance with CDM-PDD (version 02 of 1 July 2004)

Table 2 Requirements Checklist

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
A. General Description of Project Activity <i>The project design is assessed.</i>					
A.1. Project Boundaries <i>Project Boundaries are the limits and borders defining the GHG emission reduction project.</i>					
A.1.1. Are the project's spatial (geographical) boundaries clearly defined?	/1/	DR	The Anaconda Landfill Gas to Energy Project is located at the: Estrada Velha de Santa Isabel Mogi km 3 - Bairro Cachoeira - Santa Isabel, São Paulo.		OK
A.1.2. Are the project's system (components and facilities used to mitigate GHGs) boundaries clearly defined?	/1/	DR	The project system's boundaries are limited to the geographic area of the Anaconda Landfill site and include the landfill gas capture as well as flaring system.		OK
A.2. Technology to be employed <i>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.</i>					
A.2.1. Does the project design engineering reflect current good practices?	/1/	DR	The project design engineering reflects good practice through the use of: landfill cells covered with a compacted clay layer, a landfill gas recovery by means of an interconnection of vertical drains through aerial horizontal tubing, which then are connected to the gas suction and flaring equipment. Residues are treated in a		OK

* MoV = Means of Verification, DR= Document Review, I= Interview, N/A=Not Applicable

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			water treatment plant		
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	Common practice in Brazil is a sanitary landfill without an active landfill gas recovery system and LFG flaring only for safety reasons.		OK
A.2.3. Is the project technology likely to be substituted by other or more efficient technologies within the project period?	/1/	DR	The project is unlikely to be replaced by other more efficient technologies.		OK
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	The project needs expertise for the operation of the gas collection and treatment system. The supplier of the flaring system will be responsible for assisting the pre-commissioning, training of operators and starting up of the plant. It will also provide technical assistance and consulting, including all the specialized engineering services also related to the Biogas System.		OK
A.2.5. Does the project make provisions for meeting training and maintenance needs?	/1/	DR	Yes, see A.2.4		OK
A.3. Contribution to Sustainable Development <i>The project's contribution to sustainable development is assessed.</i>					
A.3.1. Is the project in line with relevant legislation and plans in the host country?	/1/	DR	Yes, the landfill has the required Installation as well as the Operation License issued by CETESB according EIA presented to SMA/DAIA.		OK
A.3.2. Is the project in line with host-country specific CDM requirements?	/1/	DR	The consultation of local stakeholders was carried out according Resolution 1 of Brazilian DNA, and all the letters received support the project.		OK
A.3.3. Is the project in line with sustainable	/1/	DR	The project is in line with current sustainable		

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
development policies of the host country?			development priorities in Brazil. Nevertheless, the DNA of Brazil has not yet confirmed that the project assists in achieving sustainable development.		
A.3.4. Will the project create other environmental or social benefits than GHG emission reductions?	/1/	DR	The project is expected to create some jobs during its implementation and some staff will be employed for operation. The project will also create environmental benefits by avoiding odour emanated from the landfill.		OK
B. Project Baseline <i>The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.</i>					
B.1. Baseline Methodology <i>It is assessed whether the project applies an appropriate baseline methodology.</i>					
B.1.1. Is the baseline methodology previously approved by the CDM Executive Board?	/1/	DR	The project applies the approved baseline methodology ACM0001 "Consolidated Baseline Methodology for Landfill Gas Project Activities".		OK
B.1.2. Is the baseline methodology the one deemed most applicable for this project and is the appropriateness justified?	/1/	DR	The project fulfils the conditions under which AM0001 defines the applicability; it means that the captured gas is flared.		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
B.2. Baseline Determination <i>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.</i>					
B.2.1. Is the application of the methodology and the discussion and determination of the chosen baseline transparent?	/1/	DR	The arguments, which are presented, demonstrate that the project's establishment is in compliance with the chosen baseline methodology ACM0001.		OK
B.2.2. Has the baseline been determined using conservative assumptions where possible?	/1/	DR	Although there is only occasional flaring in the baseline scenario, It is mentioned that an Adjustment Factor (AF) of 20 % was selected in order to be conservative. The present situation of LFG collection and occasional flaring will be further investigated during follow up interviews.		OK
B.2.3. Has the baseline been established on a project-specific basis?	/1/	DR	The baseline methodology was applied taking into account project specific circumstances, such as the project specific requirements contained in the license for operating the landfill and a project specific financial analysis.		OK
B.2.4. Does the baseline scenario sufficiently take into account relevant national and/or sectorial policies, macro-economic trends and political aspirations?	/1/	DR	Environment regulation in Brazil is more concerned with waste disposal in an adequate way (landfill) and no changes are foreseen regarding new requirements to LFG recovery and destruction.		OK
B.2.5. Is the baseline determination compatible with the available data?	/1/	DR	The baseline emissions are estimated based on IPCC's First Decay Order Methodology, based on the expected amount of waste dumped from 2000 until 2012.		OK
B.2.6. Does the selected baseline represent the most	/1/	DR	The PDD presents, according to the "Tool for	CAR-2	OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
likely scenario among other possible and/or discussed scenarios?			demonstration and assessment of "additionality" two scenarios (continued LFG release and LFG destruction with flares). LFG collection and utilisation of LFG to produce electricity, another potential baseline scenario, is currently not discussed, but should be included in the analysis of possible baseline scenarios.		
B.2.7. Is it demonstrated/justified that the project activity itself is not a likely baseline scenario (e.g. through (a) a flow-chart or series of questions that lead to a narrowing of potential baseline options, (b) a qualitative or quantitative assessment of different potential options and an indication of why the non-project option is more likely, (c) a qualitative or quantitative assessment of one or more barriers facing the proposed project activity or (d) an indication that the project type is not common practice in the proposed area of implementation, and not required by a Party's legislation/regulations)?	/1/	DR	<p>The PDD, on section B.3 includes a series of questions according to the "Tool for demonstration and assessment of "additionality" to justify why the project is not a likely baseline scenario.</p> <p>Step 0 does not apply as the project has not yet started.</p> <p>Step 1a - The two scenarios considered are i) the continuation of the situation prior to project implementation (limited LFG collection with passive system and flaring, i.e. the baseline scenario) and ii) the landfill operator would invest in LFG capture and flaring.</p> <p>Step 1b - No legal requirement is likely to be implemented with respect to capture and destruction of LFG.</p> <p>Step 2 - Option I, simple cost analysis, was chosen as there are no economic benefits other than the CDM related incomes. The analysis demonstrates all the costs related to the CDM project and demonstrates that the proposed project is economically less attractive (without the revenue from the sale of CERs) than the</p>		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			continuation of the current practice. Step 4 - A common practice analysis demonstrates that the collection and flaring of LFG is not common practice in Brazil (with the exception of some few projects proposed as CDM project activities). Step 5 - As there is no income from the project, the sale of CERs will significantly alleviate the economic and financial hurdles of the project.		
B.2.8. Have the major risks to the baseline been identified?	/1/	DR	The monitoring plan includes the review of Brazilian regulations with respect to LFG regulations.		OK
B.2.9. Is all literature and sources clearly referenced?	/1/	DR	Yes		OK
C. Duration of the Project/ Crediting Period <i>It is assessed whether the temporary boundaries of the project are clearly defined.</i>					
C.1.1. Are the project's starting date and operational lifetime clearly defined and reasonable?	/1/	DR	The project is foreseen to start on 01 January 2006 and the project's expected operational lifetime is 21 years.		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 7 years crediting period starting on 1 January 2006 has been chosen.		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
D. Monitoring Plan <i>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).</i>					
D.1. Monitoring Methodology <i>It is assessed whether the project applies an appropriate baseline methodology.</i>					
D.1.1. Is the monitoring methodology previously approved by the CDM Executive Board?	/1/	DR	The project applies the approved monitoring methodology ACM0001 "Consolidated monitoring methodology for landfill gas to project activities".		OK
D.1.2. Is the monitoring methodology applicable for this project and is the appropriateness justified?	/1/	DR	Yes, the GHG emissions reductions will be obtained through direct measurement according to approved monitoring methodology.		OK
D.1.3. Does the monitoring methodology reflect good monitoring and reporting practices?	/1/	DR	<p>The monitoring plan does not apply the relevant elements of the monitoring methodology ACM0001 that are used to determine the amount of methane to be destroyed. The monitoring plan must be revised to include all the relevant monitoring indicators of ACM0001:</p> <ul style="list-style-type: none"> the flare combustion efficiency must be monitored by continuously monitoring the operating hours of the flare and by quarterly (or monthly if unstable) measuring the flare efficiency (instead of only each semester as indicated in the monitoring plan) 	CAR-3 CL-2	OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			<ul style="list-style-type: none"> • the temperature and pressure of the LFG must be monitored • the total amount of electricity and/or other energy carriers used in the project for gas pumping must be monitored • the CO₂ emission intensity of the electricity and/or other energy carriers must be determined. <p>Moreover, instead of monitoring regulatory requirements relating to landfill gas projects as required by ACM0001, LFG captured in a control group is proposed to be monitored. Further details on the appropriateness of the proposed control group, the criteria to be used to assess the control group should be provided to demonstrate that the monitoring of LFG captured in the control group is comparable to monitoring regulatory requirements (CL). Moreover, according to ACM0001, monitoring should be annually instead of every 7 years as indicated in the monitoring plan.</p>		
D.1.4. Is the discussion and selection of the monitoring methodology transparent?	/1/	DR	In line with one of the applicability conditions, the captured gas is flared and emission reductions are claimed only for LFG destruction.		OK
D.2. Monitoring of Project Emission Reductions <i>It is established whether the monitoring plan provides for reliable and complete project emission data over time.</i>					
D.2.1. Does the monitoring plan provide for the	/1/	DR	See D.1.3	CAR-3	OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas emissions within the project boundary during the crediting period?					
D.2.2. Are the choices of project GHG indicators reasonable?	/1/	DR	See D.1.3	CAR-3	OK
D.2.3. Will it be possible to monitor / measure the specified project GHG indicators?	/1/	DR	See D.1.3	CAR-3	OK
D.2.4. Will the indicators give opportunity for real measurements of achieved emission reductions?	/1/	DR	See D.1.3	CAR-3	OK
D.2.5. Will the indicators enable comparison of project data and performance over time?	/1/	DR	See D.1.3	CAR-3	OK
D.3. Monitoring of Leakage <i>It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.</i>					
D.3.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	/1/	DR	No leakage needs to be accounted for as per AMC0001.		OK
D.4. Monitoring of Baseline Emissions <i>It is established whether the monitoring plan provides for reliable and complete project emission data over time.</i>					
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	Not applicable. According to the approved methodology AMC0001, emission reductions are directly monitored.		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
D.5. Monitoring of Sustainable Development Indicators/ Environmental Impacts <i>It is checked that choices of indicators are reasonable and complete to monitor sustainable performance over time.</i>					
D.5.1. Does the monitoring plan provide the collection and archiving of relevant data concerning environmental, social and economic impacts?	/1/	DR	Neither ACM0001 nor the Brazilian DNA requires monitoring of sustainable development indicators.		OK
D.6. Project Management Planning <i>It is checked that project implementation is properly prepared for and that critical arrangements are addressed.</i>					
D.6.1. Is the authority and responsibility of project management clearly described?	/1/	DR	Procedures established on QA/QC and the operational and management structure that the project proponent will implement when starting up the project can be considered adequate. The implementation of these procedures and management structure should be verified during the first period verification of emission reductions. Nonetheless, the QA/QC table in section D.3 of the PDD has to be prepared according to the monitoring plan established in the ACM0001	CAR-4	OK
D.6.2. Is the authority and responsibility for registration, monitoring, measurement and reporting clearly described?	/1/	DR	As the project is not yet implemented, an implantation and operation process planning for the project will be elaborated. It should be verified during the first period verification of emission reductions.		OK
D.6.3. Are procedures identified for training of	/1/	DR	It will be the supplier's responsibility.		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
monitoring personnel?					
D.6.4. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/	DR	The quality guarantee measures will include procedures for treating and correcting non-conformities in the implementation of the project and in the operation and maintenance of the system. It should be verified during the first period verification of emission reductions.		OK
D.6.5. Are procedures identified for calibration of monitoring equipment?	/1/	DR	The calibration of the measurement equipment and/or monitoring will be done periodically, according to the requirements of INMETRO (Metrology National Institute), norms applied to ABNT and the precision requirements established in the used equipment maintenance plan. It should be verified during the first period verification of emission reductions.		OK
D.6.6. Are procedures identified for maintenance of monitoring equipment and installations?	/1/	DR	A maintenance plan will be elaborated and it should be verified during the first period verification of emission reductions.		OK
D.6.7. Are procedures identified for monitoring, measurements and reporting?	/1/	DR	It should be verified during the first period verification of emission reductions.		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	It should be verified during the first period verification of emission reductions.		OK
D.6.9. Are procedures identified for dealing with possible monitoring data adjustments and uncertainties?	/1/	DR	It should be verified during the first period verification of emission reductions.		OK
D.6.10. Are procedures identified for review of reported results/data?	/1/	DR	It should be verified during the first period verification of emission reductions.		OK
D.6.11. Are procedures identified for internal audits of	/1/	DR	It should be verified during the first period		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
GHG project compliance with operational requirements where applicable?			verification of emission reductions.		
D.6.12. Are procedures identified for project performance reviews before data is submitted for verification, internally or externally?	/1/	DR	It should be verified during the first period verification of emission reductions.		OK
D.6.13. Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting?	/1/	DR	It should be verified during the first period verification of emission reductions.		OK
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.</i>					
E.1.Predicted Project GHG Emission Reductions <i>The validation of predicted project GHG emissions focuses on transparency and completeness of calculations.</i>					
E.1.1. Are all aspects related to direct and indirect GHG emissions captured in the project design?	/1/	DR	<p>IPPC's first order decay model has been applied to estimate expected LFG generation based on the historic and expected future waste volume. Based on the LFG generation rate, the CH₄ emissions avoided by the project are directly estimated.</p> <p>According to ACM0001, CO₂ emissions related to the electricity and/or other energy carriers used in the project for gas pumping shall be accounted for if the project does not involve electricity generation. However, the emissions related to the electricity required for gas pumping are expected to be insignificant since</p>		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			the electricity originates from a hydropower dominated electricity grid, as it is justified in section D.2.2.2 of the PDD. It is thus deemed appropriate to disregard these emissions, considering that the costs for determining an appropriate grid emission factor would be unreasonable high.		
E.1.2. Are the GHG calculations documented in a complete and transparent manner?	/1/	DR	The expected collection efficiency of the LFG recovery system and the assumed methane fraction in LFG is mentioned. The figures k_0 and L_0 considered in the First Order Decay model were verified and considered conservative compared with IPCC default values.		OK
E.1.3. Have conservative assumptions been used to calculate project GHG emissions?	/1/	DR	See E.1.1 and E.1.2		OK
E.1.4. Are uncertainties in the GHG emissions estimates properly addressed in the documentation?	/1/	DR	See E.1.1 and E.1.2		OK
E.1.5. Have all relevant greenhouse gases and source categories listed in Kyoto Protocol Annex A been evaluated?	/1/	DR	Yes.		OK
E.2. Leakage <i>It is assessed whether there leakage effects, i.e. change of emissions that occurs outside the project boundary and which are measurable and attributable to the project, have been properly assessed.</i>					
E.2.1. Are potential leakage effects beyond the chosen project boundaries properly identified?	/1/	DR	No leakage must be considered as per ACM0001.		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
E.3. Baseline Emissions <i>The validation of predicted baseline GHG emissions focuses on transparency and completeness of calculations.</i>					
E.3.1. Have the most relevant and likely operational characteristics and baseline indicators been chosen as reference for baseline emissions?	/1/	DR	Not applicable, because emission reductions are directly calculated.		OK
E.4. Emission Reductions Validation of baseline GHG emissions will focus on methodology transparency and completeness in emission estimations.					
E.4.1. Will the project result in fewer GHG emissions than the baseline scenario?	/1/	DR	The project is expected to abate - during the first credit period – 812 374 tonnes of CO ₂ e (67 698 tonnes of CO ₂ e per year on the average).		OK
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.</i>					
F.1.1. Has an analysis of the environmental impacts of the project activity been sufficiently described?	/1/		An Environment License was issued by CETESB according to EIA presented to SMA/DAIA.		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	See F.1.1		OK
F.1.3. Will the project create any adverse environmental effects?	/1/	DR	Not foreseen		OK
F.1.4. Are transboundary environmental impacts considered in the analysis?	/1/	DR	Not foreseen		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
F.1.5. Have identified environmental impacts been addressed in the project design?	/1/	DR	No significant negative environment impacts are foreseen on the project, only positive impacts as methane combustion/destruction and odour reduction.		OK
F.1.6. Does the project comply with environmental legislation in the host country?	/1/	DR	Yes		OK
G. Stakeholder Comments <i>The validator should ensure that a stakeholder comments have been invited and that due account has been taken of any comments received.</i>					
G.1.1. Have relevant stakeholders been consulted?	/1/	DR	The consultations of local stakeholders were done according to the Brazilian DNA Resolution #1. Only supportive letters were received.		OK
G.1.2. Have appropriate media been used to invite comments by local stakeholders?	/1/	DR	See G.1.1.		OK
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	See G.1.1		OK
G.1.4. Is a summary of the stakeholder comments received provided?	/1/	DR	See G.1.2		OK
G.1.5. Has due account been taken of any stakeholder comments received?	/1/	DR	See G.1.2		OK

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Table 3 Resolution of Corrective Action and Clarification Requests

Draft report corrective action requests and requests for clarifications	Ref. to Table 1 & 2	Summary of project participants' response	Final conclusion
CAR 1 Section G.3 of the PDD must be completed.	Table 1	Section G.3 of the PDD was completed with: No relevant comments were received.	OK. Section G.3 of the revised PDD of May 2005 is completed.
CAR 2 LFG collection and utilisation of LFG to produce electricity, another potential baseline scenario, is currently not discussed, but should be included in the analysis of possible baseline scenarios.	B.2.6	A revised PDD includes this alternative, but it was not considered relevant. See section B.3. – Sub-step 1a. Option 3.	OK. Section B.3 of the revised PDD of May 2005 analyses a third baseline alternative. However, it is demonstrated that LFG capture and utilisation for electricity generation or other commercial purposes is not a likely baseline scenario due to technical and infrastructure constraints.
CAR 3 The monitoring plan does not apply the relevant elements of the monitoring methodology ACM0001. The monitoring plan must be revised to include all the relevant monitoring indicators of ACM0001: <ul style="list-style-type: none">• the flare combustion efficiency must be monitored by continuously monitoring the operating hours of the flare and by quarterly (or monthly if unstable) measuring the flare efficiency (instead of only each semester as indicated in the monitoring plan)• the temperature and pressure of the LFG must be monitored• the total amount of electricity and/or other energy carriers used in the project for gas pumping must be monitored	D.1.3 D.2.1	A revised PDD includes the relevant elements of the monitoring methodology established in ACM0001. (see table D.2.2.2. on PDD). The amount of electricity used for gas pumping might be considered insignificant, furthermore, the energy system uses clean forms of generation as explained in section D.2.2.2 of the PDD.	OK. Section D.2.2.1 of the revised PDD of May 2005 adequately provides the requested complementary monitoring elements.

Draft report corrective action requests and requests for clarifications	Ref. to Table 1 & 2	Summary of project participants' response	Final conclusion
<ul style="list-style-type: none"> the CO₂ emission intensity of the electricity and/or other energy carriers must be determined. 			
<p>CAR 4</p> <p>The QA/QC table D.3 has to be prepared according to the monitoring plan established in the ACM0001.</p>	D.6.1	A revised PDD was prepared according to the monitoring methodology established in the ACM0001. See table D.3	OK. Section D.3 of the revised PDD of May 2005 adequately provides the requested complementary QA/QC procedures.
<p>CL 1</p> <p>Annex I of the PDD also lists Herjack Engenharia e Serviços Ltda. and it remains to be clarified if this entity is also a project participant that should be listed in section A.3 of the PDD.</p>	Table 1	The name of Herjack Engenharia e Serviços Ltda. was excluded from the Annex 1.	OK. The revised PDD of May 2005 excluded this entity as it is not a project participant.
<p>CL 2</p> <p>Instead of monitoring regulatory requirements relating to landfill gas projects as required by ACM0001, LFG captured in a control group is proposed to be monitored. Further details on the appropriateness of the proposed control group, the criteria to be used to assess the control group should be provided to demonstrate that the monitoring of LFG captured in the control group is comparable to monitoring regulatory requirements. Moreover, according to ACM0001, monitoring should be annually instead of every 7 years as indicated in the monitoring plan.</p>	D.1.3	The monitoring regulatory requirements relating to landfill gas projects were included in the table D.2.2.2., according to ACM0001 monitoring methodology.	OK. The monitoring plan in the revised PDD of May 2005 complies with the requirements of ACM0001 and the initially presented control group is no longer considered.

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