



# PRELIMINARY VALIDATION REPORT

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## CAIEIRAS LANDFILL GAS EMISSION REDUCTION PROJECT IN BRAZIL

REPORT No. 2005-0458

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DET NORSKE VERITAS



## PRELIMINARY VALIDATION REPORT

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### Summary:

DNV is currently performing a validation of the Caieiras Landfill Gas Emission Reduction Project in Brazil, on the basis of UNFCCC and host Party criteria for CDM projects, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to the Kyoto Protocol criteria and the modalities and procedures for CDM project activities as agreed in the Marrakech Accords. This draft validation report summarizes the preliminary findings of the validation.

The validation consists of the following three phases: i) a desk review of the project design and the 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, the Caieiras Landfill Gas Emission Reduction Project, as documented in the PDD of March 2005, meets all present and relevant UNFCCC criteria and correctly applies the approved baseline and monitoring methodologies ACM0001. However, the project has not yet been approved by the DNA of the participating Parties, and the DNA of Brazil has not yet confirmed the project's contribution to sustainable development.

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Work verified by: Michael Lehmann			
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***Abbreviations***

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
CH <sub>4</sub>	Methane
CL	Clarification request
CO <sub>2</sub>	Carbon dioxide
CO <sub>2</sub> e	Carbon dioxide equivalent
DNV	Det Norske Veritas
DNA	Designated National Authority
GHG	Greenhouse gas(es)
IPCC	Intergovernmental Panel on Climate Change
kWh	Kilo Watt hour
LFG	Landfill gas
MP	Monitoring Plan
MVP	Monitoring and Verification Plan
NGO	Non-governmental Organisation
ODA	Official Development Assistance
PDD	Project Design Document
UNFCCC	United Nations Framework Convention on Climate Change
GWP	Global Warming Potential



## 1 INTRODUCTION

Essencis Soluções Ambientais S.A. (Essencis) has commissioned Det Norske Veritas Certification Ltd. (DNV) to validate the Caieiras Landfill Gas Emission Reduction Project, at Caieiras Municipality; São Paulo State, Brazil.

This report summarises the preliminary findings of the validation of the project, performed on the basis of UNFCCC and host Party criteria for CDM projects, as well as criteria given to provide for consistent project operations, monitoring and reporting.

### 1.1 Objective

The purpose of a validation is to have an independent third party assess the project design. In particular, the project's baseline, the monitoring plan, 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 Kyoto Protocol criteria for the CDM, the CDM rules and modalities as agreed in the Marrakech Accords and relevant decisions by the CDM Executive Board. The validation team has employed, based on the recommendations in the Validation and Verification Manual /6/ 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 corrective actions may provide input for improvement of the project design.

The validation team consists of the following personnel:

Mr Luis Filipe Tavares	DNV Rio de Janeiro	Team leader, Waste sector expert
Mrs Susanne Haefeli	DNV Oslo	GHG auditor
Mrs Cintia Dias	DNV Rio de Janeiro	GHG auditor
Mr Michael Lehmann	DNV Oslo	Internal verifier

### 1.3 Caieiras Landfill Gas Emission Reduction Project

The Caieiras landfill started operation in 2002. The landfill area is 1,880,000 m<sup>2</sup>. At present the landfill gas (LFG) is collected only through a passive system, with no systematic and monitored flaring of methane.

The aim of the Caieiras Landfill Gas Emission Reduction Project is to enhance the already operational passive vent system, in order to increase the efficiency in collecting the gas and flare it systematically, continuously monitoring the operation. The project's core idea is to avoid methane emissions from the landfill managed by Essencis in the Caieiras municipality. This



objective will be achieved through installation of an active gas recovery system and by flaring the recovered LFG.

The estimated amount of GHG reduction from the project is 1 901 386 tCO<sub>2</sub>e during the first crediting period (7 years), resulting in estimated average annual emission reductions of 271 626 tCO<sub>2</sub>e.

## 2 METHODOLOGY

The validation consists of the following three phases:

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

This preliminary validation report summarises the findings after phase I, II and part of phase III of the validation.

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 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 Caieiras Landfill Gas Emission Reduction Project is enclosed in Appendix A to this report.

### 2.1 Review of Documents

The initial Project Design Document (version 1 of November 2004) /1/ submitted by Essencis on 22 November 2004 was reviewed by DNV. After the review of the PDD and DNV's site visit, the initial validation findings were communicated to Essencis. To respond to the concerns raised in the initial validation, a revised PDD (version 2 of March 2005) /2/ was submitted on 23 March 2005.

Other documents, such as the Environmental Impact Assessment, the Environmental Licences and licence requirements, were reviewed during the site visit in order to ensure the accuracy of the relevant information.



<b>Validation Protocol Table 1: Mandatory Requirements for CDM Project Activities</b>			
<b>Requirement</b>	<b>Reference</b>	<b>Conclusion</b>	<b>Cross reference</b>
<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 <b>Corrective Action Request (CAR)</b> of risk or non-compliance with stated requirements or a request for <b>Clarification (CL)</b> 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>

  

<b>Validation Protocol Table 2: Requirement Checklist</b>				
<b>Checklist Question</b>	<b>Reference</b>	<b>Means of verification (MoV)</b>	<b>Comment</b>	<b>Draft and/or Final Conclusion</b>
<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 <b>Corrective Action Request (CAR)</b> due to non-compliance with the checklist question (See below). A request for <b>Clarification (CL)</b> is used when the validation team has identified a need for further clarification.</i>

  

<b>Validation Protocol Table 3: Resolution of Corrective Action Requests and Requests for Clarification</b>			
<b>Draft report corrective action requests and requests for clarifications</b>	<b>Ref. to Table 2</b>	<b>Summary of project participants' response</b>	<b>Final conclusion</b>
<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**



## 2.2 Follow-up Interviews

On 11 February 2005 DNV performed interviews with Essencis during a site visit at the Caieiras Landfill at Caieiras, São Paulo State, in order to confirm and resolve issues identified during the document review.

The main topics of the interviews were:

- Management System
  - authority and responsibilities
  - training
  - maintenance
  - monitoring, measurement and calibration of monitoring equipment
  - emergency preparedness
  - records maintenance
  - internal audits
  - corrective actions
- Environmental or social benefits created by the GHG emission reduction project
- Environmental aspect control
- Environmental licenses.

## 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 initial validation of the project identified 7 *Corrective Action Requests* and 8 requests for *Clarification*.

These *Corrective Action Requests* and requests for *Clarification* were discussed during the site visit on 11 February 2005. In order to respond to these requests, Essencis submitted a revised version of the PDD /2/. The revised PDD and the response provided by Essencis sufficiently addressed all requests with the exception of one *Corrective Action Request* related to the missing approval by the DNA of the participating Parties.

To guarantee the transparency of the validation process, the concerns raised and responses given are documented in more detail in Table 3 of the validation protocol in Appendix A.





### 3 PRELIMINARY VALIDATION FINDINGS

The preliminary 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.

#### 3.1 Participation Requirements

The project participants are Essencis Soluções Ambientais SA (Brazil) and Electric Power Development Co., Ltd. (Japan). The participating Parties - Brazil as host Party and Japan as Annex I Party - meet all relevant participation requirements. However, the Designated National Authorities (DNA) of Brazil and Japan have not yet approved the project.

#### 3.2 Project Design

The aim of the project is to enhance the operational passive vent system, in order to increase the efficiency of gas collection and flare it systematically and continuously monitor the operations. For this purpose, an active recovery system as well as a flare facility will be installed in the landfill. This comprises connecting well heads through pipes, which are connected to a blower, where the gas is sent to the flare.

The Caieiras Landfill has a LFG selling contract under discussion with local industries. If the contract is concluded, the revenues from the gas sale will make this methane collection feasible (estimated from 25 to 40% of methane collected) without the need of CER revenues. The methane collected and sold to local industries will thus be included in the baseline.

Also there is another internal application under study for the LFG. It may be used to run a Thermal Desorption Unit (TDU) installed on the landfill to treat polluted soils. The TDU is already in operation but with another fuel source.

The technology employed at Caieiras Landfill comprises the following components:

- A high-density polyethylene membrane impermeable layer,
- Leachate drainage system using high-density polyethylene pipes,
- Landfill gas passive collection system,
- Rain water drainage system,
- Solid waste admission control,
- Enclosed sites,
- Green belt,
- Revegetation practices,

The project has several positive impacts towards sustainable development:

- It aims at reducing methane emissions that would otherwise enhance climate change;
- It will minimize the risk of any explosions happening on site;
- The project applies technology that is not yet widely applied in Brazil, resulting in a technology transfer;
- Specialized operators will be needed for project operation, resulting in employment and capacity-building.



The project complies with the Brazilian policy for sustainable development. However, the DNA of Brazil has not yet confirmed the project's contribution to sustainable development.

The project will be funded by Essencis and no public funding is used. The validation has not revealed any information that indicated that project funding is a diversion of official development assistance (ODA) from an Annex I country.

The Caieiras Landfill Gas Emission Reduction Project has an expected operational lifetime of 20 years and applies a renewable crediting period of 7 years starting on 1 September 2005.

### 3.3 Baseline and Additionality

The project applies the approved baseline methodology ACM0001 – “Consolidated baseline methodology for landfill gas projects activities” /7/. 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 Caieiras Landfill Gas Emission Reduction Project, the destruction of methane will be done through flaring. As mentioned in the PDD, part of the LFG collected could be sold as combustible to a local industry and this LFG will be discounted from total emission reductions claimed by the project.

In accordance with ACM0001, the additionality of Caieiras Landfill Gas Emission Reduction Project is demonstrated through the “Tool for the demonstration and assessment of additionality”, which includes the following steps:

0. The project will start after registration as a CDM project activity.
1. There is no legislation in Brazil obliging landfills to flare the collected gas. Under non-CDM conditions, Caieiras would not make the necessary investments to increase the collection efficiency and flare the gas systematically under continuous monitoring, since there would be no financial benefit from such an investment. The possible baseline scenarios are: a) BAU (passive venting and flaring of LFG) and b) partial capture and sale to an industry (45%) and passive venting and flaring of the rest of the LFG emissions.
2. *Not applicable* (Only Step 3 is selected)
3. It was demonstrated that the project is not a likely baseline scenario due to the additional costs necessary for increasing the LFG capture capacity without having any revenues.
4. The possible future legislation that requires landfills to quantify and flare a certain amount of the gas produced is not likely to happen in near future when considering the waste disposition situation in Brazil. Today 56% of waste produced in Southeast of Brazil is disposed as dump and only about 37 % is destined to sanitary landfill. A major environmental problem related to domestic waste in Brazil is the lack of waste disposal to sanitary landfills.
5. The sale of CERs will provide the necessary revenue for the project to make it economically feasible.

Considering the fact that currently landfill gas is only collected by a passive system and occasionally burnt and that no future legislation requiring landfill gas collection and flaring is expected, the selected default effectiveness adjustment factor (AF) of 20%, i.e. assuming that 20% of the landfill gas recovered and flared in the project would also be recovered and flared in the baseline scenario, is appropriate.



If LFG can be sold to local industry, but if the amount of LFG sold is less than 20% of the LFG recovered by the project, the AF will remain 20%. If LFG can be sold to local industry and the amount of LFG sold is larger than 20% of the LFG recovered by the project, the AF will be adjusted to be the share of recovered LFG sold to local industry. The amount of LFG sold to local industry will be monitored and the AF will be adjusted *ex-post*, if applicable.

### 3.4 Monitoring Plan

The Caieiras Landfill Gas Emission Reduction Project correctly applies the approved monitoring methodology ACM0001 - "Consolidated monitoring methodology for landfill gas projects activities" /8/.

Details of the data to be collected, the frequency of data recording, its certainty, and format and storage location are described. The recording frequency of the data seems appropriate for the project. Algorithms and formulae used have also been clearly established.

The Quality Control and Quality Assurance datasheet for the project identifies several monitoring routines, including auditing, corrective actions and data review procedures, as could be verified during site visit. It must also be noted that Caieiras has ISO 9001:00 certification.

### 3.5 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. The calculation ensures conservativeness by using an Effectiveness Adjustment Factor of 20% (or amount of LFG sold to industry) and 80 % landfill gas collection efficiency. The assumptions used to estimate LFG generation seem appropriate and are based on the IPCC Good Practise Guidance and Brazilian conditions.

### 3.6 Leakage

Potential leakage are the emissions resulting from generating the electricity used to pump the LFG. According to ACM0001, "project participants should account for CO<sub>2</sub> emissions by multiplying the quantity of electricity required with the CO<sub>2</sub> emissions intensity of the electricity displaced". Given that an average emission intensity of the Brazilian grid is an appropriate methodology for calculating an emission factor and given that the average emission intensity of the Brazilian grid is very low due to the dominance of hydropower in the Brazilian grid, the project is unlikely to result in significant leakage effects. It is thus deemed appropriate that the electricity consumption of the project is not monitored and that possible emissions resulting from generating the electricity used to pump the LFG are not accounted for.

### 3.7 Environmental Impacts

The Caieiras landfill has an Operation Environmental Licence which was issued after the project's Environmental Impact Assessment was evaluated by the State Environmental Agency (CETESB).

The environmental Licences and the fulfilment of conditional clauses have been verified during the site visit.



We observed that the project has not yet obtained a licence for flaring landfill gas and that 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. The first period verification of the project must confirm that this licence was eventually obtained.

### **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. Comments by local stakeholders, such as the Municipal Government, the state and municipal agencies, the Brazilian forum of NGOs, neighbouring communities and the office of the attorney general, were invited. The letters sent to the local stakeholders /5/ were verified during site visit. Four comments were received and were appropriately taken into account.

## **4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS**

DNV published the PDD of November 2004 on the DNV Climate Change web site\* and stakeholders were invited through the UNFCCC CDM web site to provide comments within a 30 days period from 4 December 2004 to 3 January 2005. No comments were received.

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\* <http://www.dnv.com/certification/climatechange/Projects/ProjectDetails.asp?ProjectId=114>



## 5 PRELIMINARY VALIDATION OPINION

*Det Norske Veritas Certification Ltd. (DNV Certification) has validated the Caieiras Landfill Gas Emission Reduction Project at Caieiras, São Paulo State, Brazil (hereafter called “the project”), proposed by Essencis for registration under the CDM. 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 proposes to collect and flare landfill gas (LFG) captured at the Caieiras Landfill. Part of LFG could be sold to a local industry. If so, the amount of LFG sold will be included in the baseline and not claimed as emission reductions. By flaring LFG, the project results in the reduction of CH<sub>4</sub> emissions that is real, measurable and gives long-term benefits and that is 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. Caieiras’s landfill has an Environmental Licence. The Environmental License for LFG recovery and flaring has not yet been obtained. Given that the flaring of landfill gas has little adverse or no different environmental impacts, it is likely that the licence will be obtained when the project is implemented. The first period verification of the project must confirm that this licence was eventually obtained.*

*The project is in line with the current sustainable development policies of Brazil. Nevertheless, the Brazilian DNA has not yet confirmed the project’s contribution to sustainable development.*

*The project applies the approved baseline and monitoring methodology ACM0001, i.e. “Consolidated baseline and monitoring methodology for landfill gas projects activities”. The baseline methodology has been applied correctly 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 plan sufficiently specifies the monitoring requirements of the main project indicators.*

*Local stakeholder comments were invited according to the Brazilian DNA Resolution 1 and Parties, stakeholders and NGOs were invited to comment on the validation requirements. Four comments have been received and taken into account.*

*In summary, the Caieiras Landfill Gas Emission Reduction Project, as documented in the PDD of March 2005, meets all present and relevant UNFCCC criteria and correctly applies the approved baseline and monitoring methodologies ACM0001. However, the project has not yet been approved by the DNA of the participating Parties, and the DNA of Brazil has not yet confirmed the project’s contribution to sustainable development.*



## REFERENCES

*Documents provided by the project participants that relate directly to the project:*

- /1/ Essencis: Project Design Document for the Caieiras Landfill Gas Emission Reduction Project (EPLGP). Version 1 (22 November de 2004)
- /2/ Essencis: Project Design Document for the Caieiras Landfill Gas Emission Reduction Project (EPLGP). Version 2 (23 March 2005)
- /3/ Essencis: Caieiras Baseline Workbook for the Caieiras Landfill Gas Emission Reduction Project. Version 1 (November 2004)
- /4/ Essencis: Environment Quality Management System Manual, documents and records.
- /5/ Letters for local stakeholders

*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*. <http://www.vvmanual.info>
- /7/ Approved Baseline Methodology ACM 0001: "Consolidated baseline methodology for landfill gas projects activities". Version 01 of 03 September 2004.
- /8/ Approved Monitoring Methodology ACM0001: "Consolidated monitoring methodology for landfill gas projects activities". Version 01 of 03 September 2004.

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

- /9/ Florent Mailly (Essencis/Suez Ambiental – Manager of Landfill)
- /10/ Juliana Scalon (Essencis/Suez Ambiental – Eng Landfill)
- /11/ Ana Carolina Genaro (Essencis/Caieiras – Eng Quality and Environment)

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## **APPENDIX A**

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### **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 The PDD identifies JPOWER Develop. Co Ltda – Japan as ANNEX I project participant
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	<b>CAR 1</b>	Table 2, Section A.3 The DNA of Brazil has not yet confirmed the project's contribution to 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	<b>CAR 1</b>	The project has not yet been formally approved by the DNA of Brazil and the DNA of Japan.
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.



Requirement	Reference	Conclusion	Cross Reference / Comment
8. Parties participating in the CDM shall designate a national authority for the CDM	CDM Modalities and Procedures §29	OK	The Brazilian designated national authority for the CDM is the Comissão Interministerial de Mudança Global do Clima. The Japanese DNA is The Liaison Committee for the Utilization of the Kyoto Mechanisms
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 and Japan ratified on 4 June 2002..
10. The participating Annex I Party's assigned amount shall have been calculated and recorded	CDM Modalities and Procedures §31b	OK	Japan's assigned amount is 94% of the emissions in 1990.
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	OK	Japan has in place a national registry and reported on 6 October 2004 its national GHG inventory for the years 1990-2002.
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	<del>CAR-3</del>	Table 2, Section F The project has an Operation Environment License for the landfill but has not yet obtained a license for LFG flaring.
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

Requirement	Reference	Conclusion	Cross Reference / Comment
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	The PDD was published for comments on <a href="http://www.dnv.com/certification/ClimateChange">http://www.dnv.com/certification/ClimateChange</a> . Parties, stakeholders and NGOs were through the CDM website invited to provide comments on the validation requirement from 04 December 2004 to 03 January 2005. 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	OK	Table 2, Section B.2
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	The PDD is in line with the version 02 of 1 July 2004.

**Table 2 Requirements Checklist**

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
<b>A. General Description of Project Activity</b> <i>The project design is assessed.</i>					
<b>A.1. Project Boundaries</b> <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	Yes (PDD section A.4.1.4) However, as there are many project sites located in the same area, DNV suggests to include the exact coordinates of the landfill (+ address).	GL-1	OK
A.1.2. Are the project's system (components and facilities used to mitigate GHGs) boundaries clearly defined?	/1/	DR	The gas collection system includes: Wells in the landfill to extract LFG through exhaustion with blowers; a network of pipes connected to the wellheads transporting the biogas to the treatment units; equipment to treat the LFG drying all humidity before passing through the blowers and sent to flaring; and an integrated cover with impermeable material.		OK
<b>A.2. Technology to be employed</b> <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 top and bottom cover landfill, land fill gas recovery and		OK

\* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			flaring.		
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 common practice in Brazil is sanitary landfill without landfill gas treatment or only safety flaring. Pilot equipment for collection and combustion of LFG was verified during the site visit. The remaining operational equipment will be implemented after the closure of the first waste cell.		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 substituted 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 will require minimal additional training for project operation and maintenance.		OK
A.2.5. Does the project make provisions for meeting training and maintenance needs?	/1/	DR	The project activity does not have any training needs.		OK
<b>A.3. Contribution to Sustainable Development</b> <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	Environmental Licence for landfill are available. However, the Licence for LFG recovery and flaring were not yet available.	CAR-2	OK
A.3.2. Is the project in line with host-country specific CDM requirements?	/1/	DR	The project follows the Resolution 1 of the Interministerial Committee for Climate Change		OK
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 policies in Brazil. Nevertheless, the Designated National Authority ("Interministerial" Commission on Global	CAR 1	

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			Climate Change) has not yet confirmed the project's contribution to Brazilian sustainable development priorities.		
A.3.4. Will the project create other environmental or social benefits than GHG emission reductions?	/1/	DR	The PDD mentions that part of the revenue generated through emissions reductions will be used for activities that would benefit the local community, environment and economy. Examples of this are Environmental Education Center for Elementary School of Caieiras, maintain 1.000.000 m <sup>2</sup> native forest, and, as compensation action established by Environment License,, the waste collection of Caieiras.		OK
<b>B. Project Baseline</b>					
<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>B.1. Baseline Methodology</b>					
<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/ /8/	DR	The project applies the approved baseline methodology called "Consolidated baseline Methodology for landfill gas project activities" – ACM0001.		OK
B.1.2. Is the baseline methodology the one deemed most applicable for this project and is the appropriateness justified?	/1/	DR	Yes. (PDD section B.1.1). The project fulfils the conditions under which ACM0001 / Version 01 is applicable.		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
<b>B.2. Baseline Determination</b> <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 baseline is considered as sale of the gas to the industry. As this scenario makes it a commercial project which can be based on sale of gas on a commercial basis, the project's additionality can be brought in question. Hence, DNV requests a further elaboration of this matter in order to determine that this scenario will or will not result in a CDM project.	CL-2	OK
B.2.2. Has the baseline been determined using conservative assumptions where possible?	/1/	DR	The following need clarification: <ul style="list-style-type: none"> <li>• What are the assumptions while choosing the AF?</li> <li>• How was the DOC calculated, and on what basis?</li> </ul>	CL-3	OK
B.2.3. Has the baseline been established on a project-specific basis?	/1/	DR	Yes, project specific circumstances, such as the possible sale of LFG to local industry have been considered.		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	Yes. 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% of the LFG produced.		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
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	The project has a sales contract for LFG gas under discussion with local industries. If the contract is concluded, the revenues will make the methane collection commercially feasible, without the CERs additional revenues. So on what basis was the most likely scenario chosen?	GL-4	OK
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	The justification of the project is not clear enough, as the specific barriers for the project need be more transparently and completely discussed. Are they economic, technical, legal, or/and practical? If the contract under discussion is established, why would the project still be additional? It seems that the project might go on even without CERs revenues. Why are CERs claimed?	CAR-3	OK
B.2.8. Have the major risks to the baseline been identified?	/1/	DR	See B2.7	CAR-3	OK
B.2.9. Is all literature and sources clearly referenced?	/1/	DR	The key information and data used to determine the baseline scenario (variables, parameters, data sources etc.) were not demonstrated properly.	GL-5	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
<b>C. Duration of the Project/ Crediting Period</b> <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	Yes. The starting date will be September 2005. The expected operational lifetime is 20 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 crediting period starting on 01 September 2005 is selected.		OK
<b>D. Monitoring Plan</b> <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>					
<b>D.1. Monitoring Methodology</b> <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	Yes. The project uses the approved consolidated monitoring methodology ACM0001.		OK
D.1.2. Is the monitoring methodology applicable for this project and is the appropriateness justified?	/1/	DR	Yes.		OK
D.1.3. Does the monitoring methodology reflect good	/1/	DR	The monitoring data is not in accordance with	GAR-4	OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
monitoring and reporting practices?			the Table "Data to be collected or used to monitor emissions" provided in ACM0001.		
D.1.4. Is the discussion and selection of the monitoring methodology transparent?	/1/	DR	See D.1.3	CAR-4	OK
<b>D.2. Monitoring of Project Emissions</b> <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 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	The project uses the approved consolidated monitoring methodology ACM0001, but the monitoring plan is not in accordance with ACM0001. See D.1.3	CAR-4	OK
D.2.2. Are the choices of project GHG indicators reasonable?	/1/	DR	It has to be justified and demonstrated that a flare efficiency of 100% is achievable.	CAR-5	OK
D.2.3. Will it be possible to monitor / measure the specified project GHG indicators?	/1/	DR	Yes. The methane produced can be measured by the gas flow, gas composition, flare efficiency and flare working hours.		OK
D.2.4. Will the indicators give opportunity for real measurements of achieved emission reductions?	/1/	DR	Yes (PDD section D.2.2)		OK
D.2.5. Will the indicators enable comparison of project data and performance over time?	/1/	DR	The indicators to be measured are not in accordance with the ACM0001. It has to be indicated that for how long the data will be kept.	CAR-6	OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
<b>D.3. Monitoring of Leakage</b> <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	The project considers the emissions resulting from energy use for pumping of gas and dismisses them as minor, but it's not clearly demonstrated how this exclusion can be justified.	<del>CAR-7</del>	OK
D.3.2. Have relevant indicators for GHG leakage been included?	/1/	DR	See comments in D.3.1	<del>CAR-7</del>	OK
D.3.3. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	/1/	DR	See comments in D.3.1	<del>CAR-7</del>	OK
D.3.4. Will it be possible to monitor the specified GHG leakage indicators?	/1/	DR	See comments in D.3.1	<del>CAR-7</del>	OK
<b>D.4. Monitoring of Baseline Emissions</b> <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	See D.2.5	<del>CAR-6</del>	OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
<b>D.5. Monitoring of Sustainable Development Indicators/ Environmental Impacts</b> <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 Brazilian DNA requires monitoring of sustainable development indicators.		OK
<b>D.6. Project Management Planning</b> <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	PDD section D.4 mentions an ISO 9001 and ISO 14001 management systems, The ISO 9001 has certificate 38760 ABS issued on Feb/2005. The Quality Manual 001 includes Environment Management System and the certification audit is foreseen to April 2005.		OK
D.6.2. Is the authority and responsibility for registration, monitoring, measurement and reporting clearly described?	/1/	DR	See comments in D.6.1		OK
D.6.3. Are procedures identified for training of monitoring personnel?	/1/	DR	See comments in D.6.1		OK
D.6.4. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/	DR	See comments in D.6.1		OK
D.6.5. Are procedures identified for calibration of monitoring equipment?	/1/	DR	See comments in D.6.1		OK
D.6.6. Are procedures identified for maintenance of	/1/	DR	See comments in D.6.1		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
monitoring equipment and installations?					
D.6.7. Are procedures identified for monitoring, measurements and reporting?	/1/	DR	See comments in D.6.1		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	See comments in D.6.1		OK
D.6.9. Are procedures identified for dealing with possible monitoring data adjustments and uncertainties?	/1/	DR	See comments in D.6.1		OK
D.6.10. Are procedures identified for review of reported results/data?	/1/	DR	See comments in D.6.1		OK
D.6.11. Are procedures identified for internal audits of GHG project compliance with operational requirements where applicable?	/1/	DR	See comments in D.6.1		OK
D.6.12. Are procedures identified for project performance reviews before data is submitted for verification, internally or externally?	/1/	DR	See comments in D.6.1		OK
D.6.13. Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting?	/1/	DR	See comments in D.6.1		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
<b>E. Calculation of GHG Emissions by Source</b> <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>					
<b>E.1. Predicted Project GHG Emissions</b> <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	Yes (PDD section E.1)		OK
E.1.2. Are the GHG calculations documented in a complete and transparent manner?	/1/	DR	PDD section E.1 is not clear about the formulae used to determine the estimations presented in the tables 3 and 4.	GL-6	OK
E.1.3. Have conservative assumptions been used to calculate project GHG emissions?	/1/	DR	The PDD is not clear about conservative assumptions; in the baseline determination the alternatives presented in the PDD give different collection efficiencies, on what basis these efficiencies differ? How can this efficiency be ensured and what are the factors that might influence this in the project?	GL-7	OK
E.1.4. Are uncertainties in the GHG emissions estimates properly addressed in the documentation?	/1/	DR	The GHG estimation was made by first order decay model, but it is not clear whether conservative assumptions have been used for this.	GL-8	OK
E.1.5. Have all relevant greenhouse gases and source categories listed in Kyoto Protocol Annex A	/1/	DR	Only methane has been considered.		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
been evaluated?					
<b>E.2. Leakage</b> <i>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.</i>					
E.2.1. Are potential leakage effects beyond the chosen project boundaries properly identified?	/1/	DR	The project considers the emissions resulting from energy use to pump gas and dismisses them as minor, but it's not clear how this is justified	<del>GL-7</del>	OK
<b>E.3. Baseline Emissions</b> <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	Yes (PDD section E.4)		OK
E.3.2. Are the baseline boundaries clearly defined and do they sufficiently cover sources and sinks for baseline emissions?	/1/	DR	Yes (PDD section E.4)		OK
E.3.3. Are the GHG calculations documented in a complete and transparent manner?	/1/	DR	The calculations have to be demonstrated.	<del>GL-6</del>	OK
E.3.4. Have conservative assumptions been used when calculating baseline emissions?	/1/	DR	See E.1.3 E.1.4	<del>GL-7</del> <del>GL-8</del>	OK
E.3.5. Are uncertainties in the GHG emission estimates properly addressed in the documentation?	/1/	DR	Yes		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
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 See E.1.3 E.1.4	<del>CL-7</del> <del>CL-8</del>	OK
<b>E.4. Emission Reductions</b> 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	Yes (PDD section E.6)		OK
<b>F. Environmental Impacts</b> <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/	DR	Brazilian and São Paulo State environmental legislation requires the impact assessment before granting the licences. The environmental licences for landfill are obtained. However, the license for LFG recovery and flaring is not yet available.	<del>CAR-2</del>	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 comments in F.1.1	<del>CAR-2</del>	OK
F.1.3. Will the project create any adverse environmental effects?	/1/	DR	See comments in F.1.1	<del>CAR-2</del>	OK
F.1.4. Are transboundary environmental impacts considered in the analysis?	/1/	DR	See comments in F.1.1	<del>CAR-2</del>	OK
F.1.5. Have identified environmental impacts been addressed in the project design?	/1/	DR	See comments in F.1.1	<del>CAR-2</del>	OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
F.1.6. Does the project comply with environmental legislation in the host country?	/1/	DR	See comments in F.1.1	CAR-2	OK
<b>G. Stakeholder Comments</b> <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 local stakeholder consultation has been carried out according to Brazilian DNA Resolution 1. This was verified during the site visit.		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.1.1		OK
G.1.5. Has due account been taken of any stakeholder comments received?	/1/	DR	See G.1.1		OK

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**Table 3 Resolution of Corrective Action and Clarification Requests**

Draft report clarifications and corrective action requests by validation team	Ref. to Table 2	Summary of project participants' response	Validation team conclusion
CAR 1: The project has not yet been formally approved by the Brazilian designated national authority and by Japanese DNA.	Table 1- 1 / 4	Brazilian DNA requires a preliminary validation report to consider the project for approval. As a consequence this CAR will stay open until Brazilian Gov. Approval	
CAR 2: Environmental Licence for landfill are available. However, the Licence for LFG recovery and flaring were not yet available.	A.3.1 F.1.1	<p>As well as leachate treatment plant and composting plant, the Biogas plant for greenhouse gas Emission Reduction was considered in the project submitted for licensing and therefore is authorised by the environmental license.</p> <p>The biogas plant is not specifically mentioned in the licenses as there has not been specific or additional requirement on that matter.</p> <p>Moreover, the proposed project activity is the simple flaring of the biogas, what is, by itself, an improvement of environmental impact of the Landfill activity.</p> <p>Before implementing the Flaring station, Essencis will have to inform the CETESB, and eventually ask for a construction license, which may ask for additional requirement. But there is no need to provide any more environmental impact study for that purpose.</p> <p>If, in the future, Essencis pretends to invest in a LFG to energy plant, then it will have to ask for a specific license.</p> <p>See more details in the paper annexed</p>	OK We observed that the project has not yet obtained a licence for flaring landfill gas and that 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. The first period verification of the project must verify that this licence was eventually obtained.

Draft report clarifications and corrective action requests by validation team	Ref. to Table 2	Summary of project participants' response	Validation team conclusion
CAR 3: The justification of the project is not clear enough, as the specific barriers for the project need be more transparently and completely discussed. Are they economic, technical, legal, or/and practical? If the contract under discussion is established, why would the project still be additional? It seems that the project might go on even without CERs revenues. Why are CERs claimed?	B.2.7	<p>Main barriers are economical and technical.</p> <p>Selling of gas has to face technical challenges and need a good profit margin to compensate such risk.</p> <p>Moreover, there is no reason for Essencis spending money in a non compulsory activity and therefore reducing its margin in the gas selling activity.</p> <p>See more details in the discussion paper annexed</p>	<p>OK. The complementary information provided evidenced the significant difference between baseline and the project with respect of number of wells and correspondent cost of installation and operation.</p> <p>Other information is that Caieiras will continue receive industrial waste and the concentration of LFG could not reach 55% methane contend. Also, there are limitation on receive more than 45% of LFG generation by COMGAS because limitation of dilution of NG with LFG.</p>
CAR 4: The monitoring data is not in accordance with the Table "Data to be collected or used to monitor emissions" provided in the ACM0001.	D.1.3 D.2.2	see correction in the PDD: FE monitored quarterly instead of semi-annual as previously indicated.	OK, the monitoring plan is revised in accordance with ACM0001.
CAR 5: It has to be justified and demonstrated that a flare efficiency of 100% is achievable.	D.2.2	<p>Flares are designed to have a complete destruction of the Methane. (see BTS calculation note in annex)</p> <p>It has already been measured at the Salvador Landfill, through laboratories tests that the flare used has a methane destruction efficiency of around 99,8%</p> <p>Additional monitoring are under going at the Salvador Landfill to confirm such data.</p> <p>Please also find in annex papers and guidelines discussing that question. They all indicates that open flares have over 98%</p>	OK, A flare efficiency of 100% may be achieved. Actual flare efficiency will need to be monitored as required by the monitoring plan..

Draft report clarifications and corrective action requests by validation team	Ref. to Table 2	Summary of project participants' response	Validation team conclusion
		destruction efficiency and Ground flares have over 99%.	
CAR 6: The indicators to be measured are not in accordance with the ACM001. It has to be included for how long the data will be kept.	D.2.5	Information included in the PDD.	OK, PDD has been corrected.
CAR 7: The project considers the emissions resulting from energy use for pumping of gas and dismisses them as minor, but it's not clearly demonstrated why this exclusion can be justified.	D.3.1 E 2.1.	According to the document "Atlas de Energia Elétrica do Brasil - 2002" from ANEEL (National Agency of Electric Energy - <a href="http://www.aneel.gov.br/aplicacoes/Atlas/index.html">http://www.aneel.gov.br/aplicacoes/Atlas/index.html</a> ), the hydro energy is around 90% of all electricity produced in the country. Moreover, the other 10% (from biomass, fossil fuel and others) is not even entirely connected to the national grid but is mainly generation by industry for its own need. Essencis is using energy from the grid, them from hydro origin.	OK, given that an average emission intensity of the Brazilian grid is an appropriate methodology for calculating an emission factor and given that the average emission intensity of the Brazilian grid is very low due to the dominance of hydropower in the Brazilian grid, the project is unlikely to result in significant leakage effects. It is thus deemed appropriate that the electricity consumption of the project is not monitored and that possible emissions resulting from generating the electricity used to pump the LFG are not accounted for.
CL 1: Yes (PDD section A.4.1.4) However, as there are many project sites located in the same area, DNV suggests to include the exact coordinates of the landfill	A.2.2	S 23° 21' 51" W 46° 44' 26" UTM N 7418600 to 7416000 E 317800 to 319800	OK. Project identification is clear.
CL 2: The baseline considers as a scenario the gas to be sold to the industry. But this scenario may not result in a CDM project,	B.2.1	Main barriers are economical and technical. Selling of gas has to face technical challenges	OK. The complementary information provided evidences the significant difference between baseline and the

Draft report clarifications and corrective action requests by validation team	Ref. to Table 2	Summary of project participants' response	Validation team conclusion
as the project then can be seen as commercially viable without barriers for implementation.		<p>and need a good profit margin to compensate such risk.</p> <p>Moreover, there is no reason for Essencis spending money in a non compulsory activity and therefore reducing its margin in the gas selling activity.</p> <p>See more details in the discussion paper annexed</p>	project with respect of number of wells and correspondent cost of installation and operation.
CL 3: Which are the assumptions to choose the AF? How the DOC was calculated, on which basis? These assumptions have to be put into clear terms.	B.2.2	<p>AF is Brazilian BAU what correspond to a simple burning at well head, without use of pumps to recover the gas and without impermeable final covers.</p> <p>Please find in annex a paper indicating what are the parameters influencing methane destruction efficiency with such "technology" and a simulation table showing the result in terms of LFG destruction.</p> <p>DOC was calculated using the percentages of São Paulo household waste stream from the study "MSW Characterisation 2000" – Limpurb (Solid waste Department of São Paulo Municipality). In the study, the organic matter of the waste going to Caieiras is around 43%. Even so, it is worth remember that those numbers do not affect the ER to be achieved which will be determine ex-post by direct measurement of Landfill Gas recovered and destroyed.</p>	<p>OK. The complementary information provided evidences the basic parameter that could influence the effectiveness of passive venting and flaring and evidences that considering an AF of 20% is conservative-</p> <p>The DOC calculation could be considered reasonable and satisfactory.</p>
CL 4: The project has a sales contract for LFG gas under discussion with local industries. If the contract is concluded, the	B.2.6	<p>Main barriers are economical and technical.</p> <p>Selling of gas has to face technical challenges</p>	OK. The complementary information provided evidences the significant difference between baseline and the

Draft report clarifications and corrective action requests by validation team	Ref. to Table 2	Summary of project participants' response	Validation team conclusion
revenues will make the methane collection commercially feasible, without the CERs additional revenues. So on what basis the most likely scenario was chosen?		<p>and need a good profit margin to compensate such risk.</p> <p>Moreover, there is no reason for Essencis spending money in a non compulsory activity and therefore reducing its margin in the gas selling activity.</p> <p>See more details in the discussion paper annexed</p>	project with respect of number of wells and correspondent cost of installation and operation.
CL 5: The key information and data used to determine the baseline scenario (variables, parameters, data sources etc.) were not demonstrated properly.	B.2.9	<p>The information is completed in the PDD:</p> <p>page 11 – DOC - was calculated using the percentages of São Paulo household waste stream from the study “MSW Characterisation 2000” – Limpurb (Solid waste Department of São Paulo Municipality). In the study, the organic matter of the waste going to Caieiras is around 43%.</p> <p>page 15 – price of energy for the producer: extracted from <a href="http://www.cesp.com.br/sitefin/index.htm">http://www.cesp.com.br/sitefin/index.htm</a> – site of the Energy Company of São Paulo State .</p> <p>page 17 – hydro source: Atlas de Energia Elétrica do Brasil - 2002” from ANEEL (National Agency of Electric Energy - <a href="http://www.aneel.gov.br/aplicacoes/Atlas/index.html">http://www.aneel.gov.br/aplicacoes/Atlas/index.html</a>)</p>	OK. Clarifications are reasonable and satisfactory.
CL 6: PDD section E.1 is not clear about formulae used to determine the estimations displayed in the Tables 3 and 4.	E.1.2	<p>The formulae are inserted in the top of the table 4.</p> <p>Table 3 is an estimation according to the waste entering Caieiras and the waste produced in São Paulo</p>	OK. The formula is sufficiently demonstrated.

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CL 7: The PDD is not clear about conservative assumptions; in the baseline determination the alternatives presented in the PDD give different collection efficiencies, on what basis these efficiencies differ? How can this efficiency be ensured and what are the factors that might influence this in the project?	E.1.3	<p>As in many processes, the financial resources demand increase more quickly than the efficiency improvement.</p> <p>In the specific case of landfill in operation, it is very complicated to achieve a global efficiency of around 80%, and almost impossible technically to go further than that number.</p> <p>See more details on parameters influencing capture efficiency in paper in documents in annex</p>	OK. Complementary information provides in the paper "General view on gas capture efficiency" evidences the parameters that have influence on the efficiency of LFG collection.
CL 8: The GHG estimation was made by first order decay model, but it is not clear which conservative assumptions that have been used for this.	E.1.4	<p>Those numbers are only for LFG estimation. The First order decay model has never been "calibrated" in tropical conditions and the result only give an idea of the range of LFG production. Precision of the model could be of more than +/- 100%, depending of the year considered.</p> <p>In any case the result of the model can be used to determine Emission Reduction from a project activity.</p> <p>For such reasons methodologies for landfill gas CDM project have adopted ex-post determination of ER by direct measurement of LFG captured and destroyed.</p> <p>It is the ex-post determination of ER that turn the project conservative !!</p>	OK. The complementary information provide in the PDD evidences the base to consider the figures related $L_0$ and "k", and these assumptions are acceptable.