VALIDATION REPORT

QUITAÚNA LANDFILL GAS PROJECT (QLGP) IN BRAZIL.

REPORT NO. 2006-1218

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DET NORSKE VERITAS

VALIDATION REPORT

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Approved by: Michael Lehmann *Technical Director*	Organisational unit: DNV Certification, International Climate Change Services
Client: Quitaúna Serviços Ltda	Client ref.: Mr. Antonio Abdul Nour

Summary:

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

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

In summary, it is DNV's opinion that the "Quitaúna Landfill Gas Project (QLGP)", as described in the revised PDD of 20 September 2006, meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the approved consolidated baseline and monitoring methodology ACM0001 (version 04 of 28 July 2006). Hence, DNV will request the registration of the "Quitaúna Landfill Gas Project (QLGP)" as a CDM project activity.

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

Report No.: 2006-1218	Subject Group: Environment
Report title: Quitaúna Landfill Gas Project (QLGP) in Brazil.	
Work carried out by: Subhendu Biswas, Praveen Nagaraje Urs, Luis Filipe Tavares and Raphael de Souza.	
Work verified by: Vicente San Valero	
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Abbreviations

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
CETESB	State of São Paulo environmental agency
CH_4	Methane
CL	Clarification request
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
DAIA	Environmental Impacts Assessment Department (*Departamento de Avaliação de Impactos Ambientais)*
DNV	Det Norske Veritas
DNA	Designated National Authority
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
IQR	Landfill Quality Index (*IQR – Índice de Qualidade de Aterros de Resíduos*).
MP	Monitoring Plan
MVP	Monitoring and Verification Plan
N_2O	Nitrous oxide
NGO	Non-governmental Organisation
ODA	Official Development Assistance
PDD	Project Design Document
SMA	State Secretary of Environmental Impacts *(Secretaria de Estado de Meio Ambiente)*
QLGP	Quitaúna Landfill Gas Project
UNFCCC	United Nations Framework Convention on Climate Change

1 INTRODUCTION

Quitaúna Serviços Ltda and Econergy Brasil Ltda have commissioned Det Norske Veritas Certification Ltd. (DNV) to perform the validation of the "Quitaúna Landfill Gas Project (QLGP)" located in the city of Guarulhos, São Paulo State, Brazil.

This report summarises the 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.

The validation team consisted of the following personnel:

Mr Luis Filipe Tavares	DNV Certification Brazil	Team leader, Waste sector expert
Mr Subhendu Biswas	DNV Certification India	GHG auditor
Mr Praveen Nagaraje Urs	DNV Certification India	GHG auditor
Mr Raphael de Souza	DNV Certification Brazil	GHG auditor
Mr.K.V.Raman	DNV, India	Technical reviewer

1.1 Validation Objective

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

1.2 Scope

The validation scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords and the relevant decisions by the CDM Executive Board, including the approved baseline and monitoring methodology ACM0001 (version 04 of 28 July 2006). The validation team has, based on the recommendations in the Validation and Verification Manual /6/ employed a risk-based approach, focusing on the identification of significant risks for project implementation and the generation of CERs.

The validation is not meant to provide any consulting towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the project design.

1.3 "Quitaúna Landfill Gas Project (QLGP)"

The objective of the "Quitaúna Landfill Gas Project (QLGP)" is to capture and flare the landfill gas generated at the Quitaúna landfill located in the city of Guarulhos, São Paulo State, Brazil in order to avoid emissions of methane to the atmosphere.

The Quitaúna landfill, with an area of 109 500 m^2, started operations in October 2001, and has a capacity to receive 2.8 million tons of waste.

The current practise at the landfill is to collect and burn a small quantity of the landfill gas through a passive system, without any systematic and monitored flaring. Methane is emitted naturally to the atmosphere through the existing wells, and only a small part is burned for safety and odour reasons.

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

The forecsted amount of GHG emission reductions from the project is estimated to be 665 216 tonnes CO_2 equivalents (tCO_2e) during the first renewable 7-year crediting period (with the potential of being renewed twice), resulting in estimated average annual emission reductions of 95 030 tCO_2e.

2 METHODOLOGY

The validation consisted 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.

In order to ensure transparency, a validation protocol was customised for the project, according to the Validation and Verification Manual /8/. The protocol shows in transparent manner criteria (requirements), means of verification and the results from validating the identified criteria. The validation protocol serves the following purposes:

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

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

The completed validation protocol for the "Quitaúna Landfill Gas Project (QLGP)" is enclosed in Appendix A to this report.

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

i) mistakes have been made with a direct influence on project results;

ii) validation protocol requirements have not been met; or

iii) There is a risk that the project would not be accepted as a CDM project or that emission reductions will not be certified.

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

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

Validation Protocol Table 2: Requirement Checklist				
Checklist Question	***Reference***	***Means of verification (MoV)***	***Comment***	***Draft and/or Final Conclusion***
The various requirements in Table 1 are linked to checklist questions the project should meet. The checklist is organised in seven different sections. Each section is then further sub-divided. The lowest level constitutes a checklist question.	*Gives reference to documents where the answer to the checklist question or item is found.*	*Explains how conformance with the checklist question is investigated. Examples of means of verification are document review (DR) or interview (I). N/A means not applicable.*	*The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is further used to explain the conclusions reached.*	*This is either acceptable based on evidence provided (**OK**), or a **Corrective Action Request (CAR)** due to non-compliance with the checklist question (See below).A request for **Clarification (CL)** is used when the validation team has identified a need for further clarification.*

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

Figure 1 Validation protocol tables

2.1 Review of Documents

The PDD version 1 of 28 April 2006 /1/ and the subsequent revisions (version 4 of 24 July 2006, version 5 of 05 September 2006 /2/ and the final version 6 of 20 September 2006) /3/ submitted by Quitaúna Serviços Ltda and Econergy Brasil Ltda were assessed by DNV.

Also, additional documents such as the grid emission factor calculations, emission reduction calculations /4/, environmental licences and the letters sent to local stakeholders, were assessed during the validation.

2.2 Follow-up Interviews

On 07 June 2006, DNV performed interviews with a representative of Econergy Brasil Ltda in order to confirm and to resolve issues identified in the document review. This included, but was not limited to:

Table 1 Interview topics

Interviewed organisation	Interview topics
Econergy	➢ Current practise of passive venting and unsystematic burning of LFG ➢ Consultation of local stakeholders ➢ Site Visits ➢ Environmental permits ➢ Resources, training, procedures of management structure ➢ Verification of findings of the desk review ➢ Details of spreadsheet calculation and baseline development ➢ Demonstration of additionality ➢ Details on project technology ➢ Host country approval letter and sustainable development requirement ➢ Details on the monitoring plan

2.3 Resolution of Clarification and Corrective Action Requests

The objective of this phase of the validation was to resolve any outstanding issues which needed to be clarified for DNV's positive conclusion on the project design.

The initial validation of the project identified 5 (five) *corrective action requests* and 12 (twelve) requests for *clarification*. The project participant's response to DNV's draft validation report findings and the final version of the PDD of 20 September 2006 addressed the *corrective action requests* and requests for *clarification* to DNV's satisfaction.

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

3 VALIDATION FINDINGS

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

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

3.1 Participation Requirements

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

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

3.2 Project Design

The objective of the project is to capture and flare the landfill gas produced at the Quitaúna landfill site owned by the project proponent and located in the city of Guarulhos, São Paulo State, Brazil. The project activity thereby avoids emissions of methane to the atmosphere.

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

The Quitaúna landfill started operations in October 2001 and was designed for accepting waste from the São Paulo Metropolitan Region. The landfill has a valid operating license from the "Secretaria de Meio Ambiente" (CETESB). The landfill has an area of 109 500 m^2 and a capacity to receive 2.8 million tons of waste.

The project activity envisages the improvement of the landfill gas collection system and the flaring of landfill gas through the installation of an active recovery system composed of a collection and transportation pipeline network and a flaring system. The project involves the installation of wellheads at the existing concrete wells. The wellheads are connected to a collecting PVC pipeline, which are joined to the manifolds. The manifolds transfer the collected gas to the transmission PVC pipeline connected to the flare system through a blower and a dewatering system.

The project will lead to sustainable development through reduced methane emissions and minimizing the risk of explosions at the site. The transfer of technology and specialized operations will be needed for project's flare system implementation and operation. This is likely to have a positive impact on employment and building capacity skills.

The project does not involve any public funding, and the validation did not reveal any information that indicates that the project can be seen as a diversion of ODA funding towards Brazil.

3.3 Baseline Determination

The project applies the approved consolidated baseline methodology ACM0001 (version 04 of 28 July 2006) – "*Consolidated baseline methodology for landfill gas project activities*"/7/. This methodology is applicable to project activities that reduce greenhouse gas emissions through landfill gas capture and destruction of methane by flaring and/or generation of electricity. In the case of the Quitaúna Landfill Gas Project (QLGP), the destruction of methane will be through flaring only.

The selected baseline scenario is the partial atmospheric release of the landfill gas. As "Quitaúna Landfill Gas Project (QLGP)" does not have any contractual and legal obligations to burn methane, the baseline emissions are calculated using an "Adjustment Factor". The "Adjustment Factor" is estimated to be 20% of total methane destroyed by flaring. The "Adjustment Factor" of 20% allows for the destruction of LFG in the baseline scenario which would have occurred as a result of the continuation of the current practice of passive venting and unsystematic burning of LFG and is deemed to be appropriate.

GHG emissions by sources in the baseline were estimated using IPCC's guidelines and the first order decay model approach considering values of L_0 = 70 m^3CH_4/tonwaste and k (1/year) = 0.1. These figures are deemed appropriate and conservative.

3.4 Additionality

In accordance with ACM0001, the additionality of the project is demonstrated through the *Tool for the demonstration and assessment of additionality* /9/, which includes the following steps:

Step 0 -Preliminary screening based on the starting date of the project activity: As the starting date of the crediting period (01 April 2007) for the project is after to the expected date of registration, this step is not applicable.

Step 1 - Identification of alternatives to the project activity consistent with current laws and regulations: The possible baseline scenarios are: a) LFG would continue to be released to the atmosphere and only small amounts of LFG would be burned due to safety and odour reasons and b) the implementation of capturing and flaring of LFG without CDM incentives. There is no legislation in Brazil obliging landfills to flare the collected gas. Hence, both scenarios are in compliance with all applicable legal and regulatory requirements.

Step 2 - Investment analysis: As the CDM project activity does not generate any financial or economic benefit other than the CDM related income, the simple cost analysis scenario is applied. Considering the additional costs necessary for increasing the LFG capture capacity, without having any revenues, the project is not a likely baseline scenario. Even if LFG was utilised to generate electricity, this would not significantly alleviate the economic and financial hurdles of the project.

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

Step 4 - Common practice analysis: DNV was able to confirm that possible future legislation that would require landfills to quantify and flare a certain amount of the gas produced is not likely to be implemented in near future, considering the waste disposition situation in Brazil. At present 53% of waste produced in Southeast of Brazil is disposed in dumps and only about 13% is destined to sanitary landfill. A major environmental problem related to domestic waste in Brazil

is the lack of waste disposal to sanitary landfills. DNV was able to confirm that the investment to install systems to capture and flare methane is not common practice in Brazil.

Step 5 - Impact of CDM registration: The sale of CERs will provide the necessary revenue for the project to make it economically feasible.

3.5 Monitoring Plan

The project correctly applies the approved consolidated monitoring methodology ACM0001 (version 04 of 28 July 2006), titled "Consolidated monitoring methodology for landfill gas project activities" /7/.

The following parameters will be monitored in order to determine and account for emission reductions:

• Amount of landfill gas captured;

• Amount of landfill gas sent to the flare;

• The amount of methane in the landfill gas;

• Flare efficiency;

• Temperature and pressure of the landfill gas;

• Electricity requirement of the project;

• Grid emission factor – determined *ex-ante* for the entire crediting period;

• Regulatory requirement changes.

All environmental impacts will be monitored as regulated by the operational license of the "Quitaúna Landfill Gas Project (QLGP)".

The quality control and quality assurance datasheet for the project identifies several monitoring routines. As the project is not yet implemented, the responsibilities for project operation and monitoring and reporting have not yet been developed. However, by the time of the project implementation, a team and its responsibilities will be assigned. The management systems are to be assessed during the first verification.

All the data will be archived for a period of two years after the crediting period.

3.6 Calculation of GHG Emissions

Emission reductions are directly monitored and calculated *ex-post*, using the approach indicated in ACM0001 (version 04 of 28 July 2006). An adjustment factor of 20% for destruction of landfill gas in the baseline scenario will be applied during the first renewable 7-year crediting period.

For the *ex-ante* estimation of emission reductions the projected LFG generation from the landfill was determined using the IPCC first order decay model. A methane potential generation (L_0) of 70 m^3CH_4/ton waste, a decay constant k (1/year) of 0.1 and a collection efficiency of 65% were assumed.

For the calculation of project emissions due to the import of electricity used to pump the LFG, the Brazilian South-Southeast-Midwest interconnected grid CO_2 emission coefficient has been

calculated and fixed *ex-ante* for the first 7-year crediting period and is calculated to be 0.2611 tCO_2e/MWh (weighted average of the build margin (BM) and operating margin (OM) emission coefficients). The calculation conforms to the procedure given in ACM0002 (version 6 of 19 May 2006) /8/ and the calculations were based on electricity generation data provided by National Electricity System Operator (ONS) for the electricity generated in the South-Southeast-Midwest (S-SE-CO) grid in the years 2003-2005. Data for the years 2003-2005 were the most recent statistics available at the time of the PDD submission.

The project activity is projected to reduce 95 030 tCO_2 yearly. Considering the amount of uncertainty related to the methane generation and collection efficiency, which depends on the actual design and engineering of the project, this might be achievable if the project is implemented suitably. However, experiences with other landfills have shown that the methane generation and collection efficiency of the landfills projected by the first order decay model has an inherent uncertainty of almost 50% and hence the amount of CERs, which will be monitored *ex-post*, might vary from the projected amount.

3.7 Environmental Impacts

The Quitaúna landfill has been granted the operational license (nº15001196) issued by the São Paulo state environmental agency (CETESB).

The landfill gas capture and flaring project has not yet obtained a licence for flaring, and such a licence must be applied for. Given that the flaring of landfill gas has little adverse environmental impacts, it is likely that the licence will be obtained when the project is implemented. At the first period verification of the project's emission reductions, it must be confirmed that this licence was eventually obtained.

3.8 Comments by Local Stakeholders

In accordance with the Resolution 1 of the Brazilian DNA, 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 identified and were invited to comment on the project. Copies of the letters sent to the local stakeholders were verified during the follow up interviews. One comment was received and taken into account.

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

The PDD of 28 April 2006 was made publicly available on DNV's climate change website (www.dnv.com/certification/climatechange) and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 05 May 2006 to 03 June 2006. No comments were received.

5 VALIDATION OPINION

Det Norske Veritas Certification Ltd. (DNV) has performed a validation of the "Quitaúna Landfill Gas Project (QLGP)" located in the city of Guarulhos, São Paulo State, 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 Quitaúna Serviços Ltda and Econergy Brasil Ltda of Brazil. The host Party Brazil meets the relevant participation requirements. No participating Annex I Party is yet identified.

The project objective is to capture and flare the landfill gas produced at the Quitaúna landfill, to avoid emissions of methane to the atmosphere. The technology to be employed will be the improvement of landfill gas collection and flaring, through the installation of an active recovery system composed of a collection and transportation pipeline network and a flaring system.

The project applies the approved baseline and monitoring methodology ACM0001 (version 04 of 28 July 2006), i.e. "Consolidated baseline and monitoring methodology for landfill gas project activities". The baseline methodology has been correctly applied and the assumptions made for the selected baseline scenario are sound. It is sufficiently demonstrated that the project is not a likely baseline scenario and that emission reductions attributable to the project are additional to any that would occur in the absence of the project activity.

The monitoring methodology has been correctly applied. The monitoring plan sufficiently specifies the monitoring requirements.

By burning the methane contained in landfill gas the project results in reductions of CH_4 emissions that are real, measurable and give long-term benefits to the mitigation of climate change. Emission reductions are directly monitored and calculated ex-post, using the approach indicated in ACM0001. For the ex-ante estimation of emission reductions and the projected LFG generation from the landfill was determined using the IPCC first order decay model.

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 to comment on the project, in accordance with the requirements of Resolution 1 of the Brazilian DNA. One comment was received and taken into account.

In summary, it is DNV's opinion that the "Quitaúna Landfill Gas Project (QLGP)" in Brazil, as described in the revised and resubmitted project design document of 20 September 2006, meets all relevant UNFCCC requirements for the CDM and all relevant host Party criteria and correctly applies the baseline and monitoring methodology ACM0001 (version 04 of 28 July 2006). Hence, DNV will request the registration of the "Quitaúna Landfill Gas Project (QLGP)" as a CDM project activity.

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

REFERENCES

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

/1/ Econergy: *Project Design Document for the* "Quitaúna Landfill Gas Project (QLGP)", version 1 of 28 April 2006 and version 4 of 24 July 2006.

/2/ Econergy: *Project Design Document for the* " Quitaúna Landfill Gas Project (QLGP)", version 5 of 05 September 2006.

/3/ Econergy: *Project Design Document for the* " Quitaúna Landfill Gas Project (QLGP)", version 6 of 20 September 2006.

/4/ Econergy: *Spreadsheets for the calculation of the emission reductions from the* " Quitaúna Landfill Gas Project (QLGP)".

/5/ Spreadsheets for the calculation of the combined margin emission Coefficient (ONS-Emission factors S-SE-CO 2003-2005-2006.08.28.xls).

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/ CDM Executive Board: *Approved Consolidated Baseline and Monitoring Methodology ACM0001: "Consolidated baseline and monitoring methodology for landfill gas project activities",* version 04 of 28 July 2006.

/8/ CDM Executive Board: *Approved Consolidated Baseline and Monitoring Methodology ACM0002: "Consolidated baseline methodology for grid-connected electricity generation from renewable sources"* and *"Consolidated monitoring methodology for zero-emissions grid-connected electricity generation from renewable sources"*, version 6 of 19 May 2006.

/9/ CDM Executive Board: *Tool for the demonstration and assessment of additionality*, version 02 of 28 November 2005.

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

/10/ Eduardo Cardoso Filho - Econergy

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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	NA	Table 2, Section E.4.1 No Annex 1 Party is yet identified.
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 approval of voluntary participation from the DNA of Brazil, including the confirmation that the project assists it 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 the participating Parties.
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. In case public funding from Parties included in Annex I is	Decision 17/CP.7,	OK	The validation did not reveal any

Requirement	Reference	Conclusion	Cross Reference / Comment
used for the project activity, these Parties shall provide an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of these Parties.	CDM Modalities and Procedures Appendix B, § 2		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 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.
9. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol	CDM Modalities §30/31a	OK	Brazil has ratified the Kyoto Protocol on 23 August 2002.
10. The participating Annex I Party's assigned amount shall have been calculated and recorded	CDM Modalities and Procedures §31b	NA	No participating Annex I Party is yet identified.
11. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7	CDM Modalities and Procedures §31b	NA	No participating Annex I Party is yet identified.
12. Comments by local stakeholders shall be invited, a summary of these provided and how due account was taken of any comments received	CDM Modalities and Procedures §37b	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	CDM Modalities and Procedures §40	OK	The PDD of 28 April 2006 was made publicly available on DNV's climate

Requirement	Reference	Conclusion	Cross Reference / Comment
for minimum 30 days, and the project design document and comments have been made publicly available			change website (www.dnv.com/certification/climatechange) and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 05 May 2006 to 03 June 2006. 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	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 *The project design is assessed.*					
A.1. Project Boundaries *Project Boundaries are the limits and borders defining the GHG emission reduction project.*					
A.1.1. Are the project's spatial (geographical) boundaries clearly defined?	/1/ /3/	DR	The "Quitaúna Landfill Gas Project (QLGP)" is located in the city of Guarulhos, São Paulo State, Brazil.		OK
A.1.2. Are the project's system (components and facilities used to mitigate GHGs) boundaries clearly defined?	/1/ /3/	DR	The project's system boundary comprises the Quitaúna's landfill and complementary facilities to collect, pump and flare the LFG. The project engineering details have not yet been finalised. However, it is indicated that the project proponent will install wellheads at the existing concrete wells. The wellheads will be connected to a manifold. All the individual manifolds will be connected to the main transmission pipeline going to the flare system through a blower and a dewatering system. The system for the removal of leachate and its treatment prior to discharge will be as per the regulations specified in the operating licence.		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
A.2. Technology to be employed *Validation of project technology focuses on the project engineering, choice of technology and competence/ maintenance needs. The validator should ensure that environmentally safe and sound technology and know-how is used.*					
A.2.1. Does the project design engineering reflect current good practices?	/1/ /3/	DR I	The landfill gas collection system and transmission pipelines are standard technologies available in Brazil. The flare system technology and flare equipment will be imported. It can be concluded that the project design engineering reflects current good practices.		OK
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/ /3/	DR	The project involves the installation of state of the art equipment sourced from developed nations. These environmentally sound technologies will be used in the project and thus justifiably demonstrate that the project will result in a better performance.		OK
A.2.3. Is the project technology likely to be substituted by other or more efficient technologies within the project period?	/1/ /3/	DR I	The project involves the substitution of the passive system that existed before the project activity with the active recovery system for landfill gas recovery. Clarification is requested with regard to the difference in operation of the passive and the active recovery systems.	~~CL 1~~	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/ /3/	DR I	Specialised technical staff is required during the implementation stage of the project. This staff will train the local operators. The mechanism to assure this technical training	~~CL 2~~	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			is to be clarified.		
A.2.5. Does the project make provisions for meeting training and maintenance needs?	/1/ /3/	DR	Same as A.2.4	~~CL 2~~	OK
A.3. Contribution to Sustainable Development *The project's contribution to sustainable development is assessed.*					
A.3.1. Is the project in line with relevant legislation and plans in the host country?	/1/ /3/	DR	The host country Brazil has no legislation regarding the collection and flaring of landfill gas. The project proponent has all the pertinent licence for the Quitaúna landfill. The project proponent is to obtain the operating licence for the project activity of capturing and flaring of LFG, prior to the start of the project and this is to be evidenced during the first verification.		OK
A.3.2. Is the project in line with host-country specific CDM requirements?	/1/ /3/	DR	The project is in line with host country specific requirements. Prior to the submission of this validation report to the CDM Executive Board, DNV will have to receive the written confirmation by the DNA of Brazil that the project is in line with the host country specific CDM requirements.	--	--
A.3.3. Is the project in line with sustainable development policies of the host country?	/1/ /3/	DR	The project is in line with current sustainable development priorities in Brazil. Prior to the submission of this validation report to the CDM Executive Board, DNV will have to receive the written confirmation by the DNA of Brazil that the project assists in achieving sustainable development.	--	--

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
A.3.4. Will the project create other environmental or social benefits than GHG emission reductions?	/1/ /3/	DR	The project will lead to sustainable development through reduced methane emissions and minimizing the risk of explosions at the site. The transfer of technology and specialized operations will be needed for project's flare system implementation and operation. This is likely to have a positive impact on employment and building capacity skills.		OK
B. Project Baseline *The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.*					
B.1. Baseline Methodology *It is assessed whether the project applies an appropriate baseline methodology.*					
B.1.1. Is the baseline methodology previously approved by the CDM Executive Board?	/1/ /3/ /7/	DR	The project employs the approved consolidated baseline methodology ACM0001 (version 04 of 28 July 2006) "Consolidated baseline and monitoring 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/ /3/	DR	The baseline methodology is justified for the project as in the baseline only part of the landfill gases emitted was flared for safety and odour control reasons.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
B.2. Baseline Determination *The choice of baseline will be validated with focus on whether the baseline is a likely scenario, whether the project itself is not a likely baseline scenario, and whether the baseline is complete and transparent.*					
B.2.1. Is the application of the methodology and the discussion and determination of the chosen baseline transparent?	/1/ /3/	DR	The application of the methodology is correct and the baseline determination is transparent. The baseline is that in the absence of the project activity the landfill gas would be released to the atmosphere, except of a small quantity which is captured and burnt to address safety and odour concerns.		OK
B.2.2. Has the baseline been determined using conservative assumptions where possible?	/1/ /3/	DR	Yes the baseline emissions are determined using conservative estimates. In the absence of any contractual / regulatory obligations to flare the landfill gas, "Adjustment Factor" of 20% of total methane produced has been used. The selected adjustment factor (20%) to account for the amount of methane that would have been destroyed in the absence of the project needs to be justified.	~~CL 3~~	OK
B.2.3. Has the baseline been established on a project-specific basis?	/1/ /3/	DR	The amount of methane that would have been generated is calculated based on the actual monitored figures of waste collected over the years. Thus the baseline is established on a project specific basis.		OK
B.2.4. Does the baseline scenario sufficiently take into account relevant national and/or sectoral	/1/ /3/	DR	The National Waste Management Policy is under discussions and there is enough		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
policies, macro-economic trends and political aspirations?			evidence to conclude that it will result only in requirements for LFG collection, but no requirements for LFG destruction of more than 20 %.		
B.2.5. Is the baseline determination compatible with the available data?	/1/ /3/	DR	The amount of waste collected over the years is measured and recorded and used for emission estimation. Thus the data which is available is adequate.		OK
B.2.6. Does the selected baseline represent the most likely scenario among other possible and/or discussed scenarios?	/1/ /3/	DR	Yes, the selected baseline represents the most likely scenario. The common practice in Brazil is to dispose waste in open dumps. None of these landfills have any structure to collect and flare the methane generated. In some case passive venting and flaring is done only due to safety reasons. Controlled landfills with gas collection and minimum flaring comprise of only 16% (as per PNSB 2000 data). Most of the landfills which are equipped with active collection and flaring system have been developed as CDM projects.		OK
B.2.7. Is it demonstrated/justified that the project activity itself is not a likely baseline scenario?	/1/ /3/ /7/ /9/	DR I	In accordance with ACM0001, the additionality of the project is demonstrated through the *Tool for the demonstration and assessment of additionality*, which includes the following steps: *Step 0 -Preliminary screening based on the starting date of the project activity:* As the starting date of the crediting period (01 April 2007) for the project is after to the expected date of registration, this step is not applicable.	~~CAR 1~~	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			Step 1 - Identification of alternatives to the project activity consistent with current laws and regulations: The possible baseline scenarios are: a) LFG would continue to be released to the atmosphere and only small amounts of LFG would be burned due to safety and odour reasons and b) the implementation of capturing and flaring of LFG without CDM incentives. There is no legislation in Brazil obliging landfills to flare the collected gas. Hence, both scenarios are in compliance with all applicable legal and regulatory requirements. *Step 2 - Investment analysis:* As the CDM project activity does not generate any financial or economic benefit other than the CDM related income, the simple cost analysis scenario is applied. Considering the additional costs necessary for increasing the LFG capture capacity, without having any revenues, the project is not a likely baseline scenario. Even if LFG was utilised to generate electricity, this would not significantly alleviate the economic and financial hurdles of the project. *Step 3 - Barrier analysis:* Not selected (Step 2 is selected only). *Step 4 - Common practice analysis:* DNV was able to confirm that possible future legislation that would require landfills to quantify and flare a certain amount of the		

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			gas produced is not likely to be implemented in near future, considering the waste disposition situation in Brazil. At present 53% of waste produced in Southeast of Brazil is disposed in dumps and only about 13% is destined to sanitary landfill. A major environmental problem related to domestic waste in Brazil is the lack of waste disposal to sanitary landfills. DNV was able to confirm that the investment to install systems to capture and flare methane is not common practice in Brazil. *Step 5 - Impact of CDM registration:* The sale of CERs will provide the necessary revenue for the project to make it economically feasible. The segments of the Pie chart (figure 8), used to demonstrate that controlled landfill is not a common practice in brazil, when summed up, go beyond 100%. Sub step 4b is qualitative in nature and does not include any quantitative figure to demonstrate the same.		
B.2.8. Have the major risks to the baseline been identified?	/1/ /3/	DR	The basis of the collection efficiency of 80%, flare efficiency of 80% needs to be justified.	~~CL 4~~	OK
B.2.9. Is all literature and sources clearly referenced?	/1/ /3/	DR	Spreadsheets for the calculation of the emission reductions of the "Quitaúna Landfill Gas Project (QLGP)" document the calculations considering the First Order Decay Model with L_0 = .070 m^3 CH_4 /kg		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			waste and k = 0.1 from IPCC.		
C. Duration of the Project/ Crediting Period *It is assessed whether the temporary boundaries of the project are clearly defined.*					
C.1.1. Are the project's starting date and operational lifetime clearly defined and reasonable?	/1/ /3/	DR	The project is foreseen to start on 01 April 2007 and the project's expected operational lifetime is 21 years and deemed reasonable.		OK
C.1.2. Is the assumed crediting time clearly defined (renewable crediting period of seven years with two possible renewals or fixed crediting period of 10 years with no renewal)?	/1/ /3/	DR	A renewable 7-year crediting period (with the potential of being renewed twice) is selected, with a forecasted starting date of 01 April 2007.		OK
D. Monitoring Plan *The monitoring plan review aims to establish whether all relevant project aspects deemed necessary to monitor and report reliable emission reductions are properly addressed ((Blue text contains requirements to be assessed for optional review of monitoring methodology prior to submission and approval by CDM EB).*					
D.1. Monitoring Methodology *It is assessed whether the project applies an appropriate baseline methodology.*					
D.1.1. Is the monitoring methodology previously approved by the CDM Executive Board?	/1/ /3/ /7/	DR	The project applies the approved consolidated baseline and monitoring methodology ACM0001 (version 04 of 28 July 2006) - *Consolidated monitoring methodology for landfill gas project activities*.		OK
D.1.2. Is the monitoring methodology applicable for this project and is the appropriateness justified?	/1/ /3/	DR	The monitoring methodology is applicable for the project as the project involves landfill		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			gas capture and flaring. In line with the methodology the following parameters will be monitored. • Amount of landfill gas captured; • Amount of landfill gas sent to the flare; • The amount of methane in the landfill gas; • Flare efficiency; • Temperature and pressure of the landfill gas; • Electricity requirement of the project; • Grid emission factor – determined *ex-ante* for the entire crediting period; • Regulatory requirement changes. All the data will be archived for a period of two years after the crediting period.		
D.1.3. Does the monitoring methodology reflect good monitoring and reporting practices?	/1/ /3/	DR	All the parameters needed to estimate the emission reductions due the project activity are included in the monitoring methodology in line with the approved methodology. This reflects the use of current good practices		OK
D.1.4. Is the discussion and selection of the monitoring methodology transparent?	/1/ /3/	DR	Yes		OK
D.2. Monitoring of Project Emissions *It is established whether the monitoring plan provides for reliable and complete project emission data over time.*					
D.2.1. Does the monitoring plan provide for the collection and archiving of all relevant data	/1/ /3/	DR	The volumetric flow of landfill gas that is sent to the flares is monitored under the	~~CAR 2~~ ~~CAR 5~~	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
necessary for estimation or measuring the greenhouse gas emissions within the project boundary during the crediting period?	/8/		monitoring plan. The approved methodology also calls for monitoring of the total amount of landfill gas generated under the project activity. In line with the clarification given by the meth panel (AM_CLA_20) the same has to be included in the monitoring plan. ID 6 / item D.2.2.1, the source of data and the data unit do not match and has to be revised. The grid emission factor has been estimated at 0.2647 considering the South-Southeast-Midwest grid. The factor is estimated as per the guidelines of ACM0002 (version 5). The Operating margin was calculated using the simple adjusted OM, with the vintage data of 2002 to 2004 from the Brazilian Electricity System Manager (ONS). The build margin BM has been calculated using the 20% of the total generation of the year 2004 as the generation of the 5 most recent plants is less than the 20%. For calculation of project emissions due to the import of electricity used to pump the LFG, the amount of electricity consumed and Emission Factor (EF) of SSECO Brazilian grid with value of a combined margin emission coefficient of 0.2677 tCO2e/MWh (weighted average of the build and operating margin). However the calculation doesn't agree with ACM0002 (version 6 of 19 May 2006) with respect to the determination of the BM emission		

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			coefficient (PDD of 24 July 2006 – version 4).		
D.2.2. Are the choices of project GHG indicators reasonable?	/1/ /3/	DR	Under Annex 4 of the PDD the monitoring plan accounts for the monitoring of the amount of landfill gas sent to flares and their efficiencies. It is to be verified during the verification site visit as to whether a single flare or multiple flares were installed. In the case of multiple flares, how the flow(s) will be measured to prevent double accounting.	~~CL 5~~	OK
D.2.3. Will it be possible to monitor / measure the specified project GHG indicators?	/1/ /3/	DR	The parameters to be monitored under the monitoring plan of the project are measurable and thus it is possible to calculate the project GHG emissions.		OK
D.2.4. Will the indicators give opportunity for real measurements of project emissions?	/1/ /3/	DR	As the variables are measurable the emission reductions are for real and can be determined under the project activity.		OK
D.2.5. Will the indicators enable comparison of project data and performance over time?	/1/ /3/	DR	Yes		OK
D.3. Monitoring of Leakage *It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.*					
D.3.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	/1/ /3/ /7/	DR	No leakage has to be considered as required by ACM0001.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
D.4. Monitoring of Baseline Emissions *It is established whether the monitoring plan provides for reliable and complete project emission data over time.*					
D.4.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining baseline emissions during the crediting period?	/1/ /3/	DR	The first order decay model is used to predict the amount of methane that would have been generated and liberated to the atmosphere in the absence of the project. The determination is appropriate.		OK
D.4.2. Is the choice of baseline indicators, in particular for baseline emissions, reasonable?	/1/ /3/	DR	The choice of CH_4 as the baseline indicator is reasonable.		OK
D.4.3. Will it be possible to monitor / measure the specified baseline indicators?	/1/ /3/	DR	Yes		OK
D.4.4. Will the indicators give opportunity for real measurements of baseline emissions?			Yes		OK
D.5. Monitoring of Sustainable Development Indicators/ Environmental Impacts *It is checked that choices of indicators are reasonable and complete to monitor sustainable performance over time.*					
D.5.1. Does the monitoring plan provide the collection and archiving of relevant data concerning environmental, social and economic impacts?	/1/ /3/ /7/	DR	ACM0001 does not mandate the collection and archiving of sustainable development indicators, and neither does the Brazilian DNA.		OK
D.6. Project Management Planning *It is checked that project implementation is properly prepared for and that critical arrangements are addressed.*					
D.6.1. Is the authority and responsibility of project	/1/	DR	No clear management structure for	~~CAR 3~~	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
management clearly described?	/3/	I	monitoring of the progress of the project and emission reduction determination is evidenced in the document.		
D.6.2. Is the authority and responsibility for registration, monitoring, measurement and reporting clearly described?	/1/ /3/	DR I	As D.6.1	~~CAR 3~~	OK
D.6.3. Are procedures identified for training of monitoring personnel?	/1/ /3/	DR I	As D.6.1	~~CAR 3~~	OK
D.6.4. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/ /3/	DR I	As D.6.1	~~CAR 3~~	OK
D.6.5. Are procedures identified for calibration of monitoring equipment?	/1/ /3/	DR I	Periodic calibration of monitoring equipment is included as a part of the monitoring plan.		OK
D.6.6. Are procedures identified for maintenance of monitoring equipment and installations?	/1/ /3/	DR I	Flow meters, gas analysers and pressure/temperature measurement equipment are included in the maintenance plan of the project.		OK
D.6.7. Are procedures identified for monitoring, measurements and reporting?	/1/ /3/	DR I	Flow indications and methane content of the landfill gases are measured through flow meters and analysers installed at the project site. The data is logged through programmable logic controller.		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/ /3/	DR I	As D.6.1	~~CAR 3~~	OK
D.6.9. Are procedures identified for dealing with possible monitoring data adjustments and uncertainties?	/1/ /3/	DR I	As D.6.1	~~CAR 3~~	OK
D.6.10. Are procedures identified for review of reported results/data?	/1/ /3/	DR I	As D.6.1	~~CAR 3~~	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
D.6.11. Are procedures identified for internal audits of GHG project compliance with operational requirements where applicable?	/1/ /3/	DR I	As D.6.1	~~CAR 3~~	OK
D.6.12. Are procedures identified for project performance reviews before data is submitted for verification, internally or externally?	/1/ /3/	DR I	As D.6.1	~~CAR 3~~	OK
D.6.13. Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting?	/1/ /3/	DR I	As D.6.1	~~CAR 3~~	OK
E. Calculation of GHG Emissions by Source *It is assessed whether all material GHG emission sources are addressed and how sensitivities and data uncertainties have been addressed to arrive at conservative estimates of projected emission reductions.*					
E.1. Project GHG Emissions *The validation of ex-ante estimated project GHG emissions focuses on transparency and completeness of calculations.*					
E.1.1. Are all aspects related to direct and indirect GHG emissions captured in the project design?	/1/ /3/	DR	The project accounts for emissions due to electricity consumed by the blowers installed for the project.		OK
E.1.2. Are the GHG calculations documented in a complete and transparent manner?	/1/ /3/	DR	The electricity consumed by the blower(s) should be verified (evidences) during the verification.	~~CL 6~~	OK
E.1.3. Have conservative assumptions been used to calculate project GHG emissions?	/1/ /3/	DR	Under the "Build Margin" emission factor determination discussion it is evident that using IEA/ONS data the project emissions due to consumption of electricity by the blower(s) is higher making the emission reductions determination conservative in	~~CL 7~~ ~~CAR 5~~	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			nature. Clarification is required as to how the conservativeness is demonstrated using the ONS data when the project involves only flaring of landfill gas without any associated electricity generation. For calculation of project emissions due to the import of electricity used to pump the LFG, the amount of electricity consumed and Emission Factor (EF) of SSECO Brazilian grid with value of a combined margin emission coefficient of 0.2677 tCO2e/MWh (weighted average of the build and operating margin). However the calculation doesn't agree with ACM0002 (version 6 of 19 May 2006) with respect to the determination of the BM emission coefficient (PDD of 24 July 2006 – version 4).		
E.1.4. Are uncertainties in the GHG emissions estimates properly addressed in the documentation?	/1/ /3/	DR	No such uncertainties are envisaged under the project activity.	~~CAR 5~~	OK
E.1.5. Have all relevant greenhouse gases and source categories listed in Kyoto Protocol Annex A been evaluated?	/1/ /3/	DR	Yes		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
E.2. Leakage *It is assessed whether there leakage effects, i.e. change of emissions which occurs outside the project boundary and which are measurable and attributable to the project, have been properly assessed and estimated ex-ante.*					
E.2.1. Are potential leakage effects beyond the chosen project boundaries properly identified?	/1/ /3/ /7/	DR	No leakage determination is required by ACM0001.		OK
E.3. Baseline Emissions *The validation of ex-ante estimated baseline GHG emissions focuses on transparency and completeness of calculations.*					
E.3.1. Have the most relevant and likely operational characteristics and baseline indicators been chosen as reference for baseline emissions?	/1/	DR	The amount of emission reductions due to the project is estimated *ex-ante* using the first order decay model as given in the "IPCC guidelines for National greenhouse gas inventories". The K and L_0 factors taken for emission reduction estimation are found to be appropriate for Brazilian conditions. The basis of the collection efficiency of 80%, flare efficiency of 80% needs to be justified.	~~CL 4~~	OK
E.3.2. Are the baseline boundaries clearly defined and do they sufficiently cover sources and sinks for baseline emissions?	/1/ /3/	DR	Yes.		OK
E.3.3. Are the GHG calculations documented in a complete and transparent manner?	/1/ /3/	DR	The emission reduction calculations as detailed in the excel sheet do not match the emission reductions estimates mentioned at	~~CAR 4~~	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			item E.6.		
E.3.4. Have conservative assumptions been used when calculating baseline emissions?	/1/ /3/	DR	The basis of assumption of collection efficiency and flare efficiency needs to be verified during the verification.	~~CL 8~~	OK
E.3.5. Are uncertainties in the GHG emission estimates properly addressed in the documentation?	/1/ /3/	DR	In Brazil, there is no law obligating the landfills to destroy certain percentage of methane. The project consider a 20% adjustment factor based and conservatively assumes 20% of the LFG would also be destroyed due to odour and safety concerns in the baseline.		OK
E.3.6. Have the project baseline(s) and the project emissions been determined using the same appropriate methodology and conservative assumptions?	/1/ /3/	DR	A part of the gases emitted in the baseline is accounted to be burnt in the baseline scenario. The collection efficiency of the methane collection systems is estimated to be 80%. The choice of this value has to be justified.	~~CL 4~~	OK
E.4. Emission Reductions *Validation of ex-ante estimated emission reductions*.					
E.4.1. Will the project result in fewer GHG emissions than the baseline scenario?	/1/ /3/	DR	The forecasted amount of GHG emission reductions from the project is estimated to be 665 216 tCO_2e during the first renewable 7-year crediting period, resulting in estimated average annual emission reductions of 95 030 tCO_2e. The emission reduction calculations as detailed in the excel sheet do not match the emission reductions estimates mentioned at item E.6.	~~CAR 4~~	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
F. Environmental Impacts *Documentation on the analysis of the environmental impacts will be assessed, and if deemed significant, an EIA should be provided to the validator.*					
F.1.1. Has an analysis of the environmental impacts of the project activity been sufficiently described?	/1/ /3/	DR I	The environmental impacts of the project have to be assessed by the CETESB, state of São Paulo's environmental agency and verified during the verification. The landfill gas capture and flaring project does not have an operating licence. 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. It is to be verified if the impact(s) assessment has been accepted by the regulatory bodies.	~~CL 9~~	OK
F.1.2. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved?	/1/ /3/	DR	Same as F.1.1	~~CL 9~~	OK
F.1.3. Will the project create any adverse environmental effects?	/1/ /3/	DR	Since the project is for the capture and flaring of landfill gas, there will be no adverse environmental effects on the atmosphere. However, the leachate from the landfill is to be treated to the specification of Brazilian laws and regulations before discharge.		OK
F.1.4. Are transboundary environmental impacts considered in the analysis?	/1/ /3/	DR	No trans-boundary effects are envisaged due to the project.		OK
F.1.5. Have identified environmental impacts been addressed in the project design?	/1/	DR	The environmental impacts and the controls to be used for mitigation of the same are not	~~CL 10~~	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
	/3/		defined under the project design.		
F.1.6. Does the project comply with environmental legislation in the host country?	/1/ /3/	DR	Status of the project with respect to obtaining the operational license for the QLGP facility needs to be checked.	~~CL 11~~	OK
G. Stakeholder Comments *The validator should ensure that a stakeholder comments have been invited and that due account has been taken of any comments received.*					
G.1.1. Have relevant stakeholders been consulted?	/1/ /3/	DR	Yes. Relevant 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 to comment on the project, in accordance with the requirements of Resolution 1 of the Brazilian DNA. One comment was received and taken into account.		OK
G.1.2. Have appropriate media been used to invite comments by local stakeholders?	/1/ /3/	DR I	Appropriateness of the use of media to invite comments for the project and the adequacy of the stakeholder consultation with specific requirements of the DNA is to be checked.	~~CL 12~~	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/ /3/	DR	Yes.		OK
G.1.4. Is a summary of the stakeholder comments received provided?	/1/ /3/	DR	No negative comments were received during the stakeholders' consultation process.		OK
G.1.5. Has due account been taken of any stakeholder	/1/	DR	Same as above.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
comments received?	/3/				

Table 3 Resolution of Corrective Action and Clarification Requests

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
CAR 1 The segments of the Pie chart (figure 8), used to demonstrate that controlled landfill is not a common practice in brazil, when summed up, go beyond 100%. Sub step 4b is qualitative in nature and does not include any quantitative figure to demonstrate the same.	B.2.7	The Pie Chart was updated on PDD page 12. By the time of the validation, about 40 municipalities are attended by landfills with LFG recovery and Methane Destroy Systems. The PDD was updated on page 12. By the time of the Verification, the amount of municipalities attended by the landfills will be presented.	DNV considers that this data is properly presented in revised version of the PDD version 4 dated 24 July 2006. As the project is still to be implemented, the number of municipalities attended has to be checked during verification. Since this number is very dynamics this is considered appropriate. This CAR is therefore closed.
CAR 2 ID 6 / item D.2.2.1, the source of data and the data unit do not match and has to be revised.	D.2.1	PDD was updated on page 16.	The new PDD version 4 dated 24 July 2006 correctly presents the data. This CAR is therefore closed.
CAR 3 No clear management structure for monitoring of the progress of the project and emission reduction determination is evidenced in the document.	D.6.1	All management structure will be developed during the installation and before the beginning of the project activity's operation.	As the project is still to be implemented, the management structure has to be checked during the verification. This CAR is therefore closed.
CAR 4 The emission reduction calculations as detailed in the excel sheet do not match the emission reductions estimates mentioned at item E.6.	E.3.3 E.4.1	The PDD checked by the Validation Team is the version 1, while the spreadsheet sent to the team is related to PDD v4. The PDD was updated with data from the most recent version of the spreadsheet.	The emission reduction calculations were verified and found OK. This CAR is therefore closed
CAR 5 For calculation of project emissions due to the import of electricity used to pump the LFG, the amount of electricity consumed and Emission Factor (EF) of SSECO Brazilian	D.2.1 E.1.3 E.1.4	The PDD v5 and the CERs estimative were updated with the new Emission Factor equals to 0.2611 tCO_2e /MWh.	The revised PDD of 20 September 2006, applies the combined emission factor determined (data for the 2003-2005 years) in accordance with the most recent version of ACM0002.

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grid with value of a combined margin emission coefficient of 0.2677 tCO_2e/MWh (weighted average of the build and operating margin). However the calculation doesn't agree with ACM0002 (version 6 of 19 May 2006) with respect to the determination of the BM emission coefficient (PDD of 24 July 2006 – version 4).			This CAR is therefore closed.
CL 1 The project involves the substitution of the passive system that existed before the project activity with the active recovery system for landfill gas recovery. Clarification is requested with regard to the difference in operation of the passive and the active recovery systems.	A.2.3	The active recovery system is made through a blower that forces the suctions the LFG produced. In the BAU conditions, the LFG would be produced and would be accumulated inside the landfill, until it reached a pressure that could compromise the landfill's internal structure being emitted to the atmosphere.	A passive system is implemented in the baseline scenario as it is common practice to prevent explosions and odour in landfills. Nonetheless, the active system has to be checked during verification. This CL is therefore closed.
CL 2 Specialised technical staff is required during the implementation stage of the project. This staff will train the local operators. The mechanism to assure this technical training is to be clarified.	A.2.4	The team and all needed training will be made after the projects installation.	As the project is still to be implemented, the training imparted to the operators may be evidenced during the verification. This CL is therefore closed.
CL 3 The selected adjustment factor (20%) to account for the amount of methane that would have been destroyed in the absence of the project needs to be justified.	B.2.2	In Brazil, there is no law obligating the landfills to destroy a certain percentage of the methane. The 20% adjustment factor was chosen based on AM0003 and conservatively assumed as part of the LFG destroyed due to odour and safety concerns.	As there is no legal or contractual obligation that requires a percentage of LFG to be burned, 20% is considered conservative and appropriate for the project. This CL is therefore closed.
CL 4 The basis of the collection efficiency of 80%, flare efficiency of 80% needs to be justified.	B.2.8 E.3.1	A document from US EPA presents a conservative value of collection efficiency of 75%. The source was sent to the	The source document is the US EPA document on developing landfills, dated September 1996 and indicating a

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		validation team.	value of 75 to 85% collection efficiency. However considering that this is a theoretical estimate based on design. Considering the amount of uncertainty related to the methane generation and collection efficiency, which depends on the actual design and engineering of the project, this might be achievable if the project is implemented suitably. However, experiences with other landfills have shown that the methane generation and collection efficiency of the landfills projected by the first order decay model has an inherent uncertainty of almost 50% and hence the amount of CERs, which will be monitored *ex-post*, might vary from the projected amount. This CL is therefore closed.
CL 5 Under Annex 4 of the PDD the monitoring plan accounts for the monitoring of the amount of landfill gas sent to flares and their efficiencies. It is to be verified during the verification site visit as to whether a single flare or multiple flares were installed. In the case of multiple flares, how the flow(s) will be measured to prevent double accounting.	D.2.2	All measurements used to determine the flare efficiency will be available to the Verification Team. In case of a multiple flare system installation, each flare will have its own flow-meter. It will avoid that case a flare would pass through maintenance, the methane not destroyed won't be considered in CER's calculation.	As the project is still to be implemented, the system has to be checked and proved during the verification. This CL is therefore closed.
CL 6 The electricity consumed by the blower(s) should be verified (evidences) during the	E.1.2	The electricity consumed by the blower will be available to the Verification Team. Please see PDD, Table D.2.2.1.	As the project is still to be implemented, the electricity consumed has to be checked during the

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verification.			verification. The PDD conservatively estimates a 3 000 MWh/y consumption. This CL is therefore closed.
CL 7 Clarification is required as to how the conservativeness is demonstrated using the ONS data when the project involves only flaring of landfill gas without any associated electricity generation.	E.1.3	The conservativeness will be demonstrated due to the non-request of CERs due to the reduction of grid-electricity consumption.	The revised PDD, dated 20 September 2006, applies the combined emission factor determined in accordance with the most recent version of ACM0002. This CL is therefore closed.
CL 8 The basis of assumption of collection efficiency and flare efficiency needs to be verified during the verification.	E.3.4	The executive project will include the efficiency estimated of the QLGP. All measurements and calculations to determine the flare efficiency will be available to the verification team.	As the project is still to be implemented, this flare efficiency has to be checked during the verification. This CL is therefore closed.
CL 9 It is to be verified if the impact(s) assessment has been accepted by the regulatory bodies.	F.1.1	As described in the Monitoring Plan of PDD, all Environmental Impacts will be monitored through the requirements of the Operational Licence.	The possible environmental impacts are to be assessed by CETESB, the State of São Paulo's environmental agency. These are to be evidenced during the verification. This CL is therefore closed.
CL 10 The environmental impacts and the controls to be used for mitigation of the same are not defined under the project design.	F.1.5	The monitoring plan provides a list of the environmental impacts and all requirements from CETESB in order to avoid it.	As the project is still to be implemented, all the requirements listed in the Operational License have to be checked during verification. The environmental impacts analysed by the State of São Paulo's environmental agency (CETESB) are to be evidenced during the verification. This CL is therefore closed.
CL 11	F.1.6	By the time of the Validation process,	As the project is still to be

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Status of the project with respect to obtaining the operational license for the QLGP facility needs to be checked.		Quitaúna only has the Operational Licence from the landfill. Quitaúna must receive the Operational Licence as requested by CETESB – State of São Paulo in order to start the operations of the QLGP. The Licence presented in the PDD refers to the landfill's operation. Quitaúna will only implement QLGP after the registration of the project at the CDM's EB. By the time of the Verification, the Operational Licence of the QLGP will be presented to the Verification Team.	implemented, all the requirements listed in the Operational License have to be checked during verification. The landfill gas capture and flaring project has not yet obtained a licence for flaring, and such a licence must be applied for. Given that the flaring of landfill gas has little adverse environmental impacts, it is likely that the licence will be obtained when the project is implemented. At the first period verification of the project's emission reductions, it must be confirmed that this licence was eventually obtained. This CL is therefore closed.
CL 12 Appropriateness of the use of media to invite comments for the project and the adequacy of the stakeholder consultation with specific requirements of the DNA is to be checked.	G.1.2	As mentioned above, Quitaúna will only request the QLGP's Environmental Licences after the project's registration at the CDM-EB. As requested by the Brazilian legislation, the PER – Preliminary Environmental Report must be made public available and must be discussed with all stakeholder involved. A public presentation must be made and the decisions of this presentation will be taken into account to emit the Preliminary Licence. All letters, media calls and Licences will be presented to the Verification Team. As required by the Brazilian Environmental Legislation, a Preliminary	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 to comment on the project, in accordance with the requirements of Resolution 1 of the Brazilian DNA. Copies of the letters sent to the local stakeholders were verified during the follow up interviews. One comment was received and taken into account. This CL is therefore closed.

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
		Environmental Report must be developed and the comments must be invited through media. The evidence will be shown to the Verification Team by the time of the verification.	

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