

"Feira de Santana Landfill Gas Project" in Brazil

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| Project Name: "Fe Country: Brazil Methodology: ACN Version:06 | ira de Santana Lar M0001 | ndfill Gas Projec | t" | | |
| Methodology Nam ER estimate: 298 | e: "Consolidated l 004 over 7 vears | baseline method | ology fo | r landfill gas project act | ivities" |
| Size Size Large Scale Small Scale Validation Phases: Desk Review Follow up interv Resolution of ou Validation Status Corrective Actio Clarifications Re Full Approval an Rejected In summary, it is DN the PDD of 10 Septi host country criteria requests the registrat Prior to the submissi receive the written ap that the project assist | iews tstanding issues ns Requested quested d submission for re IV's opinion that the ember 2007, meets and correctly appli ion of the project a on of the final valid oproval of voluntar ts it in achieving su | egistration he "Feira de Sant s all relevant UN ies the baseline a s a CDM project dation report to th y participation fr istainable develop | ana Lang FCCC rund moni activity. The CDM om the I poment. | dfill Gas Project" in Braz equirements for the CDI toring methodology ACI Executive Board, DNV DNA of Brazil, including | <i>t</i> il, as described in M and all relevant M0001. DNV thus will have to the confirmation |
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Abbreviations

| BRL | Brazilian Real |
|-------------------|--|
| CAR | Corrective Action Request |
| CDM | Clean Development Mechanism |
| CEF | Carbon Emission Factor |
| CER | Certified Emission Reduction |
| CH ₄ | Methane |
| CL | Clarification request |
| CO ₂ | Carbon dioxide |
| CO ₂ e | Carbon dioxide equivalent |
| CRA | Centro de Recursos Ambientais (Bahia State Environment Agency) |
| DNV | Det Norske Veritas |
| DNA | Designated National Authority |
| GHG | Greenhouse gas(es) |
| GWP | Global Warming Potential |
| IPCC | Intergovernmental Panel on Climate Change |
| LFG | Landfill Gas |
| MP | Monitoring Plan |
| N ₂ O | Nitrous oxide |
| NGO | Non-governmental Organisation |
| ODA | Official Development Assistance |
| PDD | Project Design Document |
| UNFCCC | United Nations Framework Convention on Climate Change |



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1. EXECUTIVE SUMMARY – VALIDATION OPINION

Det Norske Veritas Certification AS (DNV) has performed a validation of the "Feira de Santana Landfill Gas Project", located in the municipalities of Feira de Santana, Bahia State, in Brazil. The validation was performed on the basis of UNFCCC criteria for CDM project activities and relevant Brazilian criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The project participant is Qualix Serviços Ambientais Ltda. of Brazil. The host Party Brazil meets all relevant participation requirements. No participating Annex I Party is yet identified.

The objective of Feira de Santana Landfill Gas Project is to capture and use landfill gas (LFG) generated through the decomposition of the organic waste disposed at the Feira de Santana landfill site.

By promoting renewable energy, the project is in line with the current sustainable development priorities of Brazil.

The project applies the approved baseline and monitoring methodolog ACM0001, i.e. "Consolidated baseline methodology for landfill gas project activities" (version 6). 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 of the main project indicators.

By capturing and destroying LFG, the project results in reductions of CO_2 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. The ex-ante estimation of emission reductions and the projected LFG generation from the landfill was determined using the US EPA first order decay model.

Local stakeholders, such as the Municipal Government, the state and municipal environmental 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 by DNV. It was received two supporting comments and they were taken into account. Parties, stakeholders and NGOs were invited to comment on the validation requirements via the UNFCCC web-site. No comment was received.

In summary, it is DNV's opinion that the "Feira de Santana Landfill Gas Project" as described in the revised project design document of 10 September 2007, meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the baseline and monitoring methodology ACM0001 (version 6). Hence, DNV will request the registration of the "Feira de Santana Landfill Gas Project" as a CDM project activity.

Prior to the submission of the final 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.



2. INTRODUCTION

Qualix Serviços Ambientais Ltda and MGM International have commissioned Det Norske Veritas Certification AS (DNV) to perform a validation of the "Feira de Santana Landfill Gas Project", located in the municipalities of Feira de Santana, Bahia State in Brazil (hereafter called "the project"). This report summarises the findings of the validation of the project, performed 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.

2.1. 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).

2.2. 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 6). The validation team has, based on the recommendations in the Validation and Verification Manual 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.



3. 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.

The following sections outline each step in more detail.

3.1. Desk Review of the Project Design Documentation

The following table lists the documentation that was reviewed during the validation:

- /1/ MGM International: Project Design Document for the ""Feira de Santana Landfill Gas Project"". Version 01 of 09 August 2007
- MGM International: Project Design Document for the ""Feira de Santana Landfill Gas Project"". Version 02 of 10 September 2007.
- /3/ MGM International: Investment and OM breakdown FdS 11 Set 2007
- /4/ MGM International: Economic Analyses LFG capture and power generation FdS 10Sep07
- /5/ MGM International: Economic Analyses LFG capture and power generation marginal FdS 10Sep07
- /6/ MGM International: Economic Analyses LFG capture and thermal generation FdS 13Aug07
- MGM International: Economic Analyses LFG capture and thermal generation marginal FdS 13Aug07
- /8/ MGM International: FdS LFG estimation First Credit PeriodACM0001vr6 07Aug07
- /9/ Spreadsheets for calculating ONS-Emission factors N-NE grid 2003-2005
- /10/ Administrative Contract # 112/2007 agreed between Feira de Santana Municipality and Qualix Serviços Ambientais Ltda
- /11/ Contract of Qualix Serviços Ambientais Ltda and MGM International for CDM services
- /12/ International Emission Trading Association (IETA) & the World Bank's Prototype Carbon Fund (PCF): *Validation and Verification Manual*. <u>http://www.vvmanual.info</u>
- /13/ The operational environmental license # 3701 issued on 05/12/2006 by CERAM/CRA valid until 05/12/2007
- /14/ ACM0001, "Consolidated baseline methodology for landfill gas project activities" version 06



- /15/ ACM0002, "Consolidated Methodology for Grid-Connected Power Generation from Renewable Sources". Version 06
- /16/ CDM Executive Board: "Tool for the demonstration and assessment of additionality". Version 03;
- /17/ CDM Executive Board: "Tool to determine project emissions from flaring gases containing methane".
- /18/ 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Vol. 5

The main changes made in the final PDD of 10 September 2007 compared to the version of 9 August 2007 which was published for the 30 days stakeholder commenting period are as follows:

- Included a reference to the "Tool to determine project emissions from flaring gases containing methane" in B.1
- Elaboration of the applicability conditions in B.2
- Revision of the starting date of project

| ••• | | | | | |
|------|------------|--------------------|----------------------|--|--|
| | Date | Name | Organization | Торіс | |
| /19/ | 2007-09-06 | Alexandre Citvaras | Qualix | • Crediting period starting | |
| /20/ | 2007-09-06 | Juliana Scalon | MGM International | date Additionality Monitoring plan Environmental licenses and legal compliance Stakeholder consultation Waste characteristics | |

3.2. Follow-up Interviews with Project Stakeholders

3.3. Resolution of Outstanding Issues

The objective of this phase of the validation was to resolve any outstanding issues which need be clarified prior to DNV's positive conclusion on the project design. In order to ensure transparency a validation protocol was customised for the project. The protocol shows in a transparent manner the 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 the figure below. The completed validation protocol for the "Feira de Santana Landfill Gas Project" is enclosed in Appendix A to this report.

Findings established during the validation can either be seen as a non-fulfilment of CDM 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 and/or methodology specific 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.

A request for 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 | | | |
| 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. | |

| Validation Protocol Table 2: Requirement checklist | | | | |
|---|---|--|--|---|
| Checklist Question | Reference | Means of verification (MoV) | Comment | Draft and/or Final Conclusion |
| The various requirements in Table 2 are linked to checklist questions the project should meet. The checklist is organised in different sections, following the logic of the large-scale PDD template, version 03 - in effect as of: 28 July 2006. Each section is then further sub-divided. | 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 and Clarification Requests | | | | |
|--|---|--|--|--|
| Draft report clarifications and corrective action requests | <i>Ref. to checklist question in table 2</i> | Summary of project owner response | Validation conclusion | |
| If the conclusions from the draft Validation are either a CAR or a CL, these should be listed in this section. | Reference to the checklist question number in Table 2 where the CAR or CL 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 |
|----------|------------|----------|--------|
|----------|------------|----------|--------|



3.4. Internal Quality Control

The draft validation report including the initial validation findings underwent a technical review before being submitted to the project participants. The final validation report underwent another technical review before requesting registration of the project activity. The technical review was performed by a technical reviewer qualified in accordance with DNV's qualification scheme for CDM validation and verification.

3.5. Validation Team

| Role/Qualification | Last Name | First Name | Country |
|----------------------------|-----------|-------------|---------|
| Team leader/ Sector expert | Tavares | Luis Filipe | Brazil |
| GHG Auditor | Ratton | Marco A. | Brazil |
| Technical reviewer | Viddal | Mari Grooss | Norway |

The qualification of each individual validation team member is detailed in Appendix B to this report.



4. Validation Findings

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

The final validation findings relate to the project design as documented and described in the revised and resubmitted project design documentation of 10 September 2007.

4.1. Participation Requirements

The project participant is Qualix Serviços Ambientais 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 the final 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.

4.2. Project Design

The objective of the "Feira de Santana Landfill Gas Project" is to capture and use landfill gas (LFG) generated through the decomposition of the organic matter of municipal solid waste (MSW) disposed at the Feira de Santana landfill site. This will involve investments in a landfill gas collection system, a flare station and equipment for the generation of electricity and/or thermal energy. The main components of LFG are methane (CH₄) and carbon dioxide (CO₂), both of which are greenhouse gases (GHG) covered by the Kyoto Protocol. Flaring or burning landfill gas for energy involves avoidance of methane emissions. The LFG that is converted to electricity and/or thermal energy to be used at the landfill site will further reduce GHG emissions by displacing energy that would be generated from fossil fuels.

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

The disposal of MSW in the landfill started in 2002. By the end of July 2006, more than 500 000 tonnes of waste have been filled. Upon completion, the maximum thickness of disposed MSW is expected to be about 45 meters. The current maximum landfill height is about 25 meters. The lifetime of the landfill is expected to be 14 years, ending in 2013. Currently, the landfill is filling at an average rate of 365 tonnes per day, which represents more than 130 000 tonnes per year. For the coming years, the disposal rate is expected to increase by 3% per year.

A renewable crediting period of 7 years is selected (with the potential of being renewed twice), starting 01 February 2008. The starting date of the project activity was 17 July 2006, when the contract was signed between Qualix Serviços Ambientais Ltda. and MGM International for CDM consulting services /11/. The project has an expected operational lifetime of 21 years.



The project is expected to bring improvement on sustainable development through reducing methane emissions and minimizing the risk of explosions at the site, as well as increasing local employment, thus contributing to the sustainable development objectives of the Brazilian Government.

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

4.3. Baseline Determination

The project applies the approved consolidated baseline methodology ACM0001 (version 06) -"Consolidated baseline methodology for landfill gas project activities" /14/. This methodology is applicable to the "Feira de Santana Landfill Gas Project" as this project consists of the implementation of a landfill gas collection system to flare LFG and utilise LFG for producing electricity and heat at the landfill of Feira de Santana municipality which is operated by Qualix. The project meets the applicability conditions as: i) the captured gas is flared and; ii) the captured gas is used to produce electricity and thermal energy.

In accordance with ACM0001, the project boundaries encompass all production processes related to Qualix landfill of the Feira de Santana municipality. The selected baseline scenario is the partial atmospheric release of the landfill gas. The selection of the baseline scenario is in compliance with the requirements of ACM0001 which includes the following steps:

Step 1 – Identification of alternatives to the project activity consistent with current laws and regulations.

Two possible scenarios are identified with regards to landfill gas capture;

- LFG1 (project activity without CDM) including the following sub scenarios;
 - o LFG1.1 (capture and flaring without CDM);
 - LFG1.2 (capture and electricity generation without CDM);
 - LFG1.3 (capture and heat generation without CDM);
 - o LFG1.4 (capture and electricity and heat generation without CDM) and
- LFG2 (continue the practice of release to atmosphere of the LFG with partial destruction.).

As the project intends to generate electricity and/or heat, two power generation baseline alternatives and two heat generation baseline alternatives were also identified:

- P1 (power generation without CDM),
- P6 (power plant connected to the grid),
- H1 (heat generation without CDM) and
- H4 (existing fossil fuel based thermal plant on site).

All these scenarios are in compliance with Brazilian laws and regulations.

The project does not have any contractual obligations to burn methane. This is confirmed through the Administrative Contract # 112/2007 between the Feira de Santana Municipality and Qualix Serviços Ambientais Ltda /10/. Therefore, the methane that would have been destructed in the baseline is calculated using an "Adjustment Factor". The "Adjustment Factor" has been estimated to be 20% of the total methane destructed under the project



activity. The "Adjustment Factor" of 20% allows for the destruction of LFG in the baseline scenario which would have occurred as a result of the continuation of the current practice of passive venting of LFG. Since the Brazilian landfill regulations do not mandate LFG collection and destruction and only a small amount of the methane generated is currently burned due to safety and odour reasons, an "Adjustment Factor" of 20% is deemed appropriate.

Step 2 – Identify the fuel for the baseline choice of energy source taking into account the national or sectoral policies.

For the power scenario, the fuel in the power plants connected to the grid and the emission factors are determined by applying ACM0002 version 6. For the heat scenario, the fuel for the baseline choice is LPG. This is appropriate as this is the fuel used in the existent boiler used to sterilize the waste from hospitals. This fuel choice is considered as conservative and realistic.

4.4. Additionality

The "Feira de Santana Landfill Gas Project" started 17 July 2006 with a contract between Qualix Serviços Ambientais Ltda. and MGM International regarding CDM consultancy services. The installation of the LFG capture and flaring system is foreseen to start in January 2008. Hence, it is demonstrated that the benefits from the CDM were considered in the decision to proceed with the project.

In accordance with ACM0001 /14/, the additionality of the project is demonstrated through the "Tool for the demonstration and assessment of additionality", version 3, /16/ which includes the following steps:

Step 1 - Identification of alternatives to the project activity consistent with current laws and regulations: The possible scenarios for LFG capture, electricity generation and heat generation are identified as described in chapter 4.3 above. As confirmed in the Administrative Contract # 112/2007 between Feira de Santana Municipality and Qualix Serviços Ambientais Ltda./10/, there are no contractual requirements to capture or flare LFG.

Step 2 - Investment analysis: A benchmark analysis has been selected. It has been confirmed that the baseline alternative LFG1 (project activity without CDM), including all sub scenarios, is less economically and financially attractive than the baseline scenario LFG2. The NPV was calculated with a discount rate of 10% (which is lower than the current SELIC rate of 11.5% set by the Central Bank of Brazil). The investment and O&M costs are considered realistic and the budget for the monitoring and flaring equipment (from Kock Tecnologia Quimica Ltda and John Zink Company LLC) was verified during the follow-up interviews. The electricity price taken from the first Brazilian electricity auction was verified during the follow-up interviews.

A sensitive analysis has been performed, with 20% variation of the investment costs, O&M costs, electricity prices and LPG prices. The NPV remains negative, even in the case where these parameters change in favour of the project. The financial calculations and assumptions have been assessed by DNV and are considered correct and conservative.

Step 3 - Barrier Analysis: The project also applies a barrier analysis.



a) *Investment barrier:* it was confirmed that investment loans for landfills in Brazil are not common practice.

b) *Technological barrier:* the technology applied to produce electricity from LFG is not commonly available in Brazil. LFG contains corrosive gases and needs special metal or treatment. This creates a technology barrier.

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 the near future, considering the waste disposition situation in Brazil.

DNV was also able to confirm that the investment to install systems to capture and flare methane and/or produce energy and heat is not common practice in Brazil.

Given the above, it is sufficiently demonstrated that the project is not a likely baseline scenario, and emission reductions are thus additional.

4.5. Monitoring

The project correctly applies the approved consolidated monitoring methodology ACM0001 (version 06) - "Consolidated baseline methodology for landfill gas project activities".

The proposed monitoring methodology adopted is applicable to the "Feira de Santana Landfill Gas Project" as this project consists of the landfill gas capture system where the captured gas will be flared and/or used to produce electricity and heat.

4.5.1. Parameters determined ex-ante

Baseline emission estimations are correct and transparently documented in the LFG estimation spreadsheet /8/. The emission reductions are calculated using the US EPA First Order Decay model and the "*Tool to determine project emissions from flaring gases containing methane*". The variables MDC, DOCf, DOCg, L_0 and k are based on the actual amount of waste landfilled, the characterization of the waste and by applying IPCC 2006 Guidelines /18/.

An enclosed flare is selected. The project applies the 90% default value as flare efficiency for ex ante estimations. A spreadsheet for the ex ante estimation of the emission reductions and baseline was provided /8/.

4.5.2. Parameters monitored ex-post

Emission reduction calculations are correct and transparently documented in accordance with ACM0001 v6 /14/,

Emission reductions are calculated ex-post. The LFG captured corrected by temperature and pressure and sent to flare or to produce electricity or heat will be continuously monitored.

The grid emission factor of electricity of 0.0767 tCO2/MWh, is calculated according to ACM0002 for N-NE Brazilian grid considering the most recent data from 2003-2005.

The heat emission factor and the NCV of LPG was used to calculate the baseline emissions from heat generation. LPG is the fossil fuel used in the existing thermal plant.



The flare efficiency will be monitored according to the procedures outlined in the "Tool to determine project emissions from flaring gases containing methane".

4.5.3. Management system and quality assurance

Details of the data to be collected, calibration of measurement instruments, and the frequency of data recording, format and storage location are described. The recording frequency and storage of the data are deemed appropriate for the project. Several procedures and techniques for monitoring are specified.

The authority and responsibility for registration, monitoring, measurement and reporting on emission reductions, as well as for organising and training of the staff is clearly defined. Also the procedures for calibration of monitoring equipment are identified. All data will be archived for a period of two years after the crediting period.

The management systems are to be assessed at the first periodic verification of the project's emission reductions.

4.6. Estimate of GHG Emissions

Emission reductions are directly monitored and calculated ex-post, using the approach indicated in ACM0001 (version 06). 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 is determined using the US EPA first order decay model. A methane potential generation (L_0) of 87.34 Nm3CH₄/ton waste, a decay constant k (1/year) of 0.08 are assumed using the 2006 IPCC guidelines /18/ and waste characteristics from the landfill. A collection efficiency of 65% was assumed.

The estimated amount of GHG emission reductions from the project is 298 004 tCO₂e during the first renewable 7 years crediting period, resulting in estimated average annual emission reductions of 42 572 tCO2e.

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

4.7. Environmental Impacts

The operational environmental license # 3701 was issued on 05 December 2006 by CERAM/CRA /13/. The license is valid until 05 December 2007 and was verified by DNV during follow-up interviews. All possible environment impacts were analyzed and described in the PDD. No significant negative environmental impacts are indentified.



4.8. Comments by Local Stakeholders

Local stakeholders, such as the Municipal Government, the municipal agency, the Brazilian forum of NGOs, neighbouring communities, the state environmental agency 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. Comments received were positive. Copies of the letters sent to the local stakeholders were verified during the follow up interviews.

4.9. Comments by Parties, Stakeholders and NGOs

The PDD of 10 September 2007 was made publicly available on DNV's climate change website (<u>www.dnv.com/certification/climatechange</u>) and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 18 August 2007 to 16 September 2007. No comments were received.

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APPENDIX A

CDM VALIDATION PROTOCOL

| Requirement | Reference | Conclusion |
|--|--|--|
| About Parties | | |
| 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 | No participating Annex I Party is yet identified. |
| 2. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC. | Kyoto Protocol Art.12.2. | ОК |
| 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. |
| 4. 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 the final 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. |
| 5. In case public funding from Parties included in Annex I is used for the project activity, these Parties shall provide an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of these | Decision 17/CP.7, CDM Modalities and Procedures Appendix B, | ОК |

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

| Requirement | Reference | Conclusion |
|--|---|---|
| Parties. | § 2 | |
| 6. Parties participating in the CDM shall designate a national authority for the CDM. | CDM Modalities and Procedures §29 | ОК |
| 7. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol. | CDM Modalities §30/31a | ОК |
| 8. The participating Annex I Party's assigned amount shall have been calculated and recorded. | CDM Modalities and Procedures §31b | No participating Annex I Party is yet identified. |
| 9. 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 | No participating Annex I Party is yet identified. |
| About additionality | | |
| 10. Reduction in GHG emissions shall be additional to any that would occur in the 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 | ОК |
| About forecast emission reductions and environmental impacts | | |
| 11. The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change. | Kyoto Protocol Art. 12.5b | ОК |
| For large-scale projects only | | |
| 12. 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 | CDM Modalities and Procedures §37c | ОК |

| Requirement | Reference | Conclusion |
|---|---|---|
| required by the Host Party shall be carried out. | | |
| About stakeholder involvement | | |
| 13. Comments by local stakeholders shall be invited, a summary of these provided and how due account was taken of any comments received. | CDM Modalities and Procedures §37b | ОК |
| 14. 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 of 10 September 2007 was made publicly available on DNV's climate change website and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 18 August 2007 to 16 September 2007. No comments were received. |
| Other | | |
| 15. The baseline and monitoring methodology shall be previously approved by the CDM Executive Board. | CDM Modalities and Procedures §37e | OK. |
| 16. 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. |
| 17. 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. |
| 18. The project design document shall be in conformance with the UNFCCC CDM-PDD format. | CDM Modalities and Procedures Appendix B, EB Decision | OK - The project design document conforms to version 03.1 of the CDM-PDD. |

| Requirement | Reference | Conclusion |
|--|---------------------------------------|------------|
| 19. 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 2Requirements Checklist

| CHECKLIST QUESTION | Ref. | MoV* | COMMENTS | Draft Concl. | Final Concl. |
|--|--------|---------|---|-----------------|-----------------|
| A.General Description of Project Activity The project design is assessed.A.1.Project Boundaries | | | | | |
| <i>Project Boundaries are the limits and borders defining the GHG emission reduction project.</i> | | | | | |
| A.1.1. Are the project's spatial boundaries (geographical) clearly defined? | /1//2/ | DR | "Feira de Santana Landfill Gas Project" is located in the Feira de Santana landfill, located in the municipalities of Feira de Santana, Bahia State. However, the geographical coordinates of the landfill were not clearly indicated. | CL-1 | ОК |
| A.1.2. Are the project's system boundaries (components and facilities used to mitigate GHGs) clearly defined? | /1//2/ | DR I | In accordance with ACM0001, the project's system boundaries encompass the Feira de Santana Landfill and the system boundary for the electricity system is the N-NE electric grid. | | ОК |
| A.2. Participation Requirements | | | | | |
| Referring to Part A, Annex 1 and 2 of the PDD as well as the CDM glossary with respect to the terms Party, Letter of Approval, Authorization and Project Participant. | | | | | |
| A.2.1. Which Parties and project participants are participating in the project? | /1//2/ | DR | The project participant is Qualix Serviços Ambientais Ltda. of Brazil. The host Party Brazil meets all relevant participation requirements. | | ОК |

| CHECKLIST QUESTION | Ref. | MoV* | COMMENTS | Draft Concl. | Final Concl. |
|---|--------|---------|--|-----------------|-----------------|
| A.2.2. Have all involved Parties provided a valid and complete letter of approval and have all private/public project participants been authorized by an involved Party? | /1//2/ | DR | Prior to the submission of the final 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. | | |
| A.2.3. Do all participating Parties fulfil the participation requirements as follows: Ratification of the Kyoto Protocol Voluntary participation Designated a National Authority | /1//2/ | DR | Yes, Brazil has ratified the Kyoto Protocol on 23 August 2002 and fulfils all requirements. | | ОК |
| A.2.4. Potential public funding for the project from Parties in Annex I shall not be a diversion of official development assistance. | /1//2/ | DR | The validation did not reveal any information that indicates that the project can be seen as a diversion of ODA funding towards Brazil. | | ОК |
| A.3. 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.3.1. Does the project design engineering reflect current good practices? | /1//2/ | DR I | Yes. The project design engineering reflects good practice. However, the treatment of leachate of the landfill is not mentioned. | CL-2 | OK |
| A.3.2. Does the project use state of the art technology or would the technology result in a significantly | /1//2/ | DR I | The project comprises the installation of the necessary LFG extraction wells, connecting | | ОК |

| CHECKLIST QUESTION | Ref. | MoV* | COMMENTS | Draft Concl. | Final Concl. |
|---|--------|---------|--|-----------------|-----------------|
| better performance than any commonly used technologies in the host country? | | | pipes, blowers, flare and LFG-fuelled power generator. | | |
| A.3.3. Does the project make provisions for meeting training and maintenance needs? | /1//2/ | DR I | As verified during the site visit, the operation of the capture and flaring system will be implemented with supporting training of operational and maintenance employees. | | ОК |
| A.4. Contribution to Sustainable Development | | | | | |
| The project's contribution to sustainable development is assessed. | | | | | |
| A.4.1. Has the host country confirmed that the project assists it in achieving sustainable development? | /1//2/ | DR | The project is in line with current sustainable development priorities in Brazil. Prior to the submission of the final 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. | | |
| A.4.2. Will the project create other environmental or social benefits than GHG emission reductions? | /1//2/ | DR | The project is expected to reduce the GHG emissions by capturing and flare or burning the LFG produced by the Feira de Santana landfill, minimizing environmental problems, reducing safety risks and increasing local employment, thus contributing to sustainable development objectives of the Brazilian Government. | | ОК |
| B. Project Baseline | | | | | |

| CHECKLIST QUESTION | Ref. | MoV* | COMMENTS | Draft Concl. | Final Concl. |
|--|--------|---------|--|-----------------|-----------------|
| 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. Does the project apply an approved methodology and the correct version thereof? | /1//2/ | DR | Yes - The project applies the approved baseline methodology ACM0001 - "Consolidated baseline methodology for landfill gas project activities" version 6 /14/, | | OK |
| B.1.2. Are the applicability criteria in the baseline methodology all fulfilled? | /1//2/ | DR I | The project fulfils the applicability criteria of ACM0001: i) the captured gas is flared and; ii) the captured gas is used to produce electrical or thermal energy. However the PDD mentions only the second alternative. | CL 3 | ОК |
| B.2. Baseline Scenario Determination The choice of the baseline scenario will be validated with focus on whether the baseline is a likely scenario, and whether the methodology to define the baseline scenario has been followed in a complete and transparent manner. | | | | | |
| B.2.1. What is the baseline scenario? | /1//2/ | DR I | The baseline scenario is the partial capture of landfill gas and destruction to address safety and odour concerns. The selection of the baseline scenario is in compliance with ACM0001 and includes the following steps: Step 1 – Identification of alternatives to the project activity consistent with current laws | | ОК |

| CHECKLIST QUESTION | Ref. | MoV* | COMMENTS | Draft Concl. | Final Concl. |
|--------------------|------|------|---|-----------------|-----------------|
| | | | and regulations The possible scenarios are | | |
| | | | identified, i.e. LFG1 (project activity without | | |
| | | | CDM) and LFG2 (continue the practice of | | |
| | | | release of LFG to the atmosphere with partial | | |
| | | | destruction.). As the project intends to | | |
| | | | generate electricity and/or heat, two power | | |
| | | | generation baseline alternatives and two heat | | |
| | | | generation baseline alternatives were also | | |
| | | | identified: | | |
| | | | - P1 (power generation without CDM), | | |
| | | | - P6 (power plant connected to the | | |
| | | | grid), | | |
| | | | - H1 (heat generation without CDM) | | |
| | | | and | | |
| | | | - H4 (existing fossil fuel based thermal | | |
| | | | plant on site) | | |
| | | | All these scenarios are in compliance with | | |
| | | | Brazilian regulations. These scenarios could | | |
| | | | be considered realistic. | | |
| | | | Step 2 – Identify the fuel for the baseline | | |
| | | | choice of energy source taking into account | | |
| | | | the national or sectoral policies: For the | | |
| | | | power scenario, the fuel in the power plants | | |
| | | | connected to the grid and the emission factors | | |
| | | | are determined by applying ACM0002 | | |
| | | | version 6. For the heat scenario, the fuel for | | |
| | | | the baseline choice is LPG. This is | | |

| CHECKLIST QUESTION | Ref. | MoV* | COMMENTS | Draft Concl. | Final Concl. |
|---|--------|---------|---|-----------------|-----------------|
| | | | appropriate as this is the fuel used in the existent boiler used to sterilize the waste from hospitals. This fuel choice is considered as conservative and realistic. | | |
| B.2.2. What other alternative scenarios have been considered and why is the selected scenario the most likely one? | /1//2/ | DR I | See B.2.1 | | ОК |
| B.2.3. Has the baseline scenario been determined according to the methodology? | /1//2/ | DR I | See B.2.1 | | OK |
| B.2.4. Has the baseline scenario been determined using conservative assumptions where possible? | /1//2/ | DR I | See B.2.1 | | OK |
| B.2.5. Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations? | /1//2/ | DR I | As verified, there are no Brazilian regulation or legislation that require to capture and destroy LFG. | | OK |
| B.2.6. Is the baseline scenario determination compatible with the available data and are all literature and sources clearly referenced? | /1//2/ | DR | Yes | | OK |
| B.2.7. Have the major risks to the baseline been identified? | /1//2/ | DR I | The project does not have any contractual obligations to burn methane. This is confirmed through the Administrative Contract # 112/2007 between the Feira de Santana Municipality and Qualix Serviços Ambientais Ltda /10/. Therefore, the methane | | ОК |

| CHECKLIST QUESTION | Ref. | MoV* | COMMENTS | Draft Concl | Final Concl |
|--|--------|------|--|----------------|----------------|
| | | | that would have been destructed in the baseline is calculated using an "Adjustment Factor". The "Adjustment Factor" has been estimated to be 20% of the total methane destructed under the project activity. The "Adjustment Factor" of 20% allows for the destruction of LFG in the baseline scenario which would have occurred as a result of the continuation of the current practice of passive venting of LFG. Since the Brazilian landfill regulations do not mandate LFG collection and destruction and only a small amount of the methane generated is currently burned due to safety and odour reasons, an "Adjustment Factor" of 20% is deemed appropriate. | | |
| B.3. Additionality Determination The assessment of additionality will be validated with focus on whether the project itself is not a likely baseline scenario. | | | | | |
| B.3.1. Is the project additionality assessed according to the methodology? | /1//2/ | DR | Yes, In accordance with ACM0001, the additionality of the project is demonstrated through the "Tool for the demonstration and assessment of additionality" /16/. | | OK |
| B.3.2. Are all assumptions stated in a transparent and conservative manner? | /1//2/ | DR | Yes | | OK |

| CHECKLIST QUESTION | Ref. | Ref. M | /loV* | COMMENTS | Draft Concl. | Final Concl. |
|---|-------------|--|--------------------|---|-----------------|-----------------------|
| CHECKLIST QUESTION B.3.3. Is sufficient evidence provided to support the relevance of the arguments made? | Ref. | Ref. M \//2/ I | AoV * DR | COMMENTS In accordance with ACM0001 v6 /14/, the additionality of the project is demonstrated through the "Tool for the demonstration and assessment of additionality" /16/ which includes the following steps: <i>Step 1 - Identification of alternatives to the</i> <i>project activity consistent with current laws</i> <i>and regulations</i> : The possible scenarios for LFG capture, electricity generation and heat generation are identified as described above. As confirmed in the Administrative Contract # 112/2007 between Feira de Santana Municipality and Qualix Serviços Ambientais Ltda./10/, there are no contractual requirements to capture or flare LFG <i>Step 2 - Investment analysis:</i> The baseline alternative LFG1 (project activity without CDM), including all sub scenarios,I is without the revenues from the sale of certified emission reductions, less economically and financially attractive than the baseline scenario LFG2. The NPV values were calculated applying a discount rate of 10%, which is lower than the 11.5% actual | Draft Concl. | Final Concl. OK |
| | | | | SELIC rate set by the Central Bank of Brazil. The investment and O&M costs are considered realistic and the budget for the | | |

| CHECKLIST QUESTION | Ref. | MoV* | COMMENTS | Draft Concl. | Final Concl. |
|--------------------|------|------|---|-----------------|-----------------|
| | | | monitoring and flaring equipment (from Kock Tecnologia Quimica Ltda and John Zink Company LLC) was verified during the follow-up interviews. The electricity price taken from the first Brazilian electricity auction was verified during the follow-up interviews. | | |
| | | | A sensitive analysis has been done decreasing and increasing the investment, O&M and electricity and LPG prices. The NPV remains negative, even in the case where these parameters change in favour of the project. | | |
| | | | Step 3 - <i>Barrier Analysis:</i> The project apply a barrier analysis also for the scenarios of LFG capture and flaring, LFG capture and generate electricity and LFG capture and produce heat. | | |
| | | | a) <i>Investment barrier:</i> the investment loan for landfill in Brazil is not a common practice. | | |
| | | | b) <i>Technological barrier:</i> the technology applied to produce electricity from LFG is not commonly available in Brazil. The LFG contains corrosive gases and needs special metal or treatment. This creates a technology barrier. | | |
| | | | barrier. Hence, it can be concluded that the project is | | |

| CHECKLIST QUESTION | Ref. | MoV* | COMMENTS | Draft Concl. | Final Concl. |
|---|--------|------|--|-----------------|-----------------|
| | | | not financially attractive and thus is additional. Step 4 - Common practice analysis: DNV was able to confirm that the use of LFG to produce energy or the practice of capture and flaring the LFG is not a common practice in Brazil. | | |
| B.3.4. If the starting date of the project activity is before the date of validation, has sufficient evidence been provided that the incentive from the CDM was seriously considered in the decision to proceed with the project activity? | /1//2/ | DR | The starting date of project activity is when the contract between Qualix and MGM International regarding Carbon Credit Services was signed. This was prior to the start of validation defined as when the PDD was submitted to publication | | ОК |
| B.4. Calculation of GHG Emission Reductions – Project emissions It is assessed whether the project emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified. | | | | | |
| B.4.1. Are the calculations documented according to the approved methodology and in a complete and transparent manner? | /1//2/ | DR | Emission reduction calculations are correct and transparently documented according to ACM0001 in the LFG estimation spreadsheet /8/. A 90% flare efficiency is considered according to the " <i>Tool to determine project</i> <i>emissions from flaring gases containing</i> <i>methane</i> ". | | ОК |
| B.4.2. Have conservative assumptions been used when | /1//2/ | DR | Yes, an AF of 20% is conservative and a | | OK |

| CHECKLIST QUESTION | Ref. | MoV* | COMMENTS | Draft Concl. | Final Concl. |
|--|--------|------|---|-----------------|-----------------|
| calculating the project emissions? | | I | higher value than applied by other similar projects. A capture efficiency of 65% is deemed conservative and is lower than used by other similar projects. | | |
| B.4.3. Are uncertainties in the project emission estimates properly addressed? | /1//2/ | DR | Yes, as verified in the MGM: LFG estimation spreadsheet /8/ | | OK |
| B.5. Calculation of GHG Emission Reductions – Baseline emissions It is assessed whether the baseline emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified. | | | | | |
| B.5.1. Are the calculations documented according to the approved methodology and in a complete and transparent manner? | /1//2/ | DR | Yes, the baseline emission estimations were calculated applying the US EPA First Order Decay model and the IPCC 2006 Guidelines for the variables MDC, DOCf, $DOCg/L_0$ and k based on actual amount of waste landfilled and characterization of waste. | | ОК |
| B.5.2. Have conservative assumptions been used when calculating the baseline emissions? | /1//2/ | DR | See B.5.1 | 5 | ОК |
| B.5.3. Are uncertainties in the baseline emission estimates properly addressed? | /1//2/ | DR | See B.5.1 | | OK |
| B.6. Calculation of GHG Emission Reductions – Leakage It is assessed whether leakage emissions are stated according to the methodology and whether the | | | | | |

| CHECKLIST QUESTION | Ref. | MoV* | COMMENTS | Draft Concl. | Final Concl. |
|---|--------|------|---|-----------------|-----------------|
| argumentation for the choice of default factors and values – where applicable – is justified. | | | | | |
| B.6.1. Are the leakage calculations documented according to the approved methodology and in a complete and transparent manner? | /1//2/ | DR | ACM0001 does not consider any leakage. | | OK |
| B.7. Emission Reductions | | | | | |
| The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change. | | | | | |
| B.7.1. Are the emission reductions real, measurable and give long-term benefits related to the mitigation of climate change. | /1//2/ | DR | The project is expected to reduce CO_2 emissions to the extent of 298 004 tCO ₂ e during the renewable 7 years crediting period (42 572 tCO2e/year on average). | | OK |
| B.8. Monitoring Methodology | | | | | |
| It is assessed whether the project applies an appropriate monitoring methodology. | | | | | |
| B.8.1. Is the monitoring plan documented according to the approved methodology and in a complete and transparent manner? | /1//2/ | DR | Yes. The project applies the approved consolidated monitoring methodology ACM0001 ("Consolidated monitoring methodology for landfill gas project activities") - version 06. | | ОК |
| B.8.2. Will all monitored data required for verification and issuance be kept for two years after the end of the crediting period or the last issuance of CERs, for this project activity, whichever occurs later? | /1//2/ | DR | Yes - details of the data to be collected, calibration of measurement instruments, and the frequency of data recording, format and storage location are described. The recording frequency and storage of the data are deemed | | ОК |

| CHECKLIST QUESTION | Ref. | MoV* | COMMENTS | Draft Concl. | Final Concl. |
|---|--------|---------|---|-----------------|-----------------|
| | | | appropriate for the project. | | |
| B.9. Monitoring of Project Emissions It is established whether the monitoring plan provides for reliable and complete project emission data over time. | | | | | |
| B.9.1. 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//2/ | DR I | Details of the data to be collected, format and location to be filed, data unit, description of measurements methods and procedures to be applied and QA/QC procedures are correctly described. All monitoring parameters required in ACM0001 were included. | | ОК |
| B.9.2. Are the choices of project GHG indicators reasonable and conservative? | /1//2/ | DR | See B.9.1 | | OK |
| B.9.3. Is the measurement method clearly stated for each GHG value to be monitored and deemed appropriate? | /1//2/ | DR | See B.9.1 | | OK |
| B.9.4. Is the measurement equipment described and deemed appropriate? | /1//2/ | DR | See B.9.1 | | ОК |
| B.9.5. Is the measurement accuracy addressed and deemed appropriate? Are procedures in place on how to deal with erroneous measurements? | /1//2/ | DR | See B.9.1 | | OK |
| B.9.6. Is the measurement <i>interval</i> identified and deemed appropriate? | /1//2/ | DR | See B.9.1 | | OK |

| CHECKLIST QUESTION | Ref. | MoV* | COMMENTS | Draft Concl. | Final Concl. |
|--|--------|------|-----------|-----------------|-----------------|
| B.9.7. Is the <i>registration, monitoring, measurement</i> and <i>reporting</i> procedure defined? | /1//2/ | DR | See B.9.1 | | ОК |
| B.9.8. Are procedures identified for <i>maintenance</i> of monitoring equipment and installations? Are the calibration intervals being observed? | /1//2/ | DR | See B.9.1 | | OK |
| B.9.9. 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//2/ | DR | See B.9.1 | | ОК |
| B.10. Monitoring of Baseline Emissions It is established whether the monitoring plan provides for reliable and complete baseline emission data over time. | | | | | |
| B.10.1.Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining baseline emissions during the crediting period? | /1//2/ | DR | See B.9.1 | | ОК |
| B.10.2. Are the choices of baseline GHG indicators reasonable and conservative? | /1//2/ | DR | See B.9.1 | | OK |
| B.10.3. Is the measurement method clearly stated for each baseline indicator to be monitored and also deemed appropriate? | /1//2/ | DR | See B.9.1 | | OK |
| B.10.4. Is the measurement <i>equipment</i> described and | /1//2/ | DR | See B.9.1 | | OK |

| CHECKLIST QUESTION | Ref. | MoV* | COMMENTS | Draft Concl. | Final Concl. |
|---|--------|------|---------------------------------------|-----------------|-----------------|
| deemed appropriate? | | | | | |
| B.10.5. Is the measurement <i>accuracy</i> addressed and deemed appropriate? Are procedures in place on how to deal with erroneous measurements? | /1//2/ | DR | See B.9.1 | | OK |
| B.10.6. Is the measurement <i>interval</i> for baseline data identified and deemed appropriate? | /1//2/ | DR | See B.9.1 | | OK |
| B.10.7.Is the registration, <i>monitoring</i> , <i>measurement</i> and <i>reporting</i> procedure defined? | /1//2/ | DR | See B.9.1 | | OK |
| B.10.8. Are procedures identified for <i>maintenance</i> of monitoring equipment and installations? Are the calibration intervals being observed? | /1//2/ | DR | See B.9.1 | | OK |
| B.10.9. 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//2/ | DR | See B.9.1 | | ОК |
| B.11. Monitoring of Leakage | | | | | |
| It is assessed whether the monitoring plan provides for reliable and complete leakage data over time. | | | | | |
| B.11.1.Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage? | /1//2/ | DR | ACM0001 does not consider any leakage | | ОК |

| CHECKLIST QUESTION | Ref. | MoV* | COMMENTS | Draft Concl. | Final Concl. |
|--|--------|------|---|-----------------|-----------------|
| B.12. Monitoring of Sustainable Development Indicators/ Environmental Impacts It is assessed whether choices of indicators are reasonable and complete to monitor sustainable performance over time. | | | | | |
| B.12.1.Is the monitoring of sustainable development indicators/ environmental impacts warranted by legislation in the host country? | /1//2/ | DR | Neither ACM0001 nor Resolution 1 of the Brazilian DNA requires the monitoring of social or environmental indicators. | | ОК |
| B.13. Project Management Planning It is checked that project implementation is properly prepared for and that critical arrangements are addressed. | | - | | | |
| B.13.1.Is the authority and responsibility of overall project management clearly described? | /1//2/ | DR | Several monitoring processes/ procedures are defined. The authority and responsibility for registration, monitoring, measurement and reporting of project activities as well as for organising and training of the staff in the appropriate monitoring, measurement and reporting techniques is clearly defined. Also the procedures for calibration of monitoring equipment are identified | | ОК |
| B.13.2. Are procedures identified for training of monitoring personnel? | /1//2/ | DR | Qualix Serviços Ambientais Ltda. is responsible for the project management and monitoring and reporting as well as for training of staff in the appropriate monitoring, measurement and reporting | | ОК |

| CHECKLIST QUESTION | Ref. | MoV* | COMMENTS | Draft Concl. | Final Concl. |
|---|--------|---------|---|-----------------|-----------------|
| | | | techniques. | | |
| B.13.3. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions? | /1//2/ | DR | Not applicable | | ОК |
| B.13.4. Are procedures identified for review of reported results/data? | /1//2/ | DR | See B.13.1 | | OK |
| B.13.5. Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting? | /1//2/ | DR | See B.13.1 | 2000 | OK |
| C. Duration of the Project/ Crediting Period | | | | | |
| It is assessed whether the temporary boundaries of the project are clearly defined. | | | | | |
| C.1.1. Are the project's starting date and operational lifetime clearly defined and evidenced? | /1//2/ | DR I | The project starting date is 17 July 2006 with an expected lifetime of 21 years. However, the PDD was issued in August 2007. DVN requests an adequate project starting date. | CL-4 | ОК |
| C.1.2. Is the start of the crediting period clearly defined and reasonable? | /1//2/ | DR | A renewable 7-years crediting period was selected, starting on 01 February 2008, | | ОК |
| D. 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. | | | | | |
| D.1.1. Has an analysis of the environmental impacts of | /1//2/ | DR | The operational environmental license # 3701 | CL-5 | OK |

| CHECKLIST QUESTION | Ref. | MoV* | COMMENTS | Draft Concl. | Final Concl. |
|--|--------|------|--|-----------------|-----------------|
| the project activity been sufficiently described? | | Ι | was issued on 05 December 2006 by \CERAM/CRA /13/. The license is valid until 05 December 2007 and was verified by DNV during the follow-up interviews. All possible environment impacts were analyzed and described in the PDD. No significant negative environmental impacts were identified by Qualix Serviços Ambientais Ltda. | | |
| D.1.2. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved? | /1//2/ | DR | See D.1.1 | | ОК |
| D.1.3. Will the project create any adverse environmental effects? | /1//2/ | DR | See D.1.1 | | ОК |
| D.1.4. Are transboundary environmental impacts considered in the analysis? | /1//2/ | DR | See D.1.1 | | OK |
| D.1.5. Have identified environmental impacts been addressed in the project design? | /1//2/ | DR | See D.1.1 | | OK |
| D.1.6. Does the project comply with environmental legislation in the host country? | /1//2/ | DR | See D.1.1 | | ОК |
| E. Stakeholder Comments The validator should ensure that stakeholder comments have been invited with appropriate media and that due account has been | | | | | |

| CHECKLIST QUESTION | Ref. | MoV* | COMMENTS | | Final Concl. |
|--|--------|---------|--|--|-----------------|
| taken of any comments received. | | | | | |
| E.1.1. Have relevant stakeholders been consulted? | /1//2/ | DR I | Local stakeholders, such as the Municipal Government, the municipal agency, the Brazilian forum of NGOs, neighbouring communities, the state environmental agency 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. Comments received were positive. | | ОК |
| E.1.2. Have appropriate media been used to invite comments by local stakeholders? | /1//2/ | DR | See E.1.1 | | OK |
| E.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//2/ | DR | See E.1.1 | | ОК |
| E.1.4. Is a summary of the stakeholder comments received provided? | /1//2/ | DR | See E.1.1 | | ОК |
| E.1.5. Has due account been taken of any stakeholder comments received? | /1//2/ | DR | See E.1.1 | | |

| Draft report clarifications and corrective action requests by validation team | Ref. to checklist question in table 2 | Summary of project owner response | Validation team conclusion |
|--|--|---|---|
| CL 1 The geographical coordinates of the landfill were not clearly indicated. | A.1.1 | PDD reviewed at section A.4.1.4. | The address and geographic coordinates are clear in version 2 of the PDD. Therefore this CL is closed. |
| CL 2 The treatment of leachate of the landfill is not mentioned. | A.3.1 | Leachate is treated off-site at the municipal waste water treatment plant. However, Qualix is constructing an on- site treatment plant to start operating early 2008. | As verified during site visit, the leachate is recirculated in the landfill during dry season and sent to municipal wastewater treatment station during rain season. Complementally, the landfill is in the process to contract the installation of local aerobic wastewater treatment. Therefore this CL is closed. |
| CL 3 The project fulfils the conditions under which ACM0001 is applicable: i) the captured gas is flared and; ii) the captured gas is used to produce energy electric and thermal. However the PDD mentions only the second alternative. | B.1.2 | PDD reviewed at section B.2. | Revised PDD, version 2 clarifies the applicability. Therefore this CL is closed. |
| CL 4 The project starting date is 01 January 2006 with an expected lifetime of 20 years. However, the PDD was issued in August 2007. DVN requests an adequate project starting date. | C.1.1 | The date was changed to 17/07/2006. PDD reviewed at section C.1.1. | As verified during site visit interview, the contract between Qualix and MGM International regarding Carbon Credit Services was considered as the project starting date. Therefore this CL is closed. |
| CL 5 All possible environment impacts were | D.1.1 | The landfill operational environmental permit was issued on $05/12/2006$ and is | As verified during the site visit, Feira de Santana Landfill has the Environment |

Table 3Resolution of Corrective Action and Clarification Requests

| Draft report clarifications and corrective action requests by validation team | Ref. to checklist question in table 2 | Summary of project owner response | Validation team conclusion |
|--|--|--|---|
| analyzed in the PDD and no negative environmental impacts are observed by Qualix Serviços Ambientais Ltda. An operational environmental license was issued by CRA. However the number and issue were not mentioned. DNV request evidence of the license. | | due to 05/12/2007. PDD reviewed at section D.1. Evidence was presented during the validation visit too. | License # 3701 issued on 05/12/2006 by CEPRAM/CRA and valid until 05/12/2007. Therefore this CL is closed. |

DET NORSKE VERITAS

APPENDIX B

CERTIFICATES OF COMPETENCE



CERTIFICATE OF COMPETENCE

Mari Viddal

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJI-i1

| GHG Auditor: | Yes | | |
|---|-----|---------------|-----|
| CDM Validator: | Yes | JI Validator: | Yes |
| CDM Verifier: | | JI Verifier: | |
| Industry Sector Expert for Sectoral Scope(s): | | | |
| Technical Reviewer for (group of) methodologies: | | | |
| ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G | Yes | | |
| ACM002, AMS-I.A-D, AM0019, AM0026, AM0029 | Yes | | |
| Høvik, 6 November 2006 | | | |

Einar TelnesMichael LehmannDirector, International Climate Change ServicesTechnical Director



CERTIFICATE OF COMPETENCE

Marco A. Ratton

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJI-i1

| GHG Auditor: | Yes | | |
|---|-----|---------------|--|
| CDM Validator: | | JI Validator: | |
| CDM Verifier: | | JI Verifier: | |
| Industry Sector Expert for Sectoral Scope(s): | | | |

Høvik, 5 February 2007

Einar Telnes Director, International Climate Change Services Michael Lehmann Technical Director



CERTIFICATE OF COMPETENCE

Luis Filipe Tavares

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJI-i1

| Industry Sector Expert for Sectoral Scope(s): | Sectoral scope 9 & 13 | | |
|---|-----------------------|---------------|--|
| CDM Verifier: | Yes | JI Verifier: | |
| CDM Validator: | Yes | JI Validator: | |
| GHG Auditor: | Yes | | |

Høvik, 6 November 2006

Einar Telnes Director, International Climate Change Services Michael Lehmann Technical Director