VALIDATION REPORT

SERECO S/A

NATAL LANDFILL GAS RECOVERY PROJECT

Report No: 4379/06 – 06/40

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Approved by: Mr. E. Krupp	Organisational unit: TÜV NORD JI/CDM Certification Program
Client: SERECO S/A	Client ref.: Mr. Henrique Muniz Dantas

Summary/Opinion:

Sereco S.A. has commissioned the TÜV NORD JI/CDM Certification Program (CP) to validate the project: "Natal Landfill Gas Recovery Project" with regard to the relevant requirements of the UNFCCC for CDM project activities, as well as criteria for consistent project operations, monitoring and reporting. UNFCCC criteria include article 12 of the Kyoto Protocol, the modalities and procedures for CDM (Marrakech Accords) and the relevant decisions by COP/MOP and CDM Executive Board.

The project activity uses methane capture system through flaring the methane, mitigating with the reduction of the greenhouse gases (GHG) emissions.

A risk based approach has been followed to perform this validation. In the course of the pre-validation, 19 Corrective Action Requests (CARs) and 09 Clarification Requests (CLs) were raised and successfully closed.

The review of the project design documentation and additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and review of comments by parties, stakeholders and NGOs have provided TÜV NORD JI/CDM CP with sufficient evidence to validate the fulfilment of the stated criteria.

In detail the conclusions can be summarised as follows:

- The validation team is convinced that the project is in line with all relevant host country criteria (Brazil) and all relevant UNFCCC requirements for CDM. Nevertheless the LoA is pending. Project activity approval has not yet been obtained from the DNA of Brazil since a positive validation opinion is a pre-requisite for issuance of Letter of Approval (LOA). The request for registration will not be submitted before it has been issued by the DNA.
- The project additionality is sufficiently justified in the PDD.
- The monitoring plan is transparent and adequate.
- The calculation of the project emission reductions is carried out in a transparent and conservative manner, so that the calculated emission reductions of 668,442 tCO_2e are most likely to be achieved within the renewable crediting period (1st January 2010 to 31st December 2016).

The conclusions of this report show, that the project, as it was described in the project documentation, is in line with all criteria applicable for the validation.

Report No.: 4379/06 - 06/40	Subject Group: Environment
Report title: Natal Landfill Gas Recovery Project	
Work carried out by: Rainer Winter Maria Carolina Crisci Coelho Ricardo Ribeiro Lopes Ana Maria Guena	
Work verified by: Inga Nagel	

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Indexing terms

Climate change
CDM
Validation
Kyoto Protocol

Abbreviations

BAU	Business as usual
CA	Corrective Action / Clarification Action
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CETESB	Environmental and Sanitation Company of the State of São Paulo (Companhia de Tecnologia de Saneamento Ambiental)
CIMGC	Interministerial Comission on Global Climate Change (Brazilian DNA)
CO_2	Carbon dioxide
CH_4	Methane
CO_{2e}	Carbon dioxide equivalent
CP	Certification Program
CL	Clarification Request
DNA	Designated National Authority
EB	CDM Executive Board
EIA	Environmental Impact Assessment
GHG	Greenhouse gas(es)
IPCC	Intergovernmental Panel on Climate Change
kW	Kilowatt
kWh	Kilowatt hour
LFG	Landfill gas
LoA	Letter of Approval
m	Meter
m^3	Cubic meters
MCT	Ministry of Science and Technology of Brazil
MP	Monitoring Plan
MW	Megawatt
Nm^3	Standard cubic meters
PDD	Project Design Document
QA/QC	Quality control/Quality assurance
UNFCCC	United Nations Framework Convention on Climate Change

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1 INTRODUCTION

Sereco S/A has commissioned the TÜV NORD JI/CDM Certification Program (CP) to validate the project:

"Natal Landfill Gas Recovery Project"

with regard to the relevant requirements for CDM project activities.

1.1 Objective

The purpose of this validation is to have an independent third party assessment of the project design. In particular, the project's baseline, the monitoring plan (MP) and the project's compliance with

- the requirements of Article 12 of the Kyoto Protocol/KP/; the CDM modalities and procedures as agreed in the Marrakech Accords under decision 17/CP.7/MA/; the annex to the decision; subsequent decisions made by COP/MOP & CDM Executive Board,
- other relevant rules, including the host country (Brazil) legislation and sustainability criteria,

which are validated in order to confirm that the project design as documented is sound and reasonable and meets the stated requirements and identified criteria. Validation is seen as necessary to provide assurance to stakeholders on the quality of the project and its intended generation of certified emission reductions (CERs).

1.2 Scope

The validation scope is given as an independent and objective review of the project design, the project's baseline study and monitoring plan (based on ACM 0001, version 10: "Consolidated baseline and monitoring methodology for landfill gas project activities"), which are included in the PDD and other relevant supporting documents.

The items covered in the validation are described below:

- **UNFCCC & Host Country Criteria**
  - UNFCCC/Kyoto Protocol requirements, in particular, the requirements of the CDM as set out in decision 17/CP.7 (Marrakech Accords), the present annex, and relevant decisions by COP/MOP & CDM Executive Board
  - Host country requirements / criteria

- **CDM Project Description**

- Project design
- Project boundaries
- Predicted CDM project GHG emissions

- **Project Baseline**
  - Baseline methodology
  - Baseline GHG emissions

- **Project Additionality**

- **Monitoring Plan**
  - Monitoring methodology
  - Indicators/data to be monitored and reported
  - Responsibilities

- **Background investigation and follow up interviews**

- **Stakeholder consultation**
  - Publishing the PDD on TUV NORD website
  - Review of comments

- **Draft validation reporting with CARs & CLs, if any**

- **Final validation reporting.**

The information included in the PDD and the supporting documents were reviewed against the requirements and criteria mentioned above. The TÜV NORD JI/CDM CP has, based on the recommendations in the Validation and Verification Manual[/VVM/], employed a risk-based approach in the validation, focusing on the identification of significant risks for project implementation and the generation of CERs. The validation is based on the information made available to TÜV NORD JI/CDM CP and on the contract conditions. TÜV NORD JI/CDM CP can not be held liable by any entities for making its validation opinion based on any false or misleading information supplied to it during the course of validation.

The validation is not meant to provide any consultancy to the project participant. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the project design.

1.3 GHG Project Description

1.3.1 Project Scope

The considered GHG project can be classified as a large scale CDM project in the sector given in Table 1-1 (according to List of Sectoral Scopes of UNFCCC).

Table 1-1: Project Scope

No.	Project Scope
13	Waste handling and disposal

1.3.2 Project Parties

Brazil is the party involved in the project activity.

1.3.3 Project Entities

The following entities are involved in the developing of the project:

Project Proponent: **(Host country)**	SERECO S/A Rua Romualdo Galvão, 1703 59056-100 – Natal – RN Brazil
Contact person:	Mr. Henrique Muniz Dantas (Administrative Director) +55-84-94316060 hmdantas@terra.com.br
Consultant:	Cantor Co2e Brasil Rua Borges Lagoa, 1065 cjto 146 São Paulo - SP Brazil
Contact Person:	Mr. Divaldo Costa Rezende +55 (11) 50833252 drezende@cantorco2e.com.br

1.3.4 Project location

The project site is located at the municipality of Ceará-Mirim, at the highway BR-406, 28 km from the city of Natal and 7 km from the centre of Ceará-Mirim, in the State of Rio Grande do Norte. The details of the project location are given in table 1-2:

Table 1-2: Project Location

No.	Project Scope
Host Country	Brazil
Region:	Ceará-Mirim city, Rio Grande do Norte State
Project location address:	Massaranduba Landfill - highway BR-406
Latitude:	5°41'30'' S
Longitude:	35°22'53" W

1.3.5 Technical project description

The project activity involves the installation of a gas collection and burner system, equally distributed vertical wells to extract LFG through exhaustion with blowers, collectors pipes, compressors and flaring system with continuous and automated pilot, ignition and control panel with CLP and hydraulic seal in the base.

As per the PDD this project activity is expected to reduce CO2 emissions over the chosen 07-year "renewable crediting period" of **668,442 tCO2e** starting at 01 January 2010 until 31 December 2016.

2 VALIDATION TEAM

- The Validation Team is led by Mr. **Rainer Winter**. He works at TÜV NORD as an ISO 9001/ 14001 auditor and environmental verifier for EMAS. He is also an approved emission verifier within the European Emission Trading Scheme. Mr. Winter is an authorized JI/CDM senior assessor and is the global leader of the TÜV NORD JI/CDM CP. For this validation he was assisted by:
- **Maria Carolina Crisci Coelho**, BRTÜV (TÜV NORD Brazil), Mrs. Coelho is an ISO 14001 Auditor and Product Manager for CDM Services for BRTÜV. She is an appointed expert for the TÜV NORD JI/CDM certification program.
- **Ricardo Lopes,** BRTÜV (TÜV NORD Brazil) – São Paulo, Brazil. Mr. Lopes is an ISO 9001 and 14001 auditor and GHG auditor. He has received extensive CDM training and has participated in several projects in the voluntary carbon market and CDM (Trainee).
- **Ana Maria Guena,** BRTÜV, Sao Paulo, Brazil (Trainee)

The validation report is verified by:

- **Inga Nagel,** Environmental Scientist and presently with TÜV NORD CERT GmbH. She is TÜV NORD Cert auditor for ISO 9001 and ISO 14001. She has received extensive training in CDM validation and verification process and is an appointed assessor for the JI/CDM CP of TÜV NORD.

The validation report is approved by:

- Mr. **Eric Krupp**. He is an expert in the field of environmental approval procedures as well as in national and international Emission Trading. He works at TÜV NORD as an approved emission verifier within the European Emission Trading Scheme. Mr. Krupp is an authorized JI/CDM senior assessor and deputy head of the JI/CDM Certification Program of TÜV NORD.

3 METHODOLOGY

The validation of the project was carried out from March 2008 to August 2009. It was divided into two phases: the pre-validation and the final validation phase. The pre-validation consisted of the following three phases:

- A desk review of the PDD (incl. annexes) and supporting documents with the use of a customised validation protocol /CPM/ according to the Validation and Verification Manual /VVM/;
- Back ground investigation and follow-up interviews with personnel of the project proponent, the project developer, legal authorities and other stakeholders;
- Reporting of draft validation findings taking into account the public comments received on TÜV NORD's website.

The draft validation report includes Corrective Action Requests and Clarification Requests (CAR and CL) identified in the course of this validation.

A **Corrective Action Request** is established if

- mistakes have been made in assumptions or the project documentation which directly will influence the project results,
- the requirements deemed relevant for validation of the project with certain characteristics have not been met or
- there is a risk that the project would not be registered by the UNFCCC or that emission reductions cannot be verified and certified.

A **Clarification Request** is issued where information is insufficient, unclear or not transparent enough to establish whether a requirement is met.

The final validation starts after issuance of proposed corrective action (CA) of these CAR and CL by the project proponent. The validator assesses the proposed CA. After the closure of these CAR and CL the project proponent issues the final version of the PDD. Based on this document, the final validation report and opinion are issued.

3.1 Validation Protocol

In order to ensure consideration of all relevant assessment criteria, a validation protocol was used. The protocol shows, in a transparent manner, criteria and requirements, means of verification and the results from pre-validating the identified criteria. The validation protocol serves the following purposes:

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

The validation protocol consists of three tables: Table 1 (Mandatory Requirements); Table 2 (Requirement Checklist); and Table 3 (Resolution of Corrective Action and Clarification Request) as described in Figure 1.

The completed draft validation protocol is enclosed in Annex I to this report identifying 19 Corrective Action Requests and 09 Clarification Requests.

Validation Protocol Table 1: Mandatory Requirements		
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**), or a **Corrective Action Request (CAR)** of risk or non-compliance with stated requirements. The corrective action requests are numbered and presented to the client in the Validation report.*

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 five 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). **Clarification** 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	***Ref. to checklist question in table 2***	***Summary of project owner response***	***Validation 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 Client or other 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**

3.2 Review of Documents

The PDD[/PDD/] submitted by Sereco S/A in March 2008 and supporting background documents related to the project design and baseline were reviewed.

Furthermore, the validation team used additional documentation by third parties like host party legislation, technical reports referring to the project design or to the basic conditions and technical data.

The documents that were considered during the validation process are given in chapter 7 of this report. They are listed as follows:

- Documents provided by the project proponent (Table 7-1)
- Background investigation and assessment documents (Table 7-2)
- Websites used (Table 7-3).

In order to ensure the transparency of the decision making process, the reference codes listed in tables 7-1 to 7-3 are used in the validation protocol and – as far applicable – in the report itself.

3.3 Site Visit and Follow-up Interviews

On July 20th and 21st 2006[/IM01/] and September 15th 2008[/IM02/], TÜV NORD JI/CDM CP performed on-site interviews with the project proponents, project developer and plant operating personnel to confirm selected information and to resolve issues identified in the document review.

The key interviewees and main topics of the interviews are summarised in Table 3-1.

Table 3-1 Interviewed persons and interview topics:

Interviewed Persons / Entities	Interview topics
Project developer and proponent representatives /IM01/	- General aspects of the project - Environmental Policy - Project boundary - Technical details of the project - Approval procedures and status - Quality and Environmental Management System - Involved personnel and responsibilities - Monitoring and measurement equipment - Baseline study assumptions - Environmental impacts - Socio economic impacts on the local population - Details of emissions reduction calculation

Interviewed Persons / Entities	Interview topics
	- Operational data - License, operation & maintenance authority and - responsibility - QA/QC procedure - Monitoring and measurement control of GHG - Legal aspects of the project - Project proponent representatives - Editorial aspects of PDD - Project boundary - Content of PDD - Procedural aspects - Details of emissions reduction calculation - Additionality of the Project
State authorities /IM02/	- Legal aspects of the project

A detailed list including the functions or designations of the interviewed persons is given in chapter 7 (see Table 7-4). This table also includes reference codes to be used in the validation protocol.

3.4 Resolution of Clarification and Corrective Action Requests

In order to remedy any mistakes, problems or any other outstanding issues which needed to be clarified for positive conclusion on the project design, CARs and CLs were raised.

In this validation report 19 CARs and 09 CLs are raised.

The CARs / CLs are documented in the Annex and addressed in section 4.

3.5 Public Stakeholder Comments

The PDD was made publicly available through TÜV NORD JI/CDM CP website www.global-warming.de. Comments on the PDD were invited from 2008/03/20 to 2008/04/19.

No comments were received. In case comments had been received, they would have also been made publicly available on this web site.

3.6 Finalising the report

The draft validation report was submitted to the project proponents. After reviewing the revised and resubmitted project documentation; resolving the CLs & CARs raised and outstanding concerns TÜV NORD JI/CDM CP issues this final validation report and opinion.

4 VALIDATION FINDINGS

In the following paragraphs the findings from the desk review of the draft PDD[/PDD/], visits, interviews and supporting documents are summarised.

The results are shown in table 4-1:

Table 4-1: Summary of CAR and CL issued

Validation topic [1)]	No. of CAR	No. of CL
General description of project activity (A) *(4.1)* - Project boundaries *(4.1.1)* - Participation requirements *(4.1.2)* - Technology to be employed *(4.1.3)* - Contribution to sustainable development *(4.1.4)* - General topics *(4.1.5)*	4	1
Project baseline and monitoring methodology (B) *(4.2)* - Baseline Methodology *(4.2.1)* - Baseline scenario determination *(4.2.2)* - Additionality determination *(4.2.3)* - Calculation of GHG emission reductions *(4.2.4)* Project emissions Baseline emissions Leakage Emission reductions - Monitoring Methodology *(4.2.5)* - Monitoring of *(4.2.6)* Project emissions Baseline emissions Leakage Sustainable development indicators / Environmental impacts - Project management planning *(4.2.7)*	13	7
Duration of the Project / Crediting Period (C) *(4.3)*	0	0
Environmental impacts (D) *(4.4)*	1	1
Stakeholder Comments (E) *(4.5)*	1	0
SUM	19	9

[1)] The letters in brackets (A-E) refer to the validation protocol

For an in depth evaluation of all validation items please refer to the validation protocol (Annex). The Annex also includes all CARs and CLs (Tables 2 and 3).

4.1 Participation Requirements

Brazil, as a non Annex I party meets all relevant participation requirements.

Brazil, the host country, has ratified the Kyoto Protocol on 23 August 2002. The Brazilian DNA assigned for CDM is the "Global Climate Change Interministerial Commission".

In accordance with the CDM M&P at the stage of validation a Party involved may or may not have provided its approval at the time of making the PDD public. The approval of the parties involved is required at the time of requesting registration.

At the time of the completion of this validation report, the LoA is pending. For the Brazilian DNA a positive validation opinion is a prerequisite for the host government approval and thus the LoA cannot be considered at the present validation stage.

A request for registration will not be submitted before the LoA is issued by the DNA.

Corresponding changes of the project documentation due to the DNA approval process will be addressed in another revision of the final validation report (if applicable).

4.2 Project design

The Natal landfill project uses methane capture system through flaring the methane, mitigating greenhouse gases (GHG) emissions.

The project activity is estimated to reduce GHG emissions equivalent to 668,442 tCO_{2e} within the first crediting period.

The project design does reflect current good practices as the implemented technology is state-of-art. The technology of control and monitoring equipment, LFG treatment and high efficient flare will be imported. Components used on the vertical/horizontal drains, gas network and pumps are made in Brazil.

However, CAR A1, CAR A2, CAR A3, CAR A4 and CL A1 were raised and successfully closed out.

For an in depth evaluation of all validation items please refer to the validation protocol (Annex). The Annex also includes all CARs and CLs (Table 3).

4.3 Baseline and Additionality

Baseline

The selected baseline is in line with the approved baseline methodology ACM0001 – Consolidated baseline and monitoring methodology for landfill gas project activities, version 10, , which is:

"LFG2: the atmospheric release of landfill gas or partial capture and destruction to comply with regulations or contractual requirements, or to address safety and odours concerns".

Landfill gas extraction is not compulsory in Brazil and there are no contractual requirements for its capture or destruction at Natal landfill. For the project activity, some passive venting occurs for safety reasons and it is estimated that 20% of the landfill gas generated is destroyed in the concrete wells in the baseline. This factor is given by the Brazilian DNA in its official letter[/DNA1/] # 0152/2006/CIMGC, dated of 22 September 2006.

Two other alternatives were identified and were eliminated:

"LFG1: The proposed project activity without being registered as CDM"

As there are no legal or contractual requirements to implement a system for collecting and flaring landfill gases, and the proposed project activity generates no revenues besides the carbon credits, this alternative can not be considered plausible. The validation team can also confirm that according to its local experience, most of the waste in Brazil is directed to uncontrolled dump sites and that projects for extraction and flaring of biogas are only implemented with the support from CDM revenues.

"LFG3: Production and sale of electricity or heat from landfill gas"

The technology to produce electricity from biogas is not mature in Brazil, as described in the "Atlas of Electric Energy in Brazil" from November 2008, which mentioned only 3 thermoelectric plants using landfill biogas. This information can be confirmed by the local experience of the validation team, as it is certainly not common practice in Brazil, because the investment in generation and transformation equipment is usually very high, the prices of energy are volatile, the performance risk associated with unprecise estimates of biogas generation and the scale of most landfills is in most cases not enough to make viable the alternative of generating energy for the grid, except in the case of very large landfills in large cities, such as Bandeirantes and São Joao landfills in São Paulo.

However, CL B1 and CAR B2 were raised and closed out.

For an in depth evaluation of all validation items, please refer to the validation protocol (Annex). The Annex also includes all CARs and CLs (Table 3).

Baseline emission

Baseline emissions are the difference between the amount of methane actually destroyed/combusted by the project ($MD_{project,y}$) and the amount of methane that would have been destroyed/combusted during the year in the absence of the project activity due to regulatory and/or contractual requirements ($MD_{BL,y}$), times the approved Global Warming Potential (GWP) value for methane, given by equation:

$$BE_y = (MD_{project,y} - MD_{BL,y}) * GWP$$

Additionality

The additionality was demonstrated acc. to the "Tool for the demonstration and assessment of additionality" /TA/.

Barrier Analysis was chosen to demonstrate additionality. Investment Barriers, Technological Barriers and Common Practice Analysis were discussed. The individual arguments presented in the PDD/PDD/ to justify the additionality were summarised in table 4-2. This table also includes the assessment of the validation team.

However, CAR B3 was raised and successfully closed out.

For an in depth evaluation of all validation items, please refer to the validation protocol (Annex). The Annex also includes all CARs and CLs (Table 3).

Table 4-2: Additionality assessment

Type of barrier[1)]	Argument	Assessment
(a)	The project generates no revenues besides CERs. Absence of governmental subsidies and low availability of debt funding or access to international capital markets.	☐ Argument not justified ☐ Argument not convincing ☐ Argument justified but not a decisive barrier ☒ Argument justified / significant barrier As the project generates no revenues or other financial benefits for the project owner except the expected revenues from the sale of CERs. In addition, the starting date of the project activity is after validation, and the project owner argues that he will wait for project registration before implementing the project. In light of such facts, the project can be deemed additional.
(b)	Some infrastructure, technical and engineering expertise, components of LFG management systems have to be imported and expertise is not widely available in Brazil.	☐ Argument not justified ☐ Argument not convincing ☒ Argument justified but not a decisive barrier ☐ Argument justified / significant barrier Although the technology is not widespread in Brazil some components have to be imported, therefore posing a barrier for project development. It could not be considered decisive if assessed alone, but in the context of the project activity, it further contributes to define the additionality.
(c)	There are not other project activities in Brazil (landfill with flaring of LFG) without CDM. In addition, this is the only managed landfill in the state of Rio Grande do Norte, which demonstrates the business as usual scenario of open dumps to deposit urban waste.	☐ Argument not justified ☐ Argument not convincing ☒ Argument justified but not a decisive barrier ☐ Argument justified / significant barrier The statements made by the Project Proponent are accurate. The fact that no other project acitivities in Brazil for capture and flaring of landfill gas exist without CDM is a clearly indicator of the additionality of the project.

Type of barrier[1)]	Argument	Assessment
Assessment of the validation team		☒ Project is additional ☐ Project is not additional

1) Classification acc. to Attachment A to Appendix B of the simplified modalities and procedures a) investment barrier; b) technological barrier; c) barrier due to prevailing practice; d) other barriers

4.4 Crediting Period

The starting date of the crediting period as mentioned in the PDD/PDD/ under Section C.2. is 01/01/2010. The intended crediting period of the project is for a renewable period of seven years i.e. starting from the date of registration (presumably in 2010) up to 2016.

The starting date of the project activity as mentioned in the PDD/PDD/ under Section C.1 is 01/01/2010. The date corresponds to the expected date of registration, from which, according to the representatives of the PP, the investment decision can be made considering the CDM will alleviate the barriers, notably the investment barrier, to implement the project. This date is in accordance with the definition given in the CDM Glossary of Terms. As no contract has been signed yet, as according to the PP the registration of the project is essential for the investment decision as the project generates no revenues besides CERs, the starting date is not before validation and thus it is not necessary to include the timeline of events leading to project implementation according to the /GCP/.

The project life time (25 years duration) indicated in the Section C.1.2 of the PDD/PDD/ was confirmed by the technology provider of the project, Braseco.

4.5 Monitoring Plan

The Monitoring plan is based on the approved monitoring methodology ACM0001 – version 10 and based on direct measurement of the amount of landfill gas captured and destroyed at the flare. The monitoring plan provides for the continuous measurement of the quality and quantity of LFG captured and flared, including boundary conditions, such as temperature and pressure. Parameters required to monitor project emissions from electricity consumptions by the project activity are also considered in the monitoring plan. In section B.7 and Annex 4 all monitored parameters, measurement procedures, procedures for calibration, accuracy and maintenance of monitoring equipment as well as monitoring responsibilities are clearly described. A diagram included in section B.3 of the PDD clearly shows all measured points for all measured parameters.

The validation team considers that the monitoring plan, as describe in the PDD provides for the monitoring of all parameters to calculate baseline emissions and

project emissions, according to the equations given in ACM 0001 and associated tools.

CAR B11, CAR B12, CL B7, CL B4, CL B5, CL B6 and CL B7 were raised and closed out.

4.6 Calculation of GHG Emissions

Methodological choices for calculating emission reductions are documented in section B.6.1 of the PDD. The project intends to reduce greenhouse gases (GHG) emissions by methane capturing and flaring system. As no leakage effects need to be accounted under ACM001, the emission reductions (ER_y) are equal to baseline emission (BE_y) minus project emission (PE_y).

Ex-ante calculation of $MD_{project,y}$

The methane generation from the landfill in the absence of the project activity ($BE_{CH4,SWDS,y}$) is calculated on the basis of a first order kinetic model according to the "tool to determine methane avoided from disposal of waste at a solid waste disposal site". In the calculation of the methane that would have been destroyed ($MD_{project}$ which is in the project case the same like MD_{flared}) the efficiency of the degassing system as well as the efficiency of the flare was considered. For both the extraction efficiency and the flare efficiency, values from the technology provider were used in the calculation and are deemed appropriate. For the calculation of the amount of methane that would have been destroyed/combusted during the year in the absence of the project activity due to regulatory and/or contractual requirements ($MD_{BL,y}$) the specific Brazilian requirements has been considered in the determination of the adjustment factor.

The baseline data used for the ex-ante calculation for the parameters above was provided by the project developer. The annual amount of waste disposed in the landfill during the period 2004 to July 2009 was based on historical data. For the estimation of the values of waste disposed from 2009 until 2016, the growth rate from the period 2005 to 2008 was applied. The average growth rate of the entire historical period was not used to estimate future waste volume because the rate in from 2004 to 2005 was too high, as in the beginning of the operation of the landfill it received waste from some municipalities and after that the number of municipalities which sent waste to the project landfill increased. Therefore it was not considered appropriate to use the rate of the entire period as it was higher and it would not be conservative. A spreadsheet demonstrating the calculation of the estimated amount of waste disposed was made available to the validation team. The fraction of waste types used in the ex-ante calculation (53.05% organic, 0.115 paper) was determined using 12 samples collected within a period of one year. This parameter will be monitored ex-post yearly.

Project emission: The project emission results from the electricity consumption due to the equipment to extract and pump the landfill gas and to start the flare. The total

electrical requirement is estimated in 350.4 MWh/year. It is based on the proposal presented by Brasmetano for the flaring system which contained an additional possibility of installation of a biogas generator which would be enough to meet the electricity demand of the landfill. This value can be considered conservative as the generator envisioned for the project was dimensioned for maximum possible consumption of electricity.

The grid emission factor applied (0.3112 tCO2e/MWh) is calculated based on data provided by the Brazilian DNA for the year 2008, the most recent year for each published data was available. The Brazilian DNA is responsible for the calculations of parameters EF_{OM} and EF_{BM} according to the information publicly available in its website. These factors are utilized for the definition of $EF_{grid,CM}$, which in this present project is necessary to calculate project emissions due to the consumption of electricity of equipments and will be a parameter monitored ex-post.

In order to have access to the data used for the EF_{BM} (emission factor build margin) and EF_{OM} (emission factor operating margin) calculation, the DOE/AIE Forum requested the Brazilian DNA for an opportunity to assess that the "tool to calculate the emission factor for an electricity system" was correctly applied in calculating the grid emission factor at their offices, observing its specific requirements, including confidentiality and non-removal of data from its offices[/DFL/]. Through a meeting realized on 2009/02/05, in Brasília, the Brazilian DNA granted to one representative of the DOE/AEI Forum and one representative of each DOE the opportunity to assess the correct application of the tool[/DNAOF/]. One representative of TÜV NORD CERT GmbH JI/CDM Certification Program attended this meeting. Sufficient evidence could be provided that the "tool to calculate the emission factor for an electricity system" is correctly applied by the Brazilian DNA for the EF_{BM} and EF_{OM} identification.

The validation team is convinced that the identified EF_{gridCM} is properly calculated. The emission coefficient calculation is deemed to be adequate and transparent. All data required for emission coefficient calculation are derived from publicly available data of DNA website[/dna/].

Leakage: No leakage effects need to be accounted under this methodology.

The ex-ante calculation of the emission reductions was reviewed by the validation team using an own calculation tool. These calculations have shown the same results as given in the PDD. All underlying data/ values are transparent presented and assessed to be adequate. The values applied are consistent with operational records of the landfill and therefore are considered appropriate and conservative.

However, CL B2, CL B3, CAR B13, CAR B7, CAR B8, CAR B6 were raised and closed out.

For an in depth evaluation of all validation items, please refer to the validation protocol (Annex). The Annex also includes all CARs and CLs (Table 3).

4.7 Environmental Impacts

An EIA/EIA-RIMA/ was conducted and approved by the Environmental Body.

Social and environmental impacts of the project have been sufficiently addressed. No significant adverse environmental impacts or transboundary impacts have been envisaged from this project activity.

CAR D1 and CL D1 were raised and closed out.

4.8 Comments by Local Stakeholders

Sereco S.A. informed various stakeholders such as local governmental officials, and local residents about the project details according to DNA's requirements set in Resolution 1/R#1/ and Resolution 7/R#7/ and no comment was received. Supporting evidences were submitted to DOE/AR/.

However, CAR E1 was raised and closed out.

For an in depth evaluation of all validation items, please refer to the validation protocol (Annex). The Annex also includes all CARs and CLs (Table 3).

5 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

According to the modalities for the validation of CDM projects, TÜV NORD JI/CDM CP published the draft PDD on its website www.global-warming.de on 20/03/2008 and invited comments within 30 days, until 19/04/2008 by parties, stakeholders and UNFCCC accredited non-governmental organisations. No comment was received.

6 VALIDATION OPINION

Sereco S.A. has commissioned the TÜV NORD JI/CDM Certification Program (CP) to validate the project: "Natal Landfill Gas Recovery Project" with regard to the relevant requirements of the UNFCCC for CDM project activities, as well as criteria for consistent project operations, monitoring and reporting. UNFCCC criteria include article 12 of the Kyoto Protocol, the modalities and procedures for CDM (Marrakech Accords) and the relevant decisions by COP/MOP and CDM Executive Board.

The project intends to reduce GHG emissions by capturing and flaring landfill gas from the Natal Landfill and convert it into less harmful CO2.

A risk based approach has been followed to perform this validation. In the course of the pre-validation, 19 Corrective Action Requests (CARs) and 09 Clarification Requests (CLs) were raised and successfully closed.

The review of the project design documentation and additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and review of comments by parties, stakeholders and NGOs have provided TÜV NORD JI/CDM CP with sufficient evidence to validate the fulfilment of the stated criteria.

In detail the conclusions can be summarised as follows:

- The validation team is convinced that the project is in line with all relevant host country criteria (Brazil) and all relevant UNFCCC requirements for CDM. Nevertheless the LoA is pending. Project activity approval has not yet been obtained from the DNA of Brazil since a positive validation opinion is a pre-requisite for issuance of Letter of Approval (LOA). The request for registration will not be submitted before it has been issued by the DNA.
- The project additionality is sufficiently justified in the PDD.
- The monitoring plan is transparent and adequate.
- The calculation of the project emission reductions is carried out in a transparent and conservative manner, so that the calculated emission reductions of 668,442 tCO_2e are most likely to be achieved within the fixed crediting period (1st January 2010 to 31st December 2016).

The conclusions of this report show, that the project, as it was described in the project documentation, is in line with all criteria applicable for the validation.

Essen, 2009-08-31

Rainer Winter

TÜV NORD JI/CDM Certification Program

Validation Team Leader

Essen, 2009-08-31

Eric Krupp

TÜV NORD JI/CDM Certification Program

Senior Assessor

7 REFERENCES

Table 7-1: Documents provided by the project proponent

Reference	Document
/AR/	Proof of receipt of letters sent to local stakeholders
/CB/	Official communication from Braseco confirming the lifetime and extraction effficiency
/CCb/	Calibration certificate of scale (waste): TB1#786657 *Filizola* scale IDS I – serial number: 46749 – 2008/01/29 *Filizola* scale IDS I – serial number: 46748 – 2008/01/29 TB1#801173 *Filizola* scale IDS I – serial number: 46748 – 2008/04/09 TB1#801174 *Filizola* scale IDS I – serial number: 46749 – 2008/04/09
/CCm/	Certificate #Y2167/ST - Control #5337 of concentration and outflow measurer – 2007/12/20 – valid: 2008/06/20
/EIA-RIMA/	Environmental Impact Assessment (soft copy) – Jan-Mar 2004
/FL/	Fireman License #158/06 P of 2008/07/29 – valid: 01 year
/ISO/	Certificate of ISO14001 (SGA) – 2007/11/26
/LCH/	License of City Hall of Ceará-Mirim issued 2008/03/14
/MRw/	Monitoring report of well water: Well #1 – 2008/07/25 Well #2 – 2008/04/28
/OfL/	Official Letter #1123/08 (report of landfill operation during period from Jan/Feb/Mar-2008 – 2008/04/10 (received by IDEMA in 2008/04/14) Official Letter #1235/08 (report of landfill operation during period from Apr/May/Jun-2008 – 2008/04/10 (received by IDEMA in 2008/07/16)
/OL/	Operation License IDEMA #2007-LO-5408/TEC/RLO-1662 – issued: 2008/08/04 valid: 2009/02/07; Proof of submission of the request for renewal of Operating License in due time (IDEMA Process # 2008-023922/TEC/RLO-1420, 2008/10/07
/PB11-21/	Plate of gas draining system (in the EIA-RIMA)

Reference	Document
/PB12-21/	Plate of gas capturing well
/PDD/	Project Design Document "Natal Landfill Gas Recovery Project", version 2 hosted for public comments during 2008/03/20 to 2008/04/19 Project Design Document "Braseco Landfill Gas Recovery Project", version 3 of 2008/07/15 Project Design Document "Natal Landfill Gas Recovery Project", version 4 of 2008/04/30. Project Design Document "Natal Landfill Gas Recovery Project", version 5 of 2008/08/28.
/TP/	Technical Project – Descriptive Petition (maps dt 2006-02)
/WM/	Waste Monitoring – spreadsheet – 2008/09/05
/XCS/	Spreadsheet SERECO Calculations (emission reduction calculations)

Table 7-2: Background investigation and assessment documents

Reference	Document
/ACM0001/	ACM0001: "Consolidated baseline methodology for landfill gas project activities" , Version 10
/ATT/	Analysis of Technology Transfer in CDM Projects (UNFCCC) – December'07
/CPM/	TÜV NORD JI / CDM CP Manual (incl. CP procedures and forms)
/DFL/	DOE/AIE Forum request letter for opportunity to assess that the "tool to calculate the emission factor for an electricity system" was correctly applied.
/DNA1/	DNA's Official Letter # MDL 152/2006/CIMGC of 2006/09/22
/DNAOF/	Brazilian DNA Official Letter inviting the DOE to have an opportunity to assess that the "tool to calculate the emission factor for an electricity system" was correctly applied.
/GC/	Guidelines for Completing the Project Design Document (CDM-PDD), and the Proposed New Baseline and Monitoring Methodologies (CDM-NM) – Version 6.2.
/INPE/	Report INPE-11475-RPQ/776 - Motta, Adauto Gouveia, *Climate in Natal*, 2004
/IPCC-2006/	2006 IPCC Guidelines for National Greenhouse Gas Inventories: General

Reference	Document
	Guidance and Reporting
/IPCC-GGI/	IPCC 2006 Guidelines for National Greenhouse Gas Inventories
/IPCC-GP/	IPCC Good Practice Guidance & Uncertainty Management in National Greenhouse Gas Inventories, 2000
/KP/	Kyoto Protocol (1997)
/MA/	Decision 17/CP. 7 (Marrakesh – Accords)
/R#1/	Resolution #1 of CIMGC
/R#7/	Resolution #7 of CIMGC
/TA/	Tool for the demonstration and assessment of additionality (Version 5.2)
/TEF/	Tool to calculate emission factor for an electricity system (Version 1.1)
/TL/	Tool to determine methane emissions avoided from dumping waste at a solid waste disposal site (Version 04)
/TP/	Tool to calculate baseline, project and/or leakage emissions from electricity consumption (Version 01)
/TPE/	Tool to determine project emissions from flaring gases containing methane (Annex 13/EB28)
/VVM/	Validation and Verification Manual (Version 1, Annex 3; EB 44)

Table 7-3: Websites used

Reference	Link	Organisation
/abetre/	http://www.abetre.org.br	Brazilian association for waste treatment, recycling and management
/braseco/	http://www.braseco.com.br/2008/index.php	Braseco
/cetesb/	http://www.cetesb.sp.gov.br	Environmental and Sanitation Company of the State of São Paulo
/dna/	http://www.mct.gov.br/index.p	Ministry of Science and Technology (Brazil)

Reference	Link	Organisation
	hp/content/view/3881.html	
/idema/	http://www.idema.rn.gov.br	Institute of Economic Development and Environmental
/ipcc/	www.ipcc-nggip.iges.or.jp	IPCC publications
/tuv/	http://www.global-warming.de	TÜV NORD JI/CDM CP
/unfccc/	http://cdm.unfccc.int	UNFCCC

Table 7-4: List of interviewed persons

Reference	MoI[1]		Name	Organisation / Function
/IM01/	V	☒ Mr. ☐ Ms.	Sérgio Grosso	Sereco S/A, Director
/IM01/ /IM02/	V	☒ Mr. ☐ Ms.	Alexandre Damazo Bernardes	Braseco S/A, Technical Director
/IM02/	V	☐ Mr. ☒ Ms.	Adriana Jachinto Berti	Ecológica, Analyst Technician
/IM02/	V	☐ Mr. ☒ Ms.	Fabiana Silva Medeiros	Environmental technologist, Sereco S/A
/IM01/	T	☐ Mr. ☒ Ms.	Doris Day Santos da Silva	IDEMA, Environmental Technician

1) Means of Interview: (**T**elephone, **E**-Mail, **V**isit)

ANNEX

Validation Protocol

ANNEX : DRAFT VALIDATION PROTOCOL

Table 1: Mandatory Requirements for (CDM) Project Activities – to be filled in during FVR preparation

Requirement	Reference	Conclusion
Parties		
The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3.	Kyoto Protocol Art.12.2	OK
The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC.	Kyoto Protocol Art.12.2.	OK
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	(OK)
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	(OK)
In case public funding from Parties included in Annex I is used for the project activity, these Parties shall provide an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of these Parties.	Decision 17/CP.7, CDM Modalities and Procedures Appendix B, § 2	n.a.
Parties participating in the CDM shall designate a national authority for the CDM.	CDM Modalities and Procedures §29	OK
The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol.	CDM Modalities §30/31a	OK
The participating Annex I Party's assigned amount shall have been	CDM Modalities and Procedures §31b	It's an

Requirement	Reference	Conclusion
calculated and recorded.		unilateral project. Annex 1 Party will be identified in due time
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	It's an unilateral project. Annex 1 Party will be identified in due time
Additionality		
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	~~CAR B2~~ ~~CAR B3~~ OK
Forecast emission reductions and environmental impacts		
The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.	Kyoto Protocol Art. 12.5b	~~CAR B10~~ ~~CAR B.6~~ ~~CAR B.7~~ OK

Requirement	Reference	Conclusion
Environmental impacts (only for large scale projects)		
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	~~CAR D1~~ ~~CL D1~~ OK
Stakeholder involvement		
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	~~CAR E1~~ OK
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
Other		
The baseline and monitoring methodology shall be previously approved by the CDM Executive Board.	CDM Modalities and Procedures §37e	OK
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	~~CAR B2~~ OK
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
The project design document shall be in conformance with the UNFCCC CDM-PDD format.	CDM Modalities and Procedures Appendix B, EB Decision	OK

Requirement	Reference	Conclusion
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
Requirements for small-scale projects only		
The proposed project activity shall meet the eligibility criteria for small scale CDM project activities set out in § 6 (c) of the Marrakech Accords and shall not be a debundled component of a larger project activity.	Simplified Modalities and Procedures for Small Scale CDM Project Activities §12a,c	N/A
The proposed project activity shall confirm to one of the project categories defined for small scale CDM project activities and use the simplified baseline and monitoring methodology for that project category.	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22e	N/A
If required by the host country, an analysis of the environmental impacts of the project activity is carried out and documented.	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22c	N/A

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 boundaries (geographical) clearly defined?	/PDD/ (A.4.1.4)	DR, I	The geographical coordinates (longitude / latitude) of the location are mentioned (5°41'30'' S and 35°22'53" W).	OK	
A.1.2. Are the project's system boundaries (components and facilities used to mitigate GHGs) clearly defined?	/PDD/ /PDD2/ (B.3)	DR, I	In section B.3 of the PDD a short description of the project boundary is lacking. Additionally to that, the table has to be revised considering the project situation. The greenhouse gases included in the project boundary have been addressed in the table. However, emission of CO_2 due to on-site fossil fuel consumption due to the project activity other than for electricity generation and from on-site electricity use (mentioned on B.3) is not compatible with information given in sections B.4 (see pp. 08 PDD) and B.6.1 (see pp. 08 and 10 PDD, respectively, and Annex 4 (see pp. 43 PDD). Clarification is required.	~~CAR A1~~	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
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?	/PDD/ (A.3)	DR	It is a unilateral project hosted in Brazil with one project proponent. According to the PDD, the name of the project participant is Sereco S/A.	OK	
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?	/dna/	DR, I	In accordance with the CDM M&P at the stage of validation a Party involved may or may not have provided its approval at the time of making the PDD public. The approval of the parties involved is required at the time of requesting registration. At the time of the completion of the validation the LoA is pending. For the Brazilian DNA a positive validation opinion is a prerequisite for the host government approval and thus the LoA cannot be considered at the present validation stage. The request for registration will not be submitted before it has been issued	(OK)	

CHECKLIST QUESTION		Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
				by the DNA.		
A.2.3.	Do all participating Parties fulfill the participation requirements as follows: – Ratification of the Kyoto Protocol – Voluntary participation – Designated a National Authority	/dna/	DR	Brazil, the host country, has ratified the Kyoto Protocol on 23rd August 2002. The Brazilian DNA assigned for CDM is the "Global Climate Change international Commission".	OK	
A.2.4.	Potential public funding for the project from Parties in Annex I shall not be a diversion of official development assistance.	/PDD/ (A4.4)		No public funding is involved.	OK	
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?	/PDD/ (A.4.3)	DR	Please clarify what are the main components of the management system for LFG collection and how many flares of what type are used.	~~CAR A2~~	OK
A.3.2.	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?	/PDD/ (A.4.3) /ATT/	DR	Please clarify how the technology and engineering expertise will be transferred to the host country.	~~CL A1~~	OK
A.3.3.	Does the project make provisions for	/PDD/	DR,	The project activity will require only	OK	

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
meeting training and maintenance needs?	/IM01/	I	minimal additional training for operation and maintenance of the system. It was made clear during interviews that the personnel responsible for monitoring will be trained by the equipment manufacturer.		
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 in achieving sustainable development?	/R#1/	DR	The project contributes to current sustainable development priorities in Brazil. Nevertheless the Brazilian DNA will finally decide whether the project is in line with the sustainable development policies - considering the results of this validation report.	(OK)	
A.4.2. Will the project create other environmental or social benefits than GHG emission reductions?	/PDD/ (A.2, D.1) /AM01/ /GC/	DR, I	Please elaborate the socio-environmental contributions of the project concerning better solid waste management practices and environmental issues, including reduction of vectors and odours in the neighborhood, presentations in schools and to the general public regarding waste management. Specify the "well known problems to the community" mentioned in section A.4.3.	~~CAR A3~~	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
Small scale project activity *Is it assessed whether the project qualifies as small-scale CDM project activity*					
A.4.3. Does the project qualify as a small scale CDM project activity as defined in paragraph 6 (c) of decision 17/CP.7 on the modalities and procedures for the CDM?			N/A		
A.4.4. Is the small scale project activity not a debundled component of a larger project activity?			N/A		
A.5. General Topics					
A.5.1. Has the PDD been duly filled up?	/PDD/ /GC/	DR	Following corrections are required: - In section A.1. the date of the document has to be completed. - In the table of section A.4.4 the years shall be specified in English. - The section B.7.1 was not filled with the correct table template according to the Guidelines for Completing the PDD/GC/ version 06.2. Correction is needed. - The stated date of completion of the baseline and monitoring study (2007/09/26) is prior to availability of the methodology version used (2007/12/14). Correction is needed.	~~CAR A4~~	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
A.5.2. Has all necessary information been made available to the validator?			Yes, the PP provided all information required for validation.	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. Does the project apply an approved methodology and the correct version thereof?	/PDD/ (B.1, B.4) /GC/	DR	The chosen baseline methodology is ACM0001: "Consolidated baseline and monitoring methodology for landfill gas project activities" – version 10 In section B.1, the applied baseline and monitoring methodology and all tools which the approved methodology draws upon have to be indicated. Revision required.	~~CAR B1~~	OK
B.1.2. Are the applicability criteria in the baseline methodology all fulfilled?	/PDD/ (B.2.) /ACM0001/	DR	Please specify each condition of applicability according to the methodology and the tools. Information provided in section B.2 refers in parts to old version of applied methodology.	~~CL B1~~	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
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?	/PDD/ (B.1, B.4. and B.5) /ACM0001/ /GC/	DR	The identification of the baseline scenario has to follow the approved methodology. A stepwise approach is described. The outcome of each step has to be documented and key assumptions and rationales have to be explained and justified (cp. Guidelines for Completing the PDD/GC/. Therefore a revision of relevant sections of the PDD is necessary.	~~CAR B2~~	OK
B.2.2. What other alternative scenarios have been considered and why is the selected scenario the most likely one?	/PDD/ (B.4.and B.5.) /NBR/	DR	See comment B.2.1	~~CAR B2~~	OK
B.2.3. Has the baseline scenario been determined according to the methodology?	/PDD/ (B.4.)	DR	See comment B.2.1	~~CAR B2~~	OK
B.2.4. Has the baseline scenario been determined using conservative assumptions where possible?	/PDD/ (B.2 and B.4.) /DNA1/	DR	See comment B.2.1	~~CAR B2~~	OK
B.2.5. Does the baseline scenario sufficiently	/PDD/	DR	See comment B.2.1	~~CAR B2~~	OK

	CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
	take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	(B.4.)				
B.2.6.	Is the baseline scenario determination compatible with the available data and are all literature and sources clearly referenced?	/PDD/ (B.4.)	DR	See comment B.2.1.	~~CAR B2~~	OK
B.2.7.	Have the major risks to the baseline been identified?	/PDD/ (B.4.)	DR	See comment B.2.1.	~~CAR B2~~	OK
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?	/PDD/ (B.5.) /TA/	DR	The application of the "Tool for the demonstration and assessment of additionality" is not sufficient with regard to the following: - Other realistic and credible alternative(s) shall be considered, e.g. the proposed project activity undertaken without being registered as a CDM project activity; - The barrier analysis shall be elaborated more detailed. Citations and all unspecific information have to be quoted properly. Contradictory statements have to be clarified. - The outcome of each step has to be	~~CAR B3~~	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			transparently documented, key assumptions and rationales have to be explained and justified.		
B.3.2. Are all assumptions stated in a transparent and conservative manner?	/PDD/ (B.5)	DR	See comment B.3.1.	~~CAR B3~~	OK
B.3.3. Is sufficient evidence provided to support the relevance of the arguments made?	/PDD/ (B.5)	DR	See comment B.3.1.	~~CAR B3~~	OK
B.3.4. If the starting date of the project activity is prior to 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?	/PDD/ (C.1.1)	DR	The starting date of the project activity is not before the validation date.	OK	
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?	/PDD/ (B.6.1, B.6.2 and B.6.3) /TPE/	DR	Information provided in section B.6.1 refers partly to an outdated version of the applied methodology. In addition there is no clear differentiation between the description of the procedures to calculate ER (section 6.1) and the application of the equations for the ex-ante calculation (section B 6.3; cp. Guidelines for Completing the PDD/GC/) E.g. equation 2	~~CAR B4~~	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			incl. explanation of the variables (B.6.3) shall be mentioned in section B.6.1. In section B.6.1, only equations relevant for the project activity shall be provided. Additionally to that the Equations 03 and 05 (section B.6.3) are the same. Both sections have to be revised accordingly.		
			Information on project emissions due to electricity consumption is not consistent throughout the PDD (e.g. section B.6.1, B.6.3, B.7.1). Moreover it shall be clearly stated if there is any fossil fuel consumption in the project activity.	~~CAR B5~~	OK
			Provide more information concerning the total electrical requirement estimation given in section B.6.3	~~CAR B6~~	OK
			The applied emission factor for the grid (0.1013tCO_2/MWh) is incompatible to that mentioned in section B.6.2 (0.0605tCO_2/MWh). Correction is needed.	~~CAR B7~~	OK
			The application of the **"**Tool to determine project emissions from flaring gases containing methane" is not explained in section B. 6.1. In this context also the type of flare and how the efficiency of the	~~CL B2~~	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			flares is calculated has to be stated. Revision is needed.		
B.4.2. Have conservative assumptions been used when calculating the project emissions?	/PDD/ /TEP/	DR	See comment B.4.1	~~CAR B4-B7 CL B2~~	OK
B.4.3. Are uncertainties in the project emission estimates properly addressed?	/PDD/ /TEP/	DR	See comment B.4.1	~~CAR B4-B7 CL B2~~	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?	/PDD/ (B.6.1, B.6.2 and B.6.3) /TL/	DR	The determination of $MD_{BL,y}$ is missing. B.6.2 should include a compilation of the data and parameters that are not monitored and fixed values are used throughout the crediting period (cp. Guidelines for Completing the PDD/GC/). Following corrections in this section are required: - add missing parameters, e.g. methane	~~CAR B8~~ ~~CAR B9~~	OK OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			density, $DOC_{j,}$, $DOC_{f,}$ $MD_{BI,y}$ - Correction is requested concerning the parameter "Regulatory requirements relating to landfill gas projects". If this data is monitored regularly, it has to be addressed in section 7.1 of the PDD. - Correct the reference *Instituto Nacional de Pesquisas Espaciais – MCT* reported on INPE-11475-RPQ/776 on Section B.6.2 - PDD. - It was estimated that about 20% of the LFG generated is burned as passive ventilation system. The source of this information shall be provided. - Provide evidence on the assumed extraction efficiency of 70%. - Clarification is required on the difference between the "Carbon Emission Factor" and monitoring parameter $EF_{grid,y}$		
B.5.2. Have conservative assumptions been used when calculating the baseline emissions		DR	See comment on B.5.1.	~~CAR B8, CAR B9~~	OK
B.5.3. Are uncertainties in the baseline emission estimates properly addressed?		DR	See comment on B.5.1.	~~CAR B8, CAR B9~~	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.6. Calculation of GHG Emission Reductions – Leakage *It is assessed whether leakage emissions are stated according to the methodology and whether the 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?	/PDD/ (B.6.1)	DR	In section B.6.1, comments regarding leakage should be addressed.	~~CL B3~~	OK
B.6.2. Have conservative assumptions been used when calculating the leakage emissions?		DR	See comments B 6.1.	~~CL B3~~	OK
B.6.3. Are uncertainties in the leakage emission estimates properly addressed?		DR	See comments B 6.1.	~~CL B3~~	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.	/PDD/ (B.6.2) (B.6.3) (B.6.4) /XCS/	DR	In the ER calculation sheet, PE_{flare} is not calculated correctly. See also comment B.4.1	~~CAR B10~~ ~~CAR B.6~~ ~~CAR B.7~~	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
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?	/PDD/ /IM01/ (B.7) /GC/	DR	Section B.7.1 shall include only monitoring parameters relevant for the project activity. Correction action is required as followed: - The parameter "Amount of methane generated during the year y of the project activity" should only be monitored if the estimation provided in PDD section B.4 that 20% of the total LFG generated is not used. - Clarification is needed concerning the approach applied to monitor the data "$fv_{i,h}$". -The parameters "$t_{o2,h}$" and "$Fv_{CH4,FG,h}$" should only be monitored in case of closed flares and continuous monitoring of the flare efficiency. Clarification is requested regarding the flare efficiency approach used. -The data "Other flare operation parameters" monitoring is only applicable if a default value is used. Please clarify the value used. -The source of the parameters "$EF_{grid,y}$" and "$TDL_{,y}$" requires the choice of one of	~~CAR B11~~	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			two provided options. Different measurements procedures are applied for each choice. Please choose one of the options given and provide corresponding evidence.. -It is missing the measurements procedures for the data "W_x". Please provide it. -The information regarding the statistical significance of the size and sampling of the data "$P_{n,i,x}$" is lacking. - Please clarify how the regular maintenance and testing regime of the flow meters to monitor the parameters $LFG_{total,y}$ and $LFG_{flare,y}$ will be carried out. -Specify the equipments used for the monitoring of the data W_{CH4}. -Please provide more technical information about the flow meters used to monitor the parameters "Temperature of the landfill gas" and "Pressure of the landfill gas". -The data/parameter $PE_{flare,y}$ appears twice in item B.7.1. - As the project activity do not comprise the fossil fuel consumptions and electricity generations the parameters "$LFG_{electricity,y}$", "EL_{LFG}", "$CEF_{elec,BL,y}$", "$E_{gen,BL}$", "Operation of the energy plant",		

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			"$EG_{k,y}$", "$HG_{k,y}$", NVCi" and "$EF_{CO2,i}$" are not to be monitored. Therefore they should be deleted from section B.7.1 of the PDD.		
			Section B.7.2 shall include a detailed description of the monitoring plan including the operational and management structure as well as responsibilities acc. to the Guidelines for Completing the PDD/GC. Also the period during which the monitored data shall be kept is not mentioned. Revision of the whole section is needed due the information given refers to the old version of the methodology.	~~CAR B 12~~	OK
			The topic "Emissions reduction calculation process" provided in Annex 4 refers to the old version of the methodology.	~~CAR B 13~~	OK
			Please clarify the sentence "… the total value to date passed through that will be shown at the flow meters." provided in the QA/QC procedures in the Annex 4 of the PDD regarding the LFG flow meter issue.	~~CL B4~~	OK
			The sentence "…quantity of methane		

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			flared… which are the same in the project activity… and the quantity of methane generated…" given in the second paragraph of the Annex 4 of the PDD is incorrect. Please correct it.	~~CL B5~~	OK
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?	/PDD/ (B.7.2) (Annex 4)	DR	See comment B.8.1 (CAR B12).	~~CAR B12~~	OK
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?	/PDD/ (B.7)	DR	Section B.7.1 shall include only monitoring parameters relevant for the project activity. Correction action is required as followed: - The parameter "Amount of methane generated during the year y of the project activity" should only be monitored if the estimation provided in PDD section B.4 that 20% of the total LFG generated is not used. - Clarification is needed concerning the approach applied to monitor the data "$fv_{i,h}$". -The parameters "$t_{o2,h}$" and "$Fv_{CH4,FG,h}$"	~~CAR B 11~~	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			should only be monitored in case of closed flares and continuous monitoring of the flare efficiency. Clarification is requested regarding the flare efficiency approach used. -The data "Other flare operation parameters" monitoring is only applicable if a default value is used. Please clarify the value used. -The source of the parameters "$EF_{grid,y}$" and "$TDL_{,y}$" requires the choice of one of two provided options. Different measurements procedures are applied for each choice. Please choose one of the options given and provide corresponding evidence.. -It is missing the measurements procedures for the data "W_x". Please provide it. -The information regarding the statistical significance of the size and sampling of the data "$P_{n,i,x}$" is lacking. - Please clarify how the regular maintenance and testing regime of the flow meters to monitor the parameters $LFG_{total,y}$ and $LFG_{flare,y}$ will be carried out. -Specify the equipments used for the monitoring of the data W_{CH4}. -Please provide more technical		

CHECKLIST QUESTION		Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
				information about the flow meters used to monitor the parameters “Temperature of the landfill gas” and “Pressure of the landfill gas”. -The data/parameter $PE_{flare,y}$ appears twice in item B.7.1. - As the project activity do not comprise the fossil fuel consumptions and electricity generations the parameters “$LFG_{electricity,y}$”, “EL_{LFG}”, “$CEF_{elec,BL,y}$”, “$E_{gen,BL}$”, “Operation of the energy plant”, “$EG_{k,y}$”, “$HG_{k,y}$”, NVCi” and “$EF_{CO2,i}$” are not to be monitored. Therefore they should be deleted from section B.7.1 of the PDD.		
B.9.2.	Are the choices of project GHG indicators reasonable and conservative?	/PDD/ (B.7)	DR	See comment B.9.1	~~CAR B 11~~	OK
B.9.3.	Is the measurement method clearly stated for each GHG value to be monitored and deemed appropriate?	/PDD/ (B.7)	DR	See comment B.9.1	~~CAR B 11~~	OK
B.9.4.	Is the measurement equipment described and deemed appropriate?	/PDD/ (B.7)	DR	See comment B.9.1	~~CAR B 11~~	OK
B.9.5.	Is the measurement accuracy addressed and deemed appropriate? Are procedures in place on how to deal with erroneous measurements?	/PDD/ (B.7)	DR	See comment B.9.1	~~CAR B 11~~	OK
B.9.6.	Is the measurement interval identified and	/PDD/	DR	See comment B.9.1	~~CAR~~	OK

	CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
	deemed appropriate?	(B.7)			~~B 11~~	
B.9.7.	Is the registration, monitoring, measurement and reporting procedure defined?	/PDD/ (B.7)	DR I	See comment B.9.1	~~CAR B 11~~	OK
B.9.8.	Are procedures identified for maintenance of monitoring equipment and installations? Are the calibration intervals being observed?	/PDD/ (B.7)	DR	See comment B.9.1	~~CAR B 11~~	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)	/PDD/ (B.7)	DR	See comment B.9.1	~~CAR B 11~~	OK
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?	/PDD/ (B.7)	DR	Section B.7.1 shall include only monitoring parameters relevant for the project activity. Correction action is required as followed: - The parameter "Amount of methane generated during the year y of the project activity" should only be monitored if the estimation provided in PDD section B.4 that 20% of the total LFG generated is not used. - Clarification is needed concerning the approach applied to monitor the data	~~CAR B 11~~	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			"$fv_{i,h}$". -The parameters "$t_{o2,h}$" and "$Fv_{CH4,FG,h}$" should only be monitored in case of closed flares and continuous monitoring of the flare efficiency. Clarification is requested regarding the flare efficiency approach used. -The data "Other flare operation parameters" monitoring is only applicable if a default value is used. Please clarify the value used. -The source of the parameters "$EF_{grid,y}$" and "$TDL_{,y}$" requires the choice of one of two provided options. Different measurements procedures are applied for each choice. Please choose one of the options given and provide corresponding evidence. -It is missing the measurements procedures for the data "W_x". Please provide it. -The information regarding the statistical significance of the size and sampling of the data "$P_{n,i,x}$" is lacking. - Please clarify how the regular maintenance and testing regime of the flow meters to monitor the parameters $LFG_{total,y}$ and $LFG_{flare,y}$ will be carried out. -Specify the equipments used for the		

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			monitoring of the data W_{CH4}. -Please provide more technical information about the flow meters used to monitor the parameters "Temperature of the landfill gas" and "Pressure of the landfill gas". -The data/parameter $PE_{flare,y}$ appears twice in item B.7.1. - As the project activity do not comprise the fossil fuel consumptions and electricity generations the parameters "$LFG_{electricity,y}$", "EL_{LFG}", "$CEF_{elec,BL,y}$", "$E_{gen,BL}$", "Operation of the energy plant", "$EG_{k,y}$", "$HG_{k,y}$", NVCi" and "$EF_{CO2,i}$" are not to be monitored. Therefore they should be deleted from section B.7.1 of the PDD.		
B.10.2. Are the choices of baseline GHG indicators reasonable and conservative?	/PDD/	DR	See comment B.10.1	~~CAR B 11~~	OK
B.10.3. Is the measurement method clearly stated for each baseline indicator to be monitored and also deemed appropriate?	/PDD/ (B.7)	DR	See comment B.10.1	~~CAR B 11~~	OK
B.10.4. Is the measurement equipment described and deemed appropriate?	/PDD/ (B.7) (Annex 4)	DR	See comment B.10.1	~~CAR B 11~~	OK
B.10.5. Is the measurement accuracy addressed and deemed appropriate? Are procedures in place on how to deal with erroneous	/PDD/ (Annex 4)	DR	See comment B.10.1	~~CAR B 11~~	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
measurements?					
B.10.6. Is the measurement interval for baseline data identified and deemed appropriate?	/PDD/ (B.7)	DR	See comment B.10.1	~~CAR B 11~~	OK
B.10.7. Is the registration, monitoring, measurement and reporting procedure defined?	/PDD/ Annex 4	DR	See comment B.10.1	~~CAR B 11~~	OK
B.10.8. Are procedures identified for maintenance of monitoring equipment and installations? Are the calibration intervals being observed?	/PDD/ (Annex 4)	DR	See comment B.10.1	~~CAR B 11~~	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)	/PDD/ (B.7) /Annex 4)	DR	See comment B.10.1	~~CAR B 11~~	OK
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?	/PDD/	DR	There is no leakage considered in the project, in line with ACM001, version 10	OK	
B.11.2. Are the choices of project leakage indicators reasonable and conservative?		DR	See comment B 11.1	OK	
B.11.3. Is the measurement method clearly stated for each leakage value to be monitored and deemed appropriate?		DR	See comment B 11.1	OK	

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?	/PDD/ (Annex 4)	DR	There is no monitoring of sustainable development indicators / environmental impacts legally required for the project activity. There are conditions in the environmental license which require the monitoring of certain environmental aspects of landfill operation, e.g., water quality at the freatic layers, the flux of the percolated liquid from landfill to the final treatment. But they are not required due to the project activity.	OK	
B.12.2. Does the monitoring plan provide for the collection and archiving of relevant data concerning environmental, social and economic impacts?	/PDD/ (B.7)	DR	N/A	N/A	
B.12.3. Are the sustainable development indicators in line with stated national priorities in the Host Country?		DR	N/A	N/A	

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
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?	/PDD/ (Annex 4)	DR, I	Yes, the overall authority and responsibility lies on Mr Henrique Muniz Dantas. However, section B.7.2 shall include a detailed description of the monitoring plan including the operational and management structure as well as responsibilities acc. to the Guidelines for Completing the PDD/GC. Also the period during which the monitored data shall be kept is not mentioned. Revision of the whole section is needed due the information given refers to the old version of the methodology.	~~CAR B12~~	OK
B.13.2. Are procedures identified for training of monitoring personnel?	/PDD/ (B.7.2) (Annex 4) (CG)	DR,	An operation handbook will be prepared for the monitoring plan. But there is no comment about training of monitoring personnel. Revision is necessary.	~~CL B6~~	OK
B.13.3. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/PDD/ (Annex 4)	DR	An operation handbook will be prepared considering the emergency measures for the project operation.	OK	
B.13.4. Are procedures identified for reviewing of reported results/data?	/PDD/ (Annex 4)	DR	Clarify how the reported results/data will be reviewed.	~~CL B7~~	OK
B.13.5. Are procedures identified for corrective	/PDD/	DR	Yes, problems/non-conformities will be	OK	

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
actions in order to provide for more accurate future monitoring and reporting?	(Annex 4)		analysed, reported and the necessary measures implemented.		
C. Duration of the Project/ Crediting Period *It is assessed whether the temporary boundaries of the project are clearly defined.*					
C.1. Are the project's starting date and operational lifetime clearly defined and evidenced?	/PDD/ /IM02/ /CB/	DR	Yes, the starting date of the project operation is 2010/01/01 and the expected lifetime is 25 years, which was confirmed by the technology provider Brasmetano.	OK	
C.2. Is the start of the crediting period clearly defined and reasonable?	/PDD/ (C.2) /GC/	DR	Yes, a renewable crediting period with a length of seven years for the first period is chosen. The starting date of the crediting period is clearly defined, 2010/01/01.	OK	
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. Has an analysis of the environmental impacts of the project activity been sufficiently described?	/PDD/ (D.1)	DR	Specification of any significant environmental impacts due to the project activity is needed.	~~CL D1~~	OK
D.2. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved?	/PDD/ (D.1) /EIA-RIMA/	DR I	There is a requirement for an environmental impact assessment (EIA) for the landfill and an approved EIA is available, but for the project activity no EIA is required.	OK	

	CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
D.3.	Will the project create any adverse environmental effects?	/PDD/ (D.1)	DR	The project activity is not expected to cause any significant adverse impacts.	OK	
D.4.	Are transboundary environmental impacts considered in the analysis?	/PDD/ (D.1)	DR	No transboundary effects are envisaged.	OK	
D.5.	Have identified environmental impacts been addressed in the project design?	/PDD/ (D.1)	DR	See comment in D.3.	OK	
D.6.	Does the project comply with environmental legislation in the host country?	/PDD/ /IM02/ /LCH/ /FL/ /OL/ /MRw/ (D.1)	DR	Please provide the Environmental License and the Fire Department License.	~~CAR D1~~	OK
For Small-scale projects						
D.7.	Does host country legislation require an analysis of the environmental impacts of the project activity?			N/A		

CHECKLIST QUESTION		Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
D.8.	Does the project comply with environmental legislation in the host country?			N/A		
D.9.	Will the project create any adverse environmental effects?			N/A		
D.10.	Have environmental impacts been identified and addressed in the PDD?			N/A		
E. Stakeholder Comments *The validator should ensure that stakeholder comments have been invited with appropriate media and that due account has been taken of any comments received.*						
E.1.	Have relevant stakeholders been consulted?	/PDD/ /AR/ (E.1)	DR	Section E.1 (PDD) provides an overview of the consulted stakeholders. But, the consult was made in 2006. New consultations have to be made.	~~CAR E1~~	OK
E.2.	Have appropriate media been used to invite comments by local stakeholders?	/PDD/ /AR/ (E.1)	DR	See comment E.1.	~~CAR E1~~	OK
E.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?	/dna/	DR	See comment E.1	~~CAR E1~~	OK
E.4.	Is a summary of the stakeholder comments received provided?	/PDD/ /AR/ (E.2)	DR	See comment E.1.	~~CAR E1~~	OK

CHECKLIST QUESTION		Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
E.5.	Has due account been taken of any stakeholder comments received?	/PDD/ /AR/ (E.3)	DR	See comment E.1.	~~CAR E1~~	OK

Table 3: Resolution of Corrective Action and Clarification Requests

Draft report clarification requests and corrective action requests by validation team	Ref. To checklist question in table 2	Summary of project owner response	Validation team conclusion
CAR A1 In section B.3 of the PDD a short description of the project boundary is lacking. Additionally to that, the table has to be revised considering the project situation. The greenhouse gases included in the project boundary have been addressed in the table. However, emission of CO_2 due to on-site fossil fuel consumption due to the project activity other than for electricity generation and from on-site electricity use (mentioned on B.3) is not compatible with information given in sections B.4 (see pp. 08 PDD) and B.6.1 (see pp. 08 and 10 PDD, respectively, and Annex 4 (see pp. 43 PDD). Clarification is required.	A.1.2	The table in section B.3 was modified and a flow diagram was added to clarify the project boundary. A brief description statement clarifies that the only source of CO2 emissions (project emissions) is from electricity consumption of the equipment to be used to extract and pump the biogas. The only existing fossil fuel consumption is from a generator used for the leachate treatment system, which is outside the project boundary.	Section B.3 was modified accordingly. The project boundary is clearly described. No fossil fuel consumption is envisaged due to the project activity. CAR is closed.
CAR A2 Please clarify what are the main components of the management system for LFG collection and how many flares of what type are used.	A.3.1	It was added in section A.4.3 the main components of the management system for LFG collection and the number of flares to be installed (one).	The required information was included in section A.4.3. CAR is closed.
CAR A3 Please elaborate the socio-environmental contributions of the project concerning better solid waste management practices and environmental issues, including reduction of vectors and odours in the neighborhood, presentations in schools and to the general public regarding waste management. Specify the “well known problems to the community” mentioned in section A. 4.3.	A.4.2	Section A.2 and A.4.3 were revised, the statement about presentations in schools was excluded.	The sections were modified and their current contents reflect the reality of the project. The “well known problems”, as explained in A.4.3,

Draft report clarification requests and corrective action requests by validation team	Ref. To checklist question in table 2	Summary of project owner response	Validation team conclusion
			refers to the odours caused by the landfill gas as it is not currently flared. CAR is closed.
CAR A4 Following corrections are required: - In section A.1. the date of the document has to be completed. - In the table of section A.4.4 the years shall be specified in English. - Section B.7.1 was not filled with the correct table template according to the Guidelines for Completing the PDD[/GC/] version 06.2. Correction is needed. - The stated date of completion of the baseline and monitoring study (2007/09/26) is prior to availability of the methodology version used (2007/12/14). Correction is needed.	A.5.1	- The date was included in section A.1. - In table A.4.4 it was modified 'ANO' for 'year'. - Tables in section B.7.1 were updated. - The date of completion was updated.	Corrections were carried out as requested. CAR is closed.
CAR B1 In section B.1. the applied baseline and monitoring methodology and all tools which the approved methodology draws upon have to be indicated. Revision required.	B.1.1	The applied baseline and monitoring methodology and list of all tools which the approved methodology draws upon was modified in section B.1.	OK. Information added in section B.1. CAR is closed.
CAR B2 The identification of the baseline scenario has to follow the approved methodology. There a stepwise approach is intended. The outcome of each step has to be documented and key assumptions and rationales have to	B.2.1	The baseline scenario was better explained in section B.4. and also in B.5. The stepwise approach was followed.	Section B.4 and B.5 were intensively revised following the stepwise approach to

Draft report clarification requests and corrective action requests by validation team	Ref. To checklist question in table 2	Summary of project owner response	Validation team conclusion
be explained and justified (cp. Guidelines for Completing the PDD/GC/. Therefore a revision of relevant sections of the PDD is necessary.			determine the baseline scenario, which is clearly described now. CAR is closed.
CAR B3 The application of the „Tool for the demonstration and assessment of additionality" is not sufficient with regard to the following: - Other realistic and credible alternative(s) shall be considered, e.g. the proposed project activity undertaken without being registered as a CDM project activity; - The barrier analyis shall be elaborated more detailed. Citations and all unspecific information have to be quoted properly. Contradictional statements have to be clarified. - The outcome of each step has to be transparently documented, key assumptions and rationales have to be explained and justified.	B.3.1	Section B.5 was completely revised.	Clarification and corrections were addressed as requested in line with the tool for demonstration and assessment of aditionality, version 5.2. Other alternatives were considered, the barrier analysis was re-elaborated. Citations were referenced and the outcome of each step was documented. CAR ís closed.
CAR B4 Information provided in section B. 6.1 refer partly to an outdated version of the applied methodology. In addition there is no clear differentiation between the description of the procedures to calculate ER (section 6.1) and the	B.4.1	The relevant equations were correctly revised and the required changes were carried out following specifications of the new version of methodology. Sections	Both sections B.6.1 and B.6.3 were reformulated in such way that the methodological

Draft report clarification requests and corrective action requests by validation team	Ref. To checklist question in table 2	Summary of project owner response	Validation team conclusion
application of the equations for the ex-ante calculation (section B 6.3; cp. Guidelines for Completing the PDD[/GC/]) E.g. equation 2 incl. explanation of the variables (B.6.3) shall be mentioned in section B.6.1 In section B.6.1. only equations relevant for the project activity shall be provided. Additionally to that the Equations 03 and 05 (section B.6.3) are the same. Both sections have to be revised accordingly.		B.6.1 and B.6.3 were completely revised.	choices are clearly described, according to ACM 001, version 10 and in line with the 'Guidelines for completing the PDD' Therefore, this CAR is closed.
CAR B5 Information on project emissions due to electricity consumption is not consistent throughout the PDD (e.g. section B.6.1, B.6.3, B.7.1). Moreover it shall be clearly stated if there is any fossil fuel consumption in the project activity.	B.4.1	It was clarified in the PDD that the only consumption of electricity due to the project activity is due to the equipment to extract and pump the landfill gas. There is no consumption of fossil fuel related to the project activity.	The only consumption of electricity attributable to the project activity is deriving from the equipment to extract the landfill gas. No fossil fuel consumption occurs due to the project activity. This is clearly described in sections B.3 and B.6.1. Please also see response in CAR A1. This CAR is closed.
CAR B6 Provide more information concerning the total electrical requirement estimation given in section B.6.3	B.4.1	The explanation is given in foot note 23, page 41, section B.6.3	In the commercial proposal from Braseco, there is an option which is to

Draft report clarification requests and corrective action requests by validation team	Ref. To checklist question in table 2	Summary of project owner response	Validation team conclusion
			install an energy generator of 40 kw installed capacity using biogas, which according to the supplier is enough to meet the needs of the project electric equipment (this generator is not going to be installed and energy will be consumed from the grid instead) It was thus assumed that the project will consume 350.4 MWh/year (40kw times 8760 hours per year). This ex-ante estimate can be deemed conservative as it considers non-stop operation of equipment all year round. CAR is closed.
CAR B7 The applied emission factor for the grid (0.1013	B.4.1	The emission factor was modified following new calculation of the	The emission factor of 0.3112 is the

Draft report clarification requests and corrective action requests by validation team	Ref. To checklist question in table 2	Summary of project owner response	Validation team conclusion
tCO_2/MWh) is incompatible to that mentioned in section B.6.2 (0.0605 tCO_2/MWh). Correction is needed.		Brazilian Emission Factor equal to 0.3112 for 2008 carried out by the CIMGC (Brazilian DNA).	combined margin of operation and build emission factors for year 2008 calculated by the Brazilian DNA. This data is publicly available. The links are given in the PDD. Please also refer to section 4.6 of this report. CAR is closed.
CAR B8 The determination of $MD_{BL,y}$ is missing.	B.5.1	The required information was added and explained in section B.6.1 and B.6.3.	Information was correctly addressed CAR is closed.
CAR B9 B.6.2 should include a compilation of the data and parameters that are not monitored and fixed values are used throughout the crediting period (cp. Guidelines for Completing the PDD[/GC/]). Following corrections in this section are required: - add missing parameters, e.g. methane density, DOC_j, DOC_f MD_{BI},y - Correction is requested concerning the parameter "Regulatory requirements relating to landfill gas projects". If this data is monitored regularly, it has to be addressed in section B.7.1 of the PDD. - Correct the reference *Instituto Nacional de Pesquisas EspAciais – MCT* reported on INPE-11475-RPQ/776 on	B.5.1	- The missing parameters were added. - "Regulatory requirements relating to landfill gas projects" is not monitored regularly, since it must be monitored at renewal of each crediting period, as described in the methodology. It was also stated in section B.6.2 of the PDD. - The correction requested for the reference to Instituto Nacional de Pesquisas Espaciais – MCT was done.	All requested corrections were correctly addressed. CAR is closed.

Draft report clarification requests and corrective action requests by validation team	Ref. To checklist question in table 2	Summary of project owner response	Validation team conclusion
Section B.6.2 - PDD. - It was estimated that about 20% of the LFG generated is burned as passive ventilation system. The source of this information shall be provided. - Provide evidence on the assumed extraction efficiency of 70%. - Clarification is required on the difference between the "Carbon Emission Factor" and monitoring parameter $EF_{grid,y}$		- The source of data for the 20% of LFG burnt in the baseline is stated in section B.6.2 (letter issued by the DNA recommending this figure for landfill projects in Brazil) - Brasmetano issued statement confirming extraction efficiency of 70%. - The tables in section B.7.1 were revised, clarifying that $EF_{grid,CM,y} = EF_{EL,j,y}$ (equation 8 of PDD). Parameter $CEF_{elec,BL,y}$ was excluded.	
CAR B10 In the ER calculation sheet PE_{flare} is not calculated correctly.	B.7.1	PE_{flare} can not be calculated ex-ante. However, flare efficiency was considered in the revised calculation approach.	The excel sheet was revised and it is in line with the equations described in section B.6.1. CAR is closed.
CAR B11 Section 7.1 shall include only monitoring parameters relevant for the project activity. Correction action is required as followed: - The parameter "Amount of methane generated during the year y of the project activity" should only be monitored if the estimation provided in PDD section B.4 that 20% of the total LFG generated is not used. - Clarification is needed concerning the approach applied	B.8.1, B.9.1, B.10.1	Section B.7.1 was completely revised.	All points raised were correctly addressed. CAR is closed.

Draft report clarification requests and corrective action requests by validation team	Ref. To checklist question in table 2	Summary of project owner response	Validation team conclusion
to monitor the data "$fv_{i,h}$". -The parameters "$t_{o2,h}$" and "$Fv_{CH4,FG,h}$" should only be monitored in case of enclosed flares and continuous monitoring of the flare efficiency. Clarification is requested regarding the flare efficiency approach used. -The data "Other flare operation parameters" monitoring is only applicable if a default value is used. Please clarify the value used. -The source of the parameters "$EF_{grid,y}$" and "$TDL_{,y}$" requires the choice of one of two provided options. Different measurements procedures are applied for each choice. Please choose one of the options given and provide corresponding evidence.. -It is missing the measurements procedures for the data "W_x". Please provide it. -The information regarding the statistical significance of the size and sampling of the data "$P_{n,i,x}$" is lacking. - Please clarify how the regular maintenance and testing regime of the flow meters to monitor the parameters $LFG_{total,y}$ and $LFG_{flare,y}$ will be carried out. -Specify the equipments used for the monitoring of the data W_{CH4}. -Please provide more technical information about the flow meters used to monitor the parameters "Temperature of the landfill gas" and "Pressure of the landfill gas". -The data/parameter $PE_{flare,y}$ appears twice in item B.7.1. - As the project activity do not comprise the fossil fuel consumptions and electricity generations the parameters "$LFG_{electricity,y}$", "EL_{LFG}", "$CEF_{elec,BL,y}$", "$E_{gen,BL}$", "Operation			

Draft report clarification requests and corrective action requests by validation team	Ref. To checklist question in table 2	Summary of project owner response	Validation team conclusion
of the energy plant", "$EG_{k,y}$", "$HG_{k,y}$", NVCi" and "$EF_{CO2,i}$" are not to be monitored. Therefore they should be deleted from section B.7.1 of the PDD.			
CAR B12 Section B.7.2 shall include a detailed description of the monitoring plan including the operational and management structure as well as responsibilities acc. to the Guidelines for Completing the PDD/GC. Also the period during which the monitored data shall be kept is not mentioned. Revision of the whole section is needed due the information given refers to the old version of the methodology.	B.8.1, B13.1	A detailed description of the monitoring plan was included. The period during which the monitored data shall be kept was mentioned.	Section B.7.2 was intensively revised including the management structure and responsibilities and it is now in line with the /GC/. CAR is closed.
CAR B13 The topic "Emissions reduction calculation process" provided in Annex 4 refers to the old version of the methodology.	B.8.1.	It was updated following the correct version of the methodology.	OK, corrections were performed accordingly in Annex 4. CAR is closed.
CAR D1 The Environmental License and the Fire Department License were not available during on site visit and shall be provided.	D.6.	The licenses were provided to the validation team.	The requested documentation was presented. Natal landfill possesses a valid environmental license, which is mentioned in section D.1 of the PDD. CAR was closed.
CAR E1 Section E.1 (PDD) provides an overview of the consulted stakeholders. But, the consultation was made in 2006.	E.1	A new local consultation process was carried out.	The new consultation was in compliance to Brazilian DNA's

Draft report clarification requests and corrective action requests by validation team	Ref. To checklist question in table 2	Summary of project owner response	Validation team conclusion
New consultations have to be made.			rules. CAR E1 closed.
CL A1 Please clarify how the technology and engineering expertise will be transferred to the host country.	A.3.2	The information required was added in the text.	The technology of control and monitoring equipment, LFG treatment and high efficient flare will be transferred. Components used on the vertical/horizontal drains, gas network and pumps are made in Brazil. CL is closed.
CL B1 Please specify each condition of applicability according to the methodology and the tools. Information provided in section B.2 refers in parts to old version of applied methodology.	B.1.2	The requested information was added.	Information was duly addressed in section B.2. CL is closed.
CL B2 The application of the **"**Tool to determine project emissions from flaring gases containing methane" is not explained in section B. 6.1. In this context also the type of flare and how the efficiency of the flares is calculated has to be stated. Revision is needed.	B.4.1	The mentioned information was modified in section B.6.1.	Section B.6.1 was modified accordingly, containing all the equations that shall be used to calculate project emissions from flaring. CL is

Draft report clarification requests and corrective action requests by validation team	Ref. To checklist question in table 2	Summary of project owner response	Validation team conclusion
			closed.
CL B3 In section B.6.1, comments regarding leakage should be addressed.	B.6.1	The information was added.	Comment was included in section B.6.1 CL is closed.
CL B4 Please clarify the sentence "… the total value to date passed through that will be shown at the flow meters." provided in the QA/QC procedures in the Annex 4 of the PDD regarding the LFG flow meter issue.	B.8.1	The sentence was modified.	Sentence was corrected. CL is closed.
CL B5 The sentence "…quantity of methane flared… which are the same in the project activity… and the quantity of methane generated…" given in the second paragraph of the Annex 4 of the PDD is incorrect. Please correct it.	B.8.1	The sentence was modified.	It was duly corrected. CL is closed.
CL B6 An operation handbook will be prepared for the monitoring plan. But there is no comment about training of monitoring personnel.	B.13.2	The requested information was added.	Ok, information added in Annex 4. CL closed.
CL B7 Clarify how the review of reported results/data will be done.	B.13.4	Information about review of reported results/data was included in Annex 4 in QA/QC section.	Clarification was addressed in Annex 4. CL is closed.
CL D1 Specification of any significant environmental impacts due to the project activity is needed.	D.1	No significant adverse environmental impacts are expected due to the project activity, according to the EIA carried out for the project. This information is included in D.1	Inclusions addressed correctly in section D.1. CL is closed.

CERTIFICATES

TÜV NORD

CERTIFICATE OF APPOINTMENT

Mr. Dipl-Ing. Rainer Winter

born on 1963-02-21

satisfies the requirements as specified in the TÜV NORD JI/CDM CP directives and is hereby appointed as

TÜV NORD JI/CDM Senior Assessor

The present appointment will terminate on 2010-07-05

Certification registration No. 04 02 154-03

Essen, 2007-07-06

Deputy of TÜV NORD JI/CDM Certification Program
of TÜV NORD CERT GmbH

TÜV NORD

CERTIFICATE OF APPOINTMENT

Mr. Dipl.-Ing. Eric Krupp

born on 1971-06-25

satisfies the requirements as specified in the TÜV NORD JI/CDM CP directives and is hereby appointed as

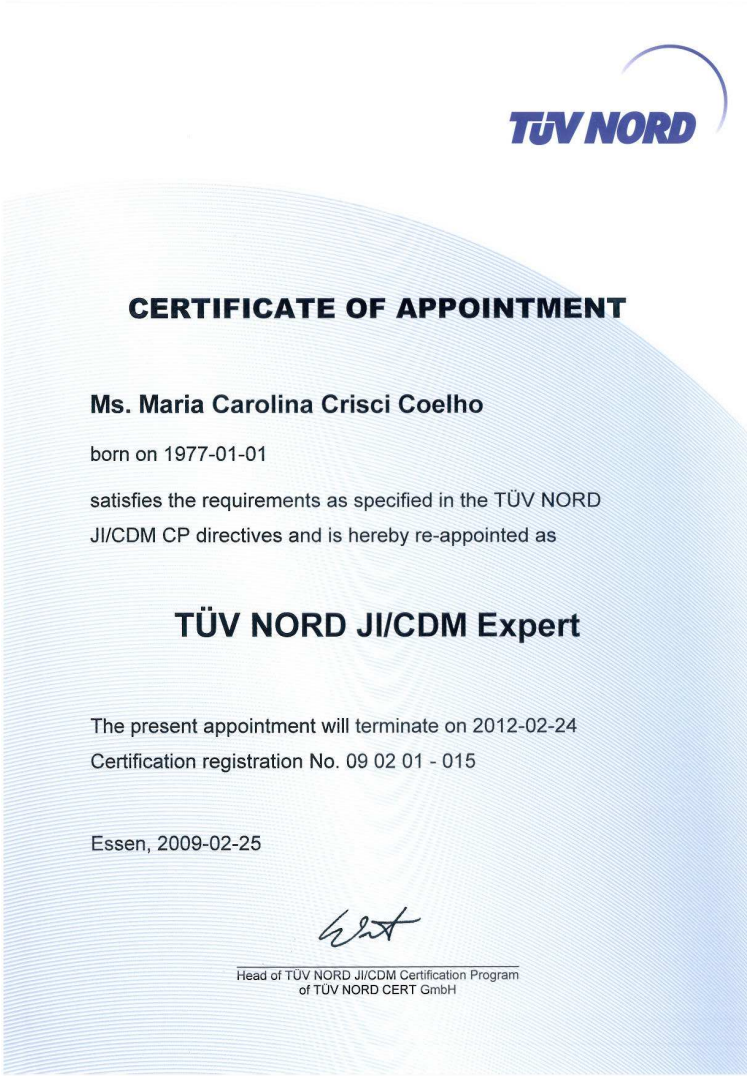
TÜV NORD JI/CDM Senior Assessor

The present appointment will terminate on 2010-07-05

Certification registration No. 06 05 01 - 017

Essen, 2007-07-06

Head of TÜV NORD JI/CDM Certification Program
of TÜV NORD CERT GmbH



TÜV NORD

CERTIFICATE OF APPOINTMENT

Ms. Maria Carolina Crisci Coelho

born on 1977-01-01

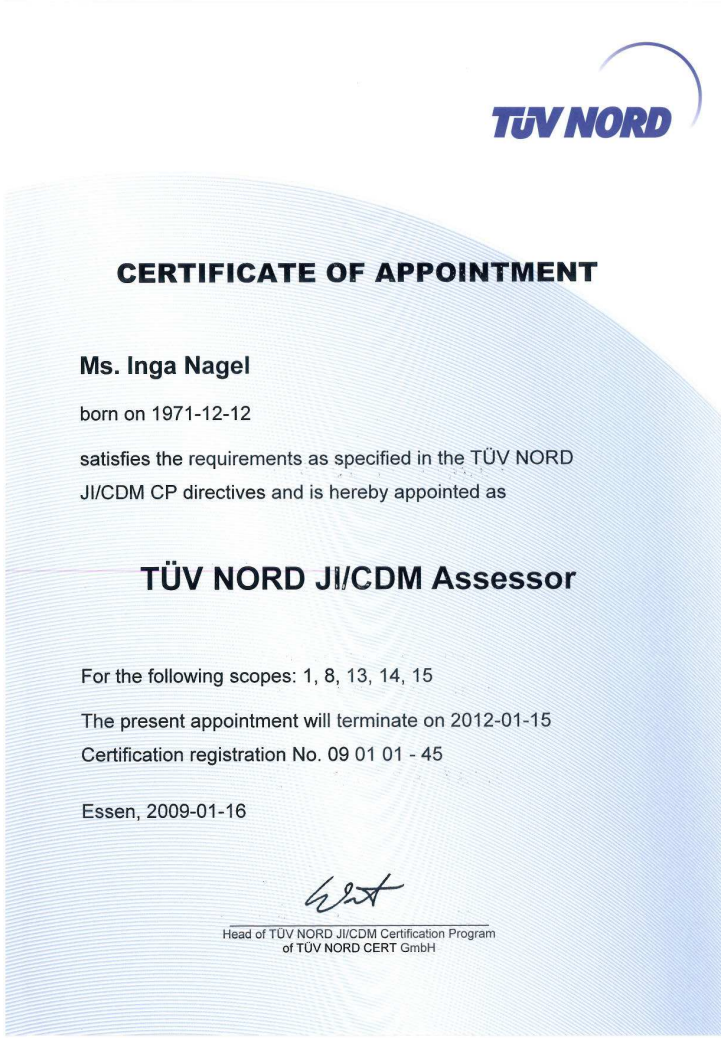
satisfies the requirements as specified in the TÜV NORD JI/CDM CP directives and is hereby re-appointed as

TÜV NORD JI/CDM Expert

The present appointment will terminate on 2012-02-24
Certification registration No. 09 02 01 - 015

Essen, 2009-02-25

Head of TÜV NORD JI/CDM Certification Program
of TÜV NORD CERT GmbH



TÜV NORD

CERTIFICATE OF APPOINTMENT

Ms. Inga Nagel

born on 1971-12-12

satisfies the requirements as specified in the TÜV NORD JI/CDM CP directives and is hereby appointed as

TÜV NORD JI/CDM Assessor

For the following scopes: 1, 8, 13, 14, 15

The present appointment will terminate on 2012-01-15
Certification registration No. 09 01 01 - 45

Essen, 2009-01-16

Head of TÜV NORD JI/CDM Certification Program
of TÜV NORD CERT GmbH