


F-CDM-REG

 <p align="center">CDM Project Activity Registration and Validation Report Form <i>(By submitting this form, designated operational entity confirms that the proposed CDM project activity meets all validation and registration requirements and thereby requests its registration)</i></p>	
Section 1: Request for registration	
Name of the designated operational entity (DOE) submitting this form	SGS United Kingdom Ltd.
Title of the proposed CDM project activity (Section A.2 of the attached CDM-PDD) submitted for registration	Aurá Landfill Gas Project
Project participants (Name(s))	Prefeitura Municipal de Belém, Pará, Brazil Conestoga-Rovers & Associados Engenharia S/A, Brazil BGC International, United Kingdom
Sector in which project activity falls	Scope number 13 – waste handling and disposal.
Is the proposed project activity a small-scale activity?	Yes / <u>No</u>
Section 2: Validation report	
List of documents to be attached to this validation report (please check mark):	
<ul style="list-style-type: none"> ✓ The CDM-PDD of the project activity. ✓ An explanation by the submitting designated operational entity of how it has taken due account of comments on validation requirements received, in accordance with the CDM modalities and procedures, from Parties, stakeholders and UNFCCC accredited non-governmental organizations; <input type="checkbox"/> The written approval of voluntary participation from the designated national authority of each Party involved, including confirmation by the host Party that the project activity assists it in achieving sustainable development; ✓ Other documents, including any validation protocol used in the validation. <ul style="list-style-type: none"> ✓ List of documents attached clearly referenced. ✓ List of persons interviewed by DOE validation team during the validation process. ✓ Copies of documents reviewed during validation visit. ✓ Information on when and how the above validation report is made publicly available. <input type="checkbox"/> Banking information on the payment of the non-reimbursable registration fee. <input type="checkbox"/> A statement signed by all project participants stipulating the modalities of communicating with the Executive Board and the secretariat in particular with regard to instructions regarding allocations of CERs at issuance. 	

Executive Summary and Introduction, including

- **Description of the proposed CDM project activity**
- **Scope of validation process (include all documentation that has been reviewed and name persons that have been interviewed as part of the validation, as applicable)**
- **DOE Validation team (list of all persons involved in the validation, describing functions assumed in the validation)**

Description of the proposed CDM project activity

This report summarizes the results of the validation of the project, performed on the basis of UNFCCC criteria. The validation has been performed as a desk review of the project documents presented by Conestoga-Rovers & Associados Engenharia S/A (CRA) and a site visit to Aurá landfill, where staff of the company was interviewed.

The purpose of the project activity is to collect landfill gas (LFG) at the Aurá Landfill and combust the extracted LFG over a ten year period utilizing a high efficiency enclosed flare, thereby reducing greenhouse gas (GHG) emissions and generating tonnes of Certified Emissions Reductions (CER).

The Aurá Landfill is located 19 kilometers (km) from the centre of the City of Belém, Pará, Brazil. The entire site covers an area of 120 hectares (ha) and the waste fill area of the site is approximately 30 hectares in size.

The Aurá landfill received non-hazardous solid municipal, industrial, commercial, institutional and some agricultural wastes for approximately 15 years. The landfill emits carbon dioxide and methane into the atmosphere, with these compounds being generated by the anaerobic decomposition of the waste.

The project will involve the construction of a landfill gas collection system consisting of a grid of horizontal trenches and vertical gas extraction wells, centrifugal blowers and all other supporting mechanical and electrical subsystem necessary to collect the LFG. To combust the LFG collected from the site, an enclosed flare with full process controls and instrumentation will also be constructed and operated. The flare will be capable of providing sufficient temperature and retention time of the extracted landfill gas for complete destruction of hydrocarbons.

The emission reductions from Aurá landfill will be achieved through flaring the LFG collected.

Total amount of emission reductions for the crediting period is therefore 3,201,764.8 tCO₂

Baseline Scenario:

The project baseline is the uncontrolled release of the landfill gas into the atmosphere.

With-project scenario:

Flaring/destruction of captured landfill gas.

Leakage:

No leakage needs to be accounted in this project. However, the methodology ACM0001 requires that quantities of electricity or any other fuels required for operating the landfill gas project, including the pumping equipment for the collection system and energy required to transport heat, should be monitored. In the project activity, electricity consumption is associated with the blower system used to draw landfill gas to the enclosed drum flare, and the total emission resulting from electricity consumption in the project activity is considered in the total project emissions. Emissions from electricity consumption over the crediting period will be 19.8 tCO₂.

Environmental and social impacts:

There are expected to be no significant environmental impacts due to the project activity. All condensate generated by the project activity will be collected and sanitary water will be properly collected and treated to comply with local environmental regulations. Emissions from the flare include the carbon dioxide component of landfill gas, but this carbon dioxide is considered to be a natural product of the carbon cycle. In the combustion of landfill gas, carbon dioxide is additionally produced, but this is also considered to be part of the natural carbon cycle and not of anthropogenic origin. There is minimal visual impact from the flare, and noise and vibration from the blower and flare will be limited to the localized site.

Positive social contributions are expected as: providing technical expertise for local recycling activities, improvement of local human health and the environment, improvement of working conditions and employment creation, contribution to income generation, technological capacity building, contribution to regional integration and cooperation with other sectors.

Scope

The scope of the validation is the independent and objective review of the project design document, the baseline study and monitoring plan and other relevant documents of the Aurá Landfill Gas Project, Belém, Pará, Brazil. The information in these documents is reviewed against the criteria defined in the Marrakech Accords (Decision 17) and the Kyoto Protocol (Article 12) and subsequent guidance from the CDM Executive Board.

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

Overview of documentation that has been reviewed and names of persons that have been interviewed as part of the validation

Please refer to Annex 3.

DOE Validation team

Name	Role
Aurea Nardelli	Team leader/lead assessor
Fabian Gonçalves	Local assessor
John Miles	Technical reviewer

Description of methodology for carrying out validation

- Review of CDM-PDD and additional documentation attached to it
- Assessment against CDM requirements (e.g. by use of a validation protocol)
- Report of findings by the DOE, e.g. by use of type of findings (e.g. corrective action requests, clarifications or observations). Please explain the way findings are "labelled" during validation.
- Include statements or assessments in the section "Conclusions, final comments and validation opinion" below.

Review of CDM-PDD and additional documentation

The validation was performed primarily as a document review of the publicly available project documents (see Annex 2 for the list of documents). The assessment was carried out by trained assessors using a validation protocol.

A site visit was required to verify assumptions in the baseline. Additional information was required to complete the validation, which was obtained through telephone, e-mail and face-to-face interviews with the project developers. These were performed by the lead assessor and local assessor, from SGS do

Brazil. Findings of the site visit carried out on 14th December 2005 are summarized in Annex 6 to this report.

Assessment against CDM requirements

In order to ensure transparency, a validation protocol was customised for the project. The protocol shows requirements, means of verification and the results from validating the identified criteria. The validation protocol serves the following purposes:

- it organises, details and clarifies the requirements the project is expected to meet; and
- it documents both how a particular requirement has been validated and the result of the validation.

The validation protocol consists of several tables. The different columns in these tables are described below.

<i>Checklist Question</i>	<i>Means of verification (MoV)</i>	<i>Comment</i>	<i>Draft and/or Final Conclusion</i>
<i>The various requirements are linked to checklist questions the project should meet.</i>	<i>Explains how conformance with the checklist question is investigated. Examples of means of verification are document review (DR) or interview (I). N/A means not applicable.</i>	<i>The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is further used to explain the conclusions reached.</i>	<i>This is either acceptable based on evidence provided (OK), or a Corrective Action Request (CAR) due to non-compliance with the checklist question (See below). New Information Request (NIR) is used when the validation team has identified a need for further clarification.</i>

The completed validation protocol for this project is attached as Annex 4 to this report.

Report of findings and use of type of findings.

As an outcome of the validation process, the team can raise different types of findings.

Where insufficient or inaccurate information is available and clarification or new information is required the Assessor shall raise a **New Information Request (NIR)** specifying what additional information is required.

Where a non-conformance arises that requires the Project Developer to do something (for example correct something in the PDD) the Assessor shall raise a **Corrective Action Request (CAR)**.

A CAR is issued, where:

- I. mistakes have been made with a direct influence on project results;
- II. validation protocol requirements have not been met; or
- III. there is a risk that the project would not be accepted as a CDM project or that emission reductions will not be verified.

The validation process may be halted until this information has been made available to the assessors'

satisfaction. Failure to address a NIR may result in a CAR. Information or clarification provided as a result of an NIR may lead to a CAR. Observations may also be raised which are for the benefit of future projects and future verification or validation actors. These have no impact upon the completion of the validation or verification activity.

Corrective Action Requests and New Information Requests are raised in the draft validation protocol and detailed in a separate form (Annex 5). In this form, the Project Developer is given the opportunity to “close” outstanding CARs and respond to NIRs and Observations.

For this project, the *CARs and NIRs* were closed out through communication between validation team and CRA staff. Changes to the project design were necessary to clarify the issues raised.

Explanation by the submitting designated operational entity of how it has taken due account of comments on validation requirements received, in accordance with the CDM modalities and procedures, from Parties, stakeholders and UNFCCC accredited non-governmental organizations;

- **Description of how and when the PDD was made publicly available**
- **Description of how comments were received and made publicly available**
- **Explanation of how due account has been taken of comments received**
- **Compilation of all comments received (Identify the submitter)**

In accordance with the CDM modalities and procedures, the project design document of this proposed CDM project activity has been made publicly available and comments have been invited from Parties, stakeholders and UNFCCC accredited non-governmental organizations. This process is described in Annex 1 to this report, which is available as a separate document.

Conclusions, final comments and validation opinion

- Provide conclusions on each requirement under paragraph 37 of the CDM modalities and procedures, describing how these requirements have been met. This shall include assessments and findings (e.g. corrective action requests, clarifications or observations) in relation to each requirement, including a confirmation that all issues raised have been addressed to the satisfaction of the DOE.
- Final comments and validation opinion

Participation requirements

United Kingdom is listed as party of the project. UK ratified the Kyoto Protocol on 31st May 2002.

No Letter of Approval from Annex I country (UK) has been provided. CAR 1 has been raised and is still outstanding. One of the required documents to apply for UK approval is the host country letter of approval from the Brazilian DNA. CRA will apply for the UK DNA letter of approval as soon as the Brazilian DNA issues its letter of approval.

Host Party: Brazil is listed as the host Party. Brazil ratified the Kyoto Protocol on 23rd August 2002 (http://unfccc.int/files/essential_background/kyoto_protocol/application/pdf/kpstats.pdf).

At time of the draft validation, no Letter of Approval from the host country had been provided. Consequently CAR 2 was raised. The Letter of Approval will be signed when the DNA of Brazil has received and analyzed the validation report. CAR 2 was cancelled.

Baseline and monitoring methodology

The methodology applied to the project is the Approved Consolidated Baseline methodology ACM 0001 - "*Consolidated baseline methodology for landfill gas project activities*" and "*Consolidated monitoring methodology for landfill gas project activities*".

ACM 0001 is applicable to landfill gas capture project activities, where the baseline scenario is the partial or total atmospheric release of the gas (as verified in Aurá landfill, total release) and the project activities include the situation where the captured gas is flared (as mentioned in item (a) of the methodology).

Aurá project's boundary is the site of the project activity where the gas is captured and destroyed. It is consistent with ACM 0001.

The methodology defines that project proponents should provide an *ex ante* estimate of emissions reductions, by projecting the future GHG emissions of the landfill using verifiable methods.

The total methane emissions in the absence of the Aurá project activity were estimated based on the waste tonnage of the landfill using a United States Environmental Protection Agency (USEPA) first-order kinetic model for landfill gas.

As described in the PDD, the landfill gas not captured by the landfill gas collection and flaring system cannot be monitored, as this emission is diffused over the landfill. The amount of landfill gas collected and destroyed by combustion can be monitored using a flow meter. Project emissions are thus comprised of the quantity of methane collected and not flared due to flaring inefficiency, and this amount is subtracted from the measured amount of collected methane (expected efficiency is upwards of 99.99%). Electricity and thermal energy emission reductions do not apply to the project Aurá.

No leakage effects need to be accounted under ACM 0001. However the methodology defines that the electricity required for the operation of the project activity should be accounted and monitored. In Aurá project, electrical consumption is associated with the blower system used to draw landfill gas to the enclosed drum flare, which corresponds to 327 MWh/year.

Project proponents will account for CO₂ emissions by multiplying the quantity of electricity required with the CO₂ emissions intensity of the electricity displaced. In Aurá project, CO₂ emissions resulting from electricity consumption will be deducted from the total emission reductions.

Additionality

The relevant information for the baseline analysis and additionality had been presented in the PDD. The project demonstrated additionality discussing and presenting evidences for each condition required in ACM0001. The methodology requires the use of the “Tool for the demonstration and assessment of additionality”. The five steps were clearly described and demonstrated in the PDD (section B.3).

The project is likely to mitigate GHG emissions by implementing a landfill gas collection system, generating less methane emissions than emitted under the baseline scenario, where the LFG is totally released to atmosphere. There are currently no legislative incentives to implement or improve landfill gas recovery in order to avoid CH₄ emissions. These GHGs emission reductions are additional to the current site conditions and current practices, and would have not occurred in the absence of the project.

The validation team concluded that the project will create emission reductions that are real, measurable and additional to what would have occurred in the absence of the project.

Monitoring plan

The data to be collected or used to monitor emissions from the project activity are defined according to the ACM0001. The Section D and Annex 4 of PDD (Monitoring Plan) covers all the relevant parameters to be monitored, including indicators of environmental impacts and sustainable development. CRA has prepared a Design Brief for the project, and once the detailed design is completed, CRA will prepare a tailored Operating & Maintenance Manual. Observation: CRA shall ensure implementation of the procedures for monitoring, measurements and reporting since the project start the operation.

No monitoring of baseline emissions is required in the Aurá project, as the baseline scenario is the total uncontrolled land fill gas releasing to atmosphere. Monitoring methodology is based on the direct measurement of the quantity of LFG captured, collected and destroyed by the LFG management system.

As defined in ACM0001, no leakage needs to be considered, but electricity required for the operation of the project activity should be accounted and monitored. There was no clear information in the PDD regarding monitoring of the energy consumption and how the amount of energy required for operating the collection system is calculated (NIR 8). The PDD was revised to include more information about electricity consumption and its monitoring. Section E.2 of the revised PDD provides an estimate for electrical consumption of 37 kWh. This is the estimate for the electricity consumption associated with the mechanical and electrical components of the gas plant required to draw and process an LFG flow ranging from 2,452 cfm (4,166 m³/h) in 2006 to 2,523 cfm (4,287 m³/h) in 2016. Monthly electrical bills charged to the project will be monitored and considered as the actual energy consumption for the project. The annual electrical consumption of 327 MWh/year was calculated based on 8,760 hours of operating time per year for an hourly energy consumption of 37 kWh.

Environmental Impacts

There is expected no significant adverse environmental impact due to the project activity. Measures for environmental control have been implemented. It was verified that the project just received the Previous license LP n° 0002/2006, issued by SEMMA (Municipal Environmental Agency) on 3/03/2006 and the Installation license LI n°0001/2006, issue by SEMMA on 15/03/2006.

Positive environmental impacts due to the project activity are identified. Landfill gas emissions will decrease, reducing greenhouse gas emissions and impacts to localized air pollution. Odour will be diminished at local receptors. Operationally, proper management of the landfill gas will reduce the potential for landfill fires and the associated release of incomplete combustion products. Further, the

driving force for subsurface migration of landfill gas and landfill gas components is minimized, protecting adjacent buildings and water bodies.

Comments by local stakeholders

It is required that relevant stakeholder have been consulted. No consultation process had been carried out until December, 2005 when the validation site was done. CAR 3 was raised.

In addition, the stakeholder consultation shall follow the DNA requirements: "Resolution n° 1 (2003/09/11) Brazil". During the desk study, it was not clear if specific stakeholders (indicated by Resolution n° 1) had been invited to comment on the Aurá CDM project. CAR 4 was raised.

To close out CAR 3 and CAR 4, evidences were provided, as copies of the letters sent, comments received and formal receipts from the post office. The PDD was updated to include this information.

The invitation was sent to specific stakeholders, considered representative of the general public.

- The municipality mayor house of Belém;
- The municipality chamber of Belém;
- The local attorneys' office ;
- The Brazilian NGO Forum;
- The state environmental agency (SECTAM – Secretaria Executiva de Ciência e Tecnologia e Meio Ambiente);
- The municipality's environmental authority (SEMMA – Secretaria Municipal de Meio Ambiente);
- Local communities associations (ASCAMBEL – Associação dos Servidores da Câmara Municipal de Belém, ASMOJE – Associação dos Moradores Moara e Jerusalém, Associação dos Moradores do Conjunto Verdejante I, II, III).

It was verified that CRA submitted the letters on 18th January, 2006 (by checking the formal records of post office).

In addition to the letters mentioned above, project proponents promoted a meeting with local stakeholders (in Belém, on 1st February, 2006) to present the project to the public as well as to local official authorities. Evidences, as invitations published on local newspapers, attendance sheets, photos and written comments were verified during the site visit. Details were included in the revised PDD. Comments received during consultation process were positive and supportive of the project.

Other requirements

The project applies the correct PDD format and no modifications have been made to the format.

As the project is under construction, additional information and evidences was required during the desk review and site visit for validating the information provided in the PDD. Some documents are not available during the site visit, as following:

- *The agreement between CRA and Belem Municipality:* NIR 5 was raised requiring a documented evidence of the contract between the landfill owner (Belém Municipality) and CRA, signed on 21st October, 2005.

CRA made available the agreement at its Sao Paulo office for review and the document was verified by SGS local assessor. The Agreement object is to design, build, commission and operate a plant for the capture and flaring of landfill gas at the Aurá Landfill. NIR 5 was closed out.

- *A list of equipment to be purchased and installed:* NIR 6 was raised asking details about the equipment specifications and purchasing. CRA sent a list of key equipment for the LFG collection system; it consist of blowers; flare unit (installed with flame arrestor, propane pilot system, flame scanner, temperature control dampers, purge blower, and thermocouples); Programmable Logic Controller (PLC); flow meters; gas analyzer; data acquisition system; remote alarm transmission system; Uninterruptable power supply

(UPS); condensate pump stations; condensate handling station; and heat and flame detectors. SGS team concluded that they are consistent to the project design. NIR 6 was closed out.

- *The project implementation schedule:* NIR 7 was raised asking a project schedule, for checking if times are plausible and to understand each stage of project construction. CRA presented a detailed table providing the necessary information, including each stage of the project and dates for its completion (43440 Belém Project Schedule.pdf). Design activities have started in late 2005 and the project start up is scheduled for November 1st, 2006. NIR 7 was closed out.

Final comments and validation opinion

Actions have been taken to close out 7 findings. One finding is still outstanding regarding to LoA from UK (CAR 1).

The Validation Opinion is based on the current and emerging rules surrounding Article 12 of the Kyoto Protocol.

The DOE declares herewith that in undertaking the validation of this proposed CDM project activity it has no financial interest related to the proposed CDM project activity and that undertaking such a validation does not constitute a conflict of interest which is incompatible with the role of a DOE under the CDM.

By submitting this validation report, the DOE confirms that all validation requirements are met.

Name of authorized officer signing for the DOE

The SGS will request the registration of the Aurá Landfill Gas Project as a CDM project activity, once the written approval by the DNA of the participating Parties and the confirmation by the DNA of Brazil and UK that the project assists in achieving sustainable development has been received.

Date and signature for the DOE

Section below to be filled by UNFCCC secretariat

Date when the form is received at UNFCCC secretariat

Date at which the registration fee has been received

Date at which registration shall be deemed final

Date of request for review, if applicable

Date and number of registration

Date

Number