F-CDM-REG

CDM Project Activity Registration and Validation Report Form

(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)

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	Canabrava Landfill Gas Project
Project participants (Name(s))	LIMPURB, City of Salvador, State of Bahia. Conestoga-Rovers & Associates Investments Limited. Natsource Asset Management Corp. Natsource (Europe) Ltd. Natsource Japan Co.
Sector in which project activity falls	Scope number 13 – waste handling and disposal.
Is the proposed project activity a small-scale activity?	Yes / **No**

Section 2: Validation report	
List of documents to be attached to this validation report (please check mark)*:*	

- ✔ 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;
- ❑ 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.
  - ✔ 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.
- ❑ Banking information on the payment of the non-reimbursable registration fee.
- ❑ 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 & Associates (CRA) and a site visit to Canabrava landfill, where staff from the company was interviewed.

The purpose of the project activity is to collect landfill gas (LFG) at Phase A of the Canabrava 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 Canabrava Landfill is located 18 kilometers (km) from the centre of the City of Salvador, Bahia, Brazil. The entire site covers an area of 66 hectares (ha) and the waste fill area of the site is approximately 40 hectares in size. The size of Phase A of the landfill is approximately 16.8 hectares. The landfill is bordered by the Mocambo River and the Coroado River to the west and to the south respectively. To the north, the site is bordered by the "Barradão" soccer stadium and the Mocambo river; to the east, the Canabrava landfill is surrounded by the Canabrava suburb, a commercial/residential area.

The Canabrava landfill received non-hazardous solid municipal, industrial, commercial, institutional and some agricultural wastes for over 30 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, with retention time of 0.5 seconds at a temperature of 875°C.

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

Total amount of emission reductions for the crediting period is therefore 2,055,953 tCO_2

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

With-project scenario:

Flaring/destruction of captured 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 to operate 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 20 tCO2.

Environmental and social impacts:
The project is not expected to result in negative environmental and social impacts.

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 Canabrava Landfill Gas Project, Salvador, Bahia, 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**
Áurea Nardelli	Team leader / lead assessor
Fabian Gonçalves	Local assessor
Irma Lubrecht	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 17th and 18th October 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.

Checklist Question	*Means of verification (MoV)*	*Comment*	*Draft and/or Final Conclusion*
The various requirements are linked to checklist questions the project should meet.	*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). **New Information Request (NIR)** is used when the validation team has identified a need for further clarification.*

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 *Corrective Action Requests (CAR)* 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 meet. 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

Canada, United Kingdom and Japan are listed as parties of the project. Canada ratified the Kyoto Protocol on 17th December 2002, UK on 31st May 2002 and Japan 4th June 2002.

No Letter of Approval from Annex I country (Canada) has been provided. No Letter of Approval from Uk and Japan (Annex 1 countries included as parties in the revised PDD, version issued on 14 November 2005). CAR 1 has been raised and is still outstanding.

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 the validation report. CAR 2 remains outstanding.

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 Canabrava landfill, total release) and the project activities include the situation where the captured gas is flared (as mentioned in item (a) of the methodology).

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

In addition, 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 Canabrava 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 Canabrava

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. Project proponents will account for CO2 emissions by multiplying the quantity of electricity required with the CO2 emissions intensity of the electricity displaced. In Canabrava project, CO2 emissions resulting from

electricity consumption will be accounted and deducted from the total emission reductions.

During the validation assessment, an issue was raised (NIR 12) asking details about the source of data informed in the PDD relate to electricity production in Brasil (that 97% of total energy coming from hydroelectric sector). The reference was included in the revised PDD and the NIR 12 was clarified.

CAR 13 was raised: The PDD was revised to attend the methodology ACM0001 version 4, 28 July 2006. To correct some information in the monitoring plan (table in section D.2.2.1 and D.3). To correct starting and ending date of crediting period (to correct all tables presented in the PDD).
The PDD was revised (new version 5, 28/07/2006). Monitoring plan was revised to attend the version 4 of the methodology. Tables 2, 3, 4, 5, 6, section A.4.4.1 of the PDD was correct to present the starting date of crediting period on 27 October 2006, and ending crediting period on 26 October 2016. CAR 13 was closed out.

Additionality

The relevant information for the baseline analysis and additionality had been presented and considered in the PDD. The project demonstrated additionality discussing and presenting evidences for each condition required in ACM 0001. 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.

It is important to note that 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; thus, the project complies with the concept of additionality defined under Kyoto's Clean Development Mechanism.

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

ACM 0001 is applicable to landfill gas capture project activities, where the baseline scenario is the partial or total atmospheric release of the gas and the project activities include situations where the captured gas is flared (the case of Canabrava project).

No monitoring of baseline emissions is required in the Canabrava project case, 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 ACM 0001, no leakage needs to be accounted.

The first version of PDD did not provide for the monitoring of all applicable indicators, as defined in the monitoring methodology. Section D.2.2.1 did not consider items 1 and 11. In addition, the methane content of the flare should be analysed to determine the fraction of methane destroyed within the flare. It was not detailed on the monitoring plan. CAR 7 was raised during desk study.

The PDD was revised (version issued on 14th November, 2005) and item 1 and 11 were included in section D.2.2.1 and D.3. The Annex 4 was updated to include the monitoring of the methane content in

the flare emissions. CAR 7 has been closed out.

During the desk study, it was verified that the monitoring plan did not provide the collection and archiving of relevant data concerning environmental, social and economic impacts. CAR 3 was raised.
To close out CAR 3, a revised PDD - Annex 4 - was prepared (version issued on 31st October, 2005), including monitoring of sustainable development indicators and environmental impacts: (1) Job creation, (2) Income generation, (3) Odour on neighbours, (4) Subsurface migration of landfill gas, (5) Landfill safety and (6) Technology transfer.

No procedures were identified for emergency preparedness for cases where abnormal or emergencies can cause unintended emissions. CAR 4 was raised.
The project responsible explained that in case of flare downtime for maintenance or other reasons, the landfill gas would not be collected/icombusted, and would be released to the atmosphere. This scenario would be equivalent to the baseline scenario, where the LFG produced at the landfill would undergo uncontrolled release to the atmosphere. Then, in case of unintended emissions, this would not affect the emission reduction, as it will be measured directly. The validation team accepted the justification and CAR 4 has been closed out.

Environmental Impacts

The environmental impacts of the project activity have not been sufficiently described on the first version of PDD. NIR 08 and NIR 10 were raised asking more details. To clarify these issues, more details about environmental impacts were provided in sections F.1 and F.2 of the updated version of the PDD.

No negative environmental impacts are associated with the project activity and there will be no adverse environmental impact to the Mocambo River or the Coroado River. 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. No liquid streams from the project activity will enter the river system.

Emissions from the enclosed drum flare are expected to be largely carbon dioxide and water vapour with trace amounts of uncombusted methane. The combustion regime of the flare will be carefully monitored to ensure the destruction of methane and other components. Further, noise from the blowers required to induce vacuum on the landfill gas collection well field will be minimal.

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 such as the Mocambo and Coroado River.
The PDD was revised (version issued on 31st October, 2005; section E, pages 26-27) to include the information above. NIR 8 and NIR 10 have been closed out.

With regard to EIA requirements, NIR 9 was raised requesting more information. It was informed during the site visit that the state environmental agency (Centro de Recursos Ambientais) requires an environmental license ("Licença de localização") and an application has been submitted to them. The potential environmental impacts of the project were described on the document submitted to Centro de Recursos Ambientais. The application receipt was verified during the SGS site visit ("Protocolo Formação de processo n° 2005 - 004517/TEC/LL-0039", 11th August, 2005, fator gerador: LL - implantação de poços de coleta de gás metano - N.S. da Vitória/Salvador - MedP).

The license has been not issued yet. Environmental Agency representative was interviewed and informed that there is no pending and that the license will be issued soon.

In addition, it was verified the document “Term of Environmental Responsibility", signed by Conestoga-Rovers & Associates representative (on 16 th June, 2005). In this document, there is a CRA commitment to be in compliance with environmental legal requirments, to promote the environemntal quality and to avoid pollution and negative impacts from Canabrava project. NIR 9 has been closed out.

The validation has confirmed that the project is in line with environmental requirements applicable to this kind of activity.

Comments by local stakeholders

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 Canabrava CDM project. CAR 5 was raised.
To closed out this CAR, evidences were provided, as copies of the letters sent, comments received and formal receipts from the post office.

The invitation was sent to specific stakeholders, considered representative of the general public. Resolution 1 of the DNA specifies the following stakeholders:

- The municipality mayor house;
- The municipality chamber;
- The local attorneys’ office;
- The Brazilian NGO Forum;
- The state environmental agency;
- The municipality’s environmental authority;
- Local communities’ associations.

It was verified that CRA submitted the letters on 9th June, 2005 (by checking the formal records of post office). Letters with praise and congratulations was received from local stakeholders.

In addition to the letters mentioned above, project proponents promoted a meeting with local stakeholders (in Salvador, on 21st June, 2005) 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 on the PDD.

There were no objections to the project.
Comment relating to further publicity of the project activity will be addressed, as described in the PDD (section G.3).

Other requirements

The project applies the correct PDD format and no modifications have been made to the format. The following “mistakes” were observed:

- PDD, Section A.3, it was not defined the status (private or public) of entity project participants. CAR 6 was raised. The PDD was updated with the identification of public and private project participants as follows:

- LIMPURB, City of Salvador, State of Bahia (Public Entity)
- Conestoga-Rovers & Associates (Private Entity)
- Natsource Asset Management Corp. (Private Entity)

- PDD, Section C.1.2, there is other information in addition to the lifetime of the project. Operational lifetime is not clearly defined, CAR 11 was raised. The text was revised and informes correctly the lifetime as “10 years and 0 months”.

The validation team accepted the revised documentation and the CARs 6 and 11 were closed.

Final comments and validation opinion

Actions have been taken to close out 13 findings. Two finding is still outstanding regarding to LoA (CAR 1 and CAR 2).

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 Canabrava 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 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