



RINA

VALIDATION REPORT

“Introduction of the recovery and
combustion of methane in the existing
sludge treatment system of the Cañaveralejo
Wastewater Treatment Plant of EMCALI in
Cali, Colombia”
in
Colombia

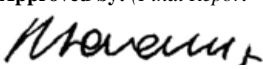
REPORT No. 2008-BQ-ME-15

REVISION No. 04



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Project Name: "Introduction of the recovery and combustion of methane in the existing sludge treatment system of the Cañaveralejo Wastewater Treatment Plant of EMCALI in Cali, Colombia".		Country: Colombia	Estimated CERs (tCO₂e): 566,325
Client: Empresas Municipales de Cali, EMCALI, EICE ESP (EMCALI).		Client contact: Mr. José Cerón / Mr. Sergio Salas	
Report title: "Introduction of the recovery and combustion of methane in the existing sludge treatment system of the Cañaveralejo Wastewater Treatment Plant of EMCALI in Cali, Colombia".		Report No.: 2008-BQ-ME-15	Rev. No.: 04 Date of this report: 14/09/2009
Approved by: (Final Report – DCI Director approval) 		Organizational Unit: DCI	Date: 15/09/2009


Methodology			
Reference: AMS III.H	Version: Version 09 of 28 March 2008	Title: "Methane Recovery in Wastewater Treatment"	Sectoral Scope: 13

RINA has performed a validation of the CDM project activity "Introduction of the recovery and combustion of methane in the existing sludge treatment system of the Cañaveralejo Wastewater Treatment Plant of EMCALI in Cali, Colombia" on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures, the simplified modalities and procedures for small-scale CDM project activities, the subsequent decisions by the CDM Executive Board and the Host country criteria.

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

In our opinion, the project, as described in the PDD of 23 July 2009, meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the approved baseline and monitoring methodology AMS III.H, i.e. "Methane Recovery in Wastewater Treatment", Version 09 of 28 March 2008.

The "Introduction of the recovery and combustion of methane in the existing sludge treatment system of the Cañaveralejo Wastewater Treatment Plant of EMCALI in Cali, Colombia" project will hence be recommended by RINA for registration as a CDM project activity.

Work carried out by: Lilian Herrmann Adriana Del Borghi Vicente San Valero	<input checked="" type="checkbox"/> No distribution without permission from the Client or responsible organizational unit <input type="checkbox"/> Strictly confidential <input type="checkbox"/> Unrestricted distribution
Work verified by: (CRT Responsible approval) Paolo Teramo 	Keywords: Validation, Climate Change, Kyoto Protocol



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Abbreviations

Explain any abbreviations that have been used in the report here.

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CL	Clarification Request
CER(s)	Certified Emission Reduction(s)
CH ₄	Methane
CND	Centro Nacional de Despacho – XM (Colombian National Dispatch Center)
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
CVC	Corporación Autónoma Regional del Valle del Cauca (Valle del Cauca Regional Autonomous Corporation)
DAGMA	Departamento Administrativo de Gestión del Medio Ambiente de Cali (Environmental Management Administrative Department of Cali)
DNA	Designated National Authority
EMCALI	Empresas Municipales de Cali (Cali Municipality Company)
GHG	Greenhouse gas(es)
IPCC	Intergovernmental Panel on Climate Change
MAVDT	Ministerio de Ambiente, Vivienda y Desarrollo Territorial (Ministry of Environment, Housing and Territorial Development)
ODA	Official Development Assistance
PDD	Project Design Document
PTAR-C	Planta de Tratamiento de Aguas Residuales de Cañaveralejo (Wastewater Treatment Plant of Cañaveralejo)
PwC	PricewaterhouseCoopers Ltda
RINA	Registro Italiano Navale
SCADA	Supervisory Control And Data Acquisition system
SST	Total Suspended Solid
UNFCCC	United Nations Framework Convention on Climate Change



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Appendix A: Validation Protocol



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1. INTRODUCTION

The Client has commissioned RINA to perform a validation of the “Introduction of the recovery and combustion of methane in the existing sludge treatment system of the Cañavalejo Wastewater Treatment Plant of EMCALI in Cali, Colombia” project in Colombia (hereafter called “Cañavalejo Recovery and combustion of methane of EMCALI” project), located in the city of Cali, Valle del Cauca Department, Colombia.

This report summarizes the findings of the validation of the project, performed on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures, the simplified modalities and procedures for small-scale CDM project activities and the subsequent decisions by the CDM Executive Board.

The validation team for this phase of the project consisted of the following personnel:

Role/Qualification	Last Name	First Name	Country
Team leader, CDM validator	San Valero	Vicente	Brazil
CDM validator	Poll Herrmann	Lilian Cristine	Brazil
Technical reviewer	Del Borghi	Adriana	Italy

1.1. Objective

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

1.2. Scope

The validation scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords, the simplified modalities and procedures for small-scale CDM project activities and the relevant decisions by the CDM Executive Board, including the approved baseline and monitoring methodology AMS III.H - “Methane Recovery in Wastewater Treatment”, Version 09 of 28 March 2008 /9/. The validation team has, based on the recommendations in the Validation and Verification Manual /8/ employed a risk-based approach, focusing on the identification of significant risks for project implementation and the generation of CERs.

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



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1.3. GHG Project Description

The proposed CDM small-scale project activity involves the capture and combustion of methane, present in biogas generated during the process of sludge treatment in the Wastewater Treatment Plant of Cañaveralejo (further called PTAR-C) located in Cali, Colombia.

The technology used by the proposed project activity comprises collection, storage and combustion of biogas generated in the anaerobic digestion tanks of PTAR-C.

The project is expected to reduce CO₂ emissions to the extent of 566,325 tCO₂e (56,632 tCO₂e / year average) over the fixed 10 years crediting period, with an expected operational lifetime of 25 years.



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2 METHODOLOGY

The validation consisted of the following three phases:

- i) a desk review of the project design documentation
- ii) follow-up interviews with project stakeholders
- iii) the resolution of outstanding issues and the issuance of the final validation report and opinion.

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

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

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

The completed validation protocol is enclosed in Appendix A to this report.

Findings established during the validation can either be seen as a non-fulfillment of validation protocol criteria or where a risk to the fulfillment of project objectives is identified. Corrective Action Requests (CAR) are issued, where:

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

The validation team may also use the term Clarification Request (CL), where:

- additional information is needed to fully clarify an issue.



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Validation Protocol Table 1: Mandatory Requirements				
Requirement	Reference	Conclusion	Cross reference	
The requirements the project must meet.	Gives reference to the legislation or agreement where the requirement is found	This is either acceptable based on evidence provided (OK), 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.	Used to refer to the relevant checklist questions in Table 2 to show how the specific requirement is validated. This is to ensure a transparent Validation process.	

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



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2.1 Review of Documents

The initial Project Design Document (PDD) of 10 March 2008 /1/ submitted by EMCALI and PwC was assessed. After initial validation findings were identified and communicated to the Client, a revised version of the PDD (Version 2 of 11 June 2008 /2/) was submitted and assessed by RINA.

In addition, spreadsheets containing detailed calculations and additional background documents (/8/to /44/) related to the project design and baseline were assessed by RINA.

Furthermore, based on the previous “Clarifications on issues associated with validation requirements for project activity under review” (Scope of Review Ref.2341), the review of the project activity undertaken by the CDM EB and their conclusion as per the CDM EB 48th meeting, a revised PDD (Version 3 of 23 July 2009 /3/), was submitted and assessed by RINA.

2.2 Follow-up Interviews

In April 2008, RINA performed interviews with project stakeholders (/45/ to /55/) to confirm selected information and to resolve issues identified in the document review. Representatives of Empresas Municipales de Cali, EMCALI, EICE ESP and PwC were interviewed.

The main topics of the interviews are summarized in Table 1.

Table 1 Interview topics

Interviewed organization(s)	Interview topics
Empresas Municipales de Cali, EMCALI, EICE ESP (EMCALI) and PwC	<ul style="list-style-type: none">- Clarifications on establishment of baseline, monitoring plan and emission reduction calculations- Resources, training needs and procedures for operation and maintenance- Monitoring Plan / Records (backups)- Maintenance program (calibration)- Project boundaries- Baseline and project emissions- Emissions reductions calculations

2.3 Resolution of Clarification and Corrective Action Requests

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

The Corrective Action Requests and Clarification Requests raised by RINA were resolved during communications between the Client and RINA. To guarantee the transparency of the validation process, the concerns raised and responses given are summarized in chapter 3 below and documented in more detail in the validation protocol in Appendix A to this report.

Since modifications to the Project design were necessary to resolve RINA's concerns, the Client decided to revise the documentation and resubmitted the project design documentation (CDM-PDD Version 2, dated 11 June 2008 /2/). After reviewing the revised and resubmitted project documentation, RINA issued this final validation report and opinion.



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3 VALIDATION FINDINGS

Where Clarification or Corrective Action Requests have been issued, the exchanges between the Client and RINA to resolve these Clarification or Corrective Action Requests are summarized and the conclusions for validation subject are presented in the validation protocol in Appendix A to this report.

The final validation findings relate to the project design as documented and described in the revised and resubmitted project design documentation, CDM-PDD for the “Introduction of the recovery and combustion of methane in the existing sludge treatment system of the Cañaveralejo Wastewater Treatment Plant of EMCALI in Cali, Colombia” project, Version 3, dated 23 July 2009 /3/.

3.1 Project Design

The “Cañaveralejo Recovery and combustion of methane of EMCALI” project is located in the city of Cali, Valle del Cauca Department, Colombia, within the area of EMCALI PTAR-C wastewater plant.

The project boundary is the physical, geographical site where the wastewater and sludge treatment takes place.

The project activity involves the capture and combustion of methane, present in biogas generated during the sludge treatment process in the Wastewater Treatment Plant of Cañaveralejo.

The technology that will be used by the proposed project comprises biogas collection, storage and purification next to methane burning in the electric generation system.

The sludge is produced in eight sedimentation tanks and next carried into the floatation thickener tank. The sludge is then redirected to four anaerobic digestion tanks (digesters) with the purpose of obtaining more stable end-product and eliminating pathogenic microorganisms present in the untreated sludge. The above mentioned anaerobic digestion, besides stabilizing sludge, generates biogas with high content of methane (between 57% and 64%). The biogas generated, a product of the anaerobic digestion of the sludge, passes through a purifier with continuous regeneration and is captured and combusted.

The methane is burned in the generator’s internal combustion engine or, in case of generator’s failure, in flares and in the water heater. Prior to being combusted, the biogas passes through the dehumidificator which allows the stabilization of the biogas humidity and therefore, the optimization of the engine’s combustion process.

The proposed project activity falls under Project category H - Methane recovery in wastewater treatment category, Type III - Other project activities and Sectoral Scope 13 - Waste handling and disposal and qualifies as a small scale CDM project activity as the annual estimated emission reductions (56,632 tCO₂e) result in emission reductions of less than or equal to 60 ktCO₂e annually (type III project activities).

The proposed project activity comprises measures that recover methane from biogenic organic matter in wastewaters by means of the introduction of methane recovery and combustion to an existing sludge treatment system (option (iii), AMS III.H - “Methane Recovery in Wastewater Treatment”, Version 09 of 28 March 2008) /9/.



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The recovered methane will be used for electrical energy generation (application (a), AMS III.H - “Methane Recovery in Wastewater Treatment”, Version 09 of 28 March 2008) /9/.

The project is not a debundled component of a large project activity as there is no registered small-scale CDM project activity or an application to register another small-scale CDM project activity with the same project participants in the same project category and technology/measure within the previous two years and whose project boundary is within 1 km of the project boundary of the proposed small-scale project activity at the closest point.

Project participants is Empresas Municipales de Cali, EMCALI, EICE ESP. PwC was mentioned as project participant in the PDD published at validation (version 1, dated 10 March 2008) and withdraw in the revised PDD submitted for final validation (version 2, dated 11 June 2008). A letter /39/ from PwC confirming its voluntary withdrawal from the proposed project activity was received.

The host Party Colombia meets all relevant participation requirements. No Annex I party has yet been identified.

The Letter of Approval (LoA) from the Colombian DNA, dated 29 April 2008 /5/ and confirming that the project contributes to the sustainable development of Colombia was received, verified and confirmed with the Climate Change Office of the Ministry of Environment, Housing and Territorial Development (MAVDT). Furthermore, a clarification letter from the Colombian DNA, dated 20 May 2008 /6/, states the correct project’s name according to the published PDD.

There is no public funding available from Annex I parties.

A 10 years fixed crediting period is selected, with a forecasted start on 01 August 2008 or after the project’s registration.

The starting date of the project activity was defined in the PDD Version 2, dated 11 June 2008, as 02 July 2003 with an expected operational lifetime of 25 years. The project starting date was initially evidenced by the Official letter no.300000-GAA-1376-03 /14/ - “CDM Methane capture and recovery projects – viability consultation” from the EMCALI Water and Sewer System Manager to the Ministry of Environment, Housing and Territorial Development, dated 2 July 2003.

Based on the previous “Clarifications on issues associated with validation requirements for project activity under review” (Scope of Review Ref.2341), the review of the project activity undertaken by the CDM EB and their conclusion as per paragraph 54 (g) of the report of the 48th meeting, the starting date of the project activity was revised in the PDD Version 3, dated 23 July 2009, to 31/03/2002 as per the provided evidence, Mitsubishi letter - Payments (on March 2002), dated 10/06/2009.

The project is expected to reduce CO₂ emissions to the extent of 566,325 tCO₂e (56,632 tCO₂e / year average) over the fixed 10 years crediting period.

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

According to the Principles, Requirements and Criteria for the national approval of the projects that apply for CDM (Resolution 0453 of 2004 of the Ministry of Environment, Housing and Territorial Development– Designated National Authority for Colombia /30/), the proposed project activity supports the sustainable development through its contribution to the principles of above mentioned Resolution.



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Through a Sustainable Development Program, EMCALI is attending to the principles of the above mentioned Resolution. The contribution to the long term improvement of the social and economical well-being of the local communities and the society in general, it is assured by EMCALI's investment in educational and environmental protection programs. The continuation of such programs should be ensured by the creation of the Committee of Sustainable Development integrated by the representatives of the local stakeholders and PTAR-C representatives.

The project's activity promotes the implementation of cleaner production by using cleaner equipment, technology, processes and introducing a good practice into the wastewater treatment system.

3.2 Baseline

The project applies the approved small-scale methodology AMS III.H - "Methane Recovery in Wastewater Treatment", Version 09 of 28 March 2008 /9/ for methane recovery in wastewater treatment.

This methodology category is applicable as the project recovers methane from biogenic organic matter in wastewaters by means of the introduction of methane recovery and combustion to an existing sludge treatment system (option iii).

The project is within the eligibility requirements of the baseline methodology since the annual estimated emission reductions (56,632 tCO₂e) result in emission reductions of less than or equal to 60 ktCO₂e annually (type III project activities).

The proposed project activity introduces good practice to the wastewater treatment plant by capturing and combusting biogas, which other ways would be released to the environment. Hence, for the proposed CDM project activity, baseline emissions are CH₄ emissions from the wastewater treatment system.

Evidences that the incentive from the CDM was seriously considered are the Official letter no. 300700-063-01 /13/ from EMCALI Strategic Programs Department (CDM Cogeneration meeting suggestion), dated 8 June 2001 and the Official letter no.300000-GAA-1376-03 /14/ - "CDM Methane capture and recovery projects – viability consultation" from the EMCALI Water and Sewer System Manager to the Ministry of Environment, Housing and Territorial Development, dated 2 July 2003.

Based on the previous "Clarifications on issues associated with validation requirements for project activity under review" (Scope of Review Ref.2341), the review of the project activity undertaken by the CDM EB and their conclusion as per paragraph 54 (g) of the report of the 48th meeting, another evidence was provided (EMCALI Internal Letter CDM2 28-06-2001, dated 28/06/2001) in which further details of the CDM consideration are mentioned, also mentioning the financial problems EMCALI is facing and the benefits that they could get from the CDM projects and deciding that Mitsubishi (already responsible for the sludge treatment plant equipments installation) should be contacted to carry out the capture and combustion and cogeneration (electricity generation).

As a result of one of the initial findings (~~CAR-2~~) the demonstration of additionality was assessed according to the revised PDD (CDM-PDD Version 2, dated 11 June 2008 /2/.

Two alternative baseline scenarios were considered:



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Alternative 1: Direct release of methane present in biogas generated from sludge digesters to the atmosphere (current practice).

Alternative 2: Capture and high efficiency combustion of methane present in biogas generated from sludge digesters.

The project's additionality is demonstrated by project participants as per the "*Attachment A to Appendix B of the simplified modalities and procedures for small-scale CDM project activities*" /11/, through an explanation to demonstrate that the project activity would not have occurred due to at least one of the following barriers, assessed by RINA: (a) technological barriers, (b) barriers due to prevailing practice and (c) other barriers.

(a) Technological barriers:

The project argues that difficulties due to the variation in the humidity of biogas and stabilization of the generators needed the support of specialized technical staff from Mitsubishi in order to start up the project activity as well as to develop the internal technical capacity of PTAR-C staff for the adequate functioning of the generation system.

Evidences of PTAR-C staff training by Mitsubishi /16/ (March/May 2007) were presented. Furthermore, since the start of the commissioning tests of the gas drying system (Communication between Mitsubishi and EMCALI, dated 15 September 2006 – Ref. no. TOK/MBI-715 /36/), until the moment of the revised PDD's presentation, the electric generators engines are not fully operational.

Furthermore, the "*Agreement about pending items called 'Not in Agreement' and assisted operation - Final closing agreement for Contract GO-505-97-ALC*" (in Spanish), dated 27 October 2004 (report Reference /20/) between EMCALI and the Contractor (Degremont), mentions that although the existing sludge treatment plant was considered "accepted" since end of 2002, the solution for pending items, still under discussion, is the implementation of an agreed working plan with conclusion dates until middle of 2005.

Alternative 1 involves lower risks due to the performance uncertainty of project activity (Alternative 2) and does not need skilled personnel to operate and maintain its technology, therefore it would lead to higher emissions.

Considering the above, the technological barrier is deemed justified.

(b) Barriers due to prevailing practice:

The project rises that the PTAR-C renewable energy (biogas) power generation plant is not a prevailing practice in Colombia and it is not required by the national law.

It was verified that the Resolution No. 1096 of 2000 /37/, that adopts RAS (Technical Regulations for the Sector of Drinking Water and Basic Purification), imposes to the wastewater treatment plants the obligation to establish an odor control program.

Furthermore, based on the verification of the information published on the website (http://reportes.sui.gov.co/fabricaReportes/frameSet.jsp?idreporte=alc_tec_002) of the Public Services Unique Information System (mentioned in the PDD, same item) it was concluded that until the moment of the validation of the project, there was no information available on any wastewater treatment plant pertaining to the municipal public service utilities that have implemented a system of methane capture and high efficiency combustion.



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Based on these two official sources, it was concluded that biogas capture and high efficiency combustion was not a prevailing practice in Colombia at the moment of the project validation.

Furthermore, there was not any similar CDM project (wastewater methane capture and combustion) hosted in Colombia that was registered or submitted for validation at the moment of the project validation, although other public services utilities (municipal wastewater treatment plants) have already expressed to the Colombian DNA their interest to develop similar projects to the one currently implemented by EMCALI.

Both alternatives are in line of the national environment requirements but Alternative 1, keeping the prevailing practice and/or following the present existing regulatory or policy requirements, would have led to higher emissions.

Considering the above, the prevailing practice barrier is deemed justified.

(c) Other barriers:

The project points out that EMCALI's core business consists of the wastewater treatment and as such does not include the activity of biogas capture and high efficiency combustion. That also lead to some changes in the traditional way of thinking of all personnel, requiring a new technology not known by the internal staff of EMCALI.

Recognizing that it is reasonably difficult to a specific sector Company to deal with a new or unfamiliar technology, beyond its core activity, it is RINA's opinion that without the capacity to absorb a new technology, emissions would have been higher.

Considering the above, the prevailing practice barrier is deemed justified.

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

Based on the previous "Clarifications on issues associated with validation requirements for project activity under review" (Scope of Review Ref.2341), the review of the project activity undertaken by the CDM EB and their conclusion as per paragraph 54 (g) of the report of the 48th meeting, further information is provided on the project start date and real and continuous actions to secure the CDM status.

The earliest prior CDM consideration evidence received was an EMCALI (Strategic Programs Department) dated 8 June 2001 (Ref. "EMCALI Internal Letter CDM1 08-06-2001.pdf"), where Mr. José Ceron (EMCALI Director, interviewed during the site visit) is suggesting a meeting with Mr. Edgar Llanos Libreros (EMCALI Strategic Programs Director), to discuss possible benefits of having the project under the Kyoto Protocol requirements. Another evidence, also from Mr. José Ceron, is another EMCALI internal letter (Ref. "EMCALI Internal Letter CDM2 28-06-2001.pdf" – in Spanish) dated 28/06/2001 in which further details of the CDM consideration are mentioned, also mentioning the financial problems EMCALI is facing and the benefits that they could get from the CDM projects and deciding that Mitsubishi (already responsible for the sludge treatment plant equipments installation) should be contacted to carry out the capture and combustion and cogeneration (electricity generation).

According to the below table of events, the real and continuous actions to secure the CDM status in compliance with the EB 41 annex 46 paragraph 5(b) is summarized. The evidences provided for each event have been reviewed by RINA.



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Date	Evidence	Description
08/06/2001	EMCALI Internal Letter CDM1 08-06-2001.pdf – <i>in Spanish</i>	Earliest CDM consideration, where Mr. José Ceron (EMCALI Director, interviewed during the site visit) is suggesting a meeting with Mr. Edgar Llanos Libreros (EMCALI Strategic Programs Director), to discuss possible benefits of having the project under the Kyoto Protocol requirements
28/06/2001	EMCALI Internal Letter CDM1 28-06-2001.pdf – <i>in Spanish</i>	Further details of the CDM consideration are mentioned, also mentioning the financial problems EMCALI is facing and the benefits that they could get from the CDM projects and deciding that Mitsubishi (already responsible for the sludge treatment plant equipments installation) should be contacted to carry out the capture and combustion and cogeneration (electricity generation)
31/03/2002	Mitsubishi letter payments 10-06-2009.pdf	Mitsubishi letter from Mr. David Rincon (dated 10/06/2009) confirming that the first payments for the generation of electricity – project reference:2285 (and also for the capture and combustion system – project reference:2341) started in March 2002 and that they are still negotiating (June 2009) the final settlements of all accounts due to some remaining pending matters. Therefore, the previous presented project's starting date (02/07/2003) should be corrected to 31/03/2002.
02/07/2003	Viability Consultation MAVDT 02-07-2003.pdf – <i>in Spanish</i>	Viability consultation of EMCALI to the Chief of Colombian Office for the Mitigation of Climate Change of the Ministry of Environment, Housing and Territorial Development of July 2nd, 2003
29/10/2004	Final liquidation Act 29-10-2004.pdf – <i>in Spanish</i>	Minutes of Meeting between EMCALI and the Contract Consortium, related to the finalization of the sludge treatment plant contract and some pending items (capture and combustion) such as technology transferring for the operation
25/10/2005	EMCALI letter to Mr. Sergio Salas 25-10-2005.pdf – <i>in Spanish</i>	Letter from Mr. José Ceron to Mr. Sergio Salas (recently joined PwC) mentioning previous contacts on 2004 (at that time Mr. Sergio was working at the MAVDT-Ministerio de Ambiente, Vivienda y Desarrollo Territorial (<i>Ministry of Environment, Housing and Territorial Development</i>)) and inviting PwC to present a proposal for CDM projects implementation
06/06/2006	EMCALI_PwC Agreement_Date corrected to 06-06-	Mentions the Agreement between PwC and EMCALI signed in 06/06/2006 and confirms (corrects) the date of the original agreement



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	2006.pdf – <i>in Spanish</i>	
15/09/2006	Mitsubishi letter 15-09-2006.pdf – <i>in Spanish</i>	Mitsubishi letter which clearly states that since October 2004 (final liquidation of the <u>sludge plant</u> contract – Ref. “Final liquidation Act 29-10-2004.pdf” – in Spanish) they were having problems and also that since August 2005 (after the installation and initial tests of the gas drying system) they are awaiting the normalization (normal operation) of the sludge plant biogas generation to finalize the tests and because there is not even a biogas recovery program adequately implemented (lack of biogas) they can not even estimate a date to re-start the tests
09/01/2007	Non-objection letter MAVDT 09-01-2007.pdf.	Non Objection Letter of the Ministry of Environment, Housing and Territorial Development of Colombia
29/04/2008	Letter of Approval MAVDT III.H 29-04-2008.pdf MAVDT III.H 29-04-2008.pdf	Letter of Approval received from MAVDT
20/05/2008	Clarification to the LoA MAVDT III.H 20-05-2008.pdf	Clarification of the LoA regarding the valid name of the project: “ Introduction of the recovery and combustion of methane in the existing sludge treatment system of the Cañaveralejo Wastewater Treatment Plant of EMCALI in Cali, Colombia”

As it can be verified from the above table events, there are CDM considerations in between the corrected project’s starting date (31/03/2002) and the request to the DNA of Colombia for granting the “No objection letter” (21 December 2006) and also other evidences, particularly the Mitsubishi letter from Mr. David Rincon (dated 10/06/2009), the Minutes of Meeting between EMCALI and the Contract Consortium (dated 29/10/2004) and the Mitsubishi letter to EMCALI (dated 15-09-2006) are clearly mentioning several problems in the sludge treatment plant construction and the natural delay this problems are causing in the CDM project’s implementation. Therefore, it is RINA’s opinion that the mentioned GAP is properly justified.

3.3 Monitoring Plan

The project correctly applies the monitoring methodology AMS III.H - “Methane Recovery in Wastewater Treatment”, Version 09 of 28 March 2008 /9/.

This methodology category is applicable as the project recovers methane from biogenic organic matter in wastewaters by means of the introduction of methane recovery and combustion to an existing sludge treatment system (option iii).

The Director of PTAR-C will be responsible for the coordination and approval of the Monitoring and Verification Plan (MVP) that will be managed by the following four areas of the PTAR-C: Instrumentation, Process, Mechanical and Electricity. The organizational structure, authority and



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responsibilities for measuring, recording, reporting, monitoring, and controlling of the monitored parameters and review of performance have been clearly defined.

Details of the data to be collected, the frequency of data recording, format and storage type are described. All data will be archived in both paper and electronic format until two years after the crediting period. Back-up of data is clearly defined.

The QA / QC procedures applied are properly described for all the measured data and parameters.

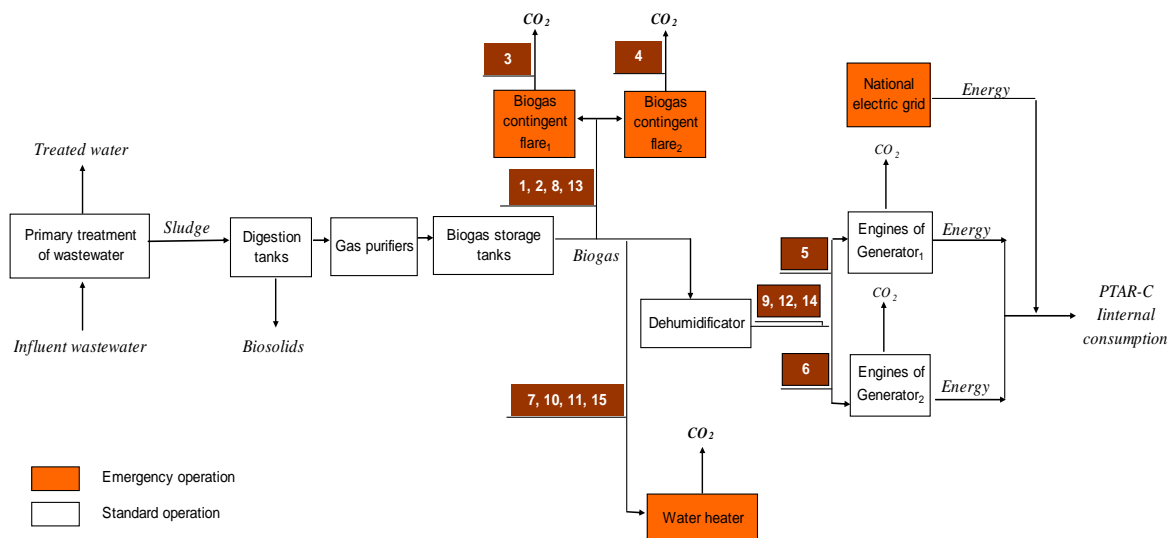
Based on the previous “Clarifications on issues associated with validation requirements for project activity under review” (Scope of Review Ref.2341), the review of the project activity undertaken by the CDM EB and their conclusion as per paragraph 54 (g) of the report of the 48th meeting, further information is provided on the monitoring of the operation of the flare in accordance with the manufacture’s specification, and electricity consumed by the project activity, as required by the methodology:

The monitored parameters as per the registered PDD (Version 02) are described below followed by the schematic with the measurement/monitoring points.

- | | | |
|---------|------------------|--|
| 1 | $fv_{CH_4,FG,h}$ | Average volumetric fraction of methane in biogas ($\mu V/V$) combusted in flares ($\mu V/V$) |
| 2 | $FV_{RG,h}$ | Volumetric flow rate of biogas carried for combustion in the flare (Nm^3/h) – emergency procedure |
| 3 and 4 | T_{flare} | Temperature in the exhaust gas of the flares ($K/^\circ C$) |
| 5 and 6 | $FV_{G,h}$ | Volumetric flow rate of biogas carried to the engines of the electric generator (m^3/h) |
| 7 | $FV_{H,h}$ | Volumetric flow rate of biogas carried for combustion in water heater (m^3/h) – emergency procedure |
| 8 | $T_{RG,h}$ | Temperature of biogas flared ($K/^\circ C$) |
| 9 | $T_{G,h}$ | Temperature of biogas fed into the engines of the electric generators ($K/^\circ C$) |
| 10 | $T_{H,h}$ | Temperature of biogas fed into the water heater ($K/^\circ C$) |
| 11 | $fv_{CH_4,H,h}$ | Average volumetric fraction of methane in biogas combusted in water heater ($\mu V/V$) |
| 12 | $fv_{CH_4,G,h}$ | Average volumetric fraction of methane in biogas fed into the engines of the electric generators ($\mu V/V$) |
| 13 | $P_{RG,h}$ | Pressure of biogas flared (psi, kg/cm^2 or Pa) |
| 14 | $P_{G,h}$ | Pressure of biogas fed into the engines of the electric generators (psi, kg/cm^2 or Pa) |
| 15 | $P_{H,h}$ | Pressure of biogas fed into the water heater (psi, kg/cm^2 or Pa) |



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As this project is connected with another CDM project activity “Displacement of the electricity of the national electric grid by the auto-generation of renewable energy in the Cañaveralejo Wastewater Treatment Plant of EMCALI in Cali, Colombia” (Ref.2285), measurements related to the engines of the electric generators (highlighted in yellow), also appear as monitored parameters in the other aforementioned project.

The technical characteristics and quality assurance/control (preventive/maintenance and calibration procedures) of the equipments/instruments used for the measurement of the above mentioned parameters are extensively described in PDD’s section B.7.1.

According to paragraph 38 of AMS.III.H version 09, 90% utilization/combustion/flare efficiency was adopted (*ex-ante*) for the contingency operation of the flares (the contingency operation of the flares is described in the Emergency Procedures PDD - section B.7.2). To ensure a continuous monitoring (*ex-post*) the biogas temperature, flow rate and pressure are monitored as foreseen in the Monitoring Plan (in the above listed monitored parameters, please see parameters 3, 4, 8 and 13).

In order to determine project emissions from methane flaring, the 7-step approach of the methodological “Tool to determine project emissions from flaring gases containing methane” was followed. According to the mentioned methodological Tool, as a simplified approach, only the volumetric fraction of methane (in the above listed monitored parameters, please see parameter 1) will be measured and the difference to 100% is considered as being nitrogen (N₂).

Furthermore, to monitor the flare efficiency (Tool-step 6), the operation time of the flares will be measured and recorded automatically by the Control and Acquisition Data System – SCADA, as well as all other parameters above mentioned.

Maintenance evidences of all the monitoring equipments/instruments will be stored in the AQUAMINT system by the Administrator of the Electromechanical Maintenance.



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Details of the data to be collected, the frequency of data recording, format and storage type are described. All data will be archived in both paper and electronic format until two years after the crediting period. Back-up of data is clearly defined.

As the “*Tool to determine project emissions from flaring gases containing methane*” mentions as one of the data and parameters to be monitored the data/parameter “*Other flare operation parameters*”, this data/parameter is mentioned in the PDD, although not clearly identifying or describing what data/parameter(s) were to be monitored.

Other flare operation parameters also refer to the proper operation of the combustion system itself by following the indications of the manufacturer, in order to have a safe and adequate combustion and implemented actions in case of a contingency situation. The aforementioned parameters are (according to the manufacturer operation guidelines):

adequate operation of the gas booster and pressure switch;

- adequate operation of the control panel that allows the input of the gas into the system and initiates spark ignition in the pilot combustor; once the flame in the pilot cabin is stable, the control panel sends a sign to initiate the main combustion;
- adequate operation of the combustion ventilator, that allows to control the oxygen input and therefore to control condition of the combustion;
- voltage circuit control system.

As it can be depicted, all the necessary parameters for the *ex-post* monitoring of the project activity, according to the requirements of the methodology AMS.III.H Version 09 and the “*Tool to determine project emissions from flaring gases containing methane*”, are included and clearly described in the Monitoring Plan and it is RINA’s understanding that the above explanations and also the complementary information on data/parameters described in PDD’s section B.7.1 are covering the necessary means of monitoring of all parameters, including other flare operation parameters.

As per PDD section A.4.2 explanations, among the equipment of the implemented technology of the methane capture and combustion CDM project activity are: gas storage tanks, gas dehumidificator, gas engine of the electric generator, biogas flares (emergency operation) and water heater (emergency operation).

As stated in the PDD, in regular operation biogas will be combusted in the engines of the electric generators, which does not require an outside input of the electric energy (from the grid) and neither does the gas dehumidificator nor gas storage tanks.

Under the emergency operation conditions, when the biogas might be combusted in the flares or the water heater, the only electricity consumption might occur during the operation of the flares and such will be monitored and subtracted from the total emission reductions achieved by the project activity, as stated in the PDD. The monitoring of the electricity consumption in such a case will be done in a following way: grid electricity consumption for the operation of the flares in year “y” will be determined by the measurement of the operation time of the flares multiplied by the default value of the electricity consumption of the flare, 3.3 kW per each flare (2.2 kW - gas booster + 1.1 kW – ventilator, according to the technical specification of the equipment). The operational time of the flares is registered in the Control and Acquisition Data System - SCADA.

To RINA’s knowledge, there are no diesel generators on site to feed the methane capture and combustion plant.



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3.4 Calculation of GHG Emissions

The emissions due to the project result from methane emissions through the presence of degradable organic carbon in the sludge treatment system; methane emissions from the decay of the sludge generated by the treatment systems; methane fugitive emissions through inefficiencies in capture and flare systems. All emissions from the project activity have been accounted for. There is no leakage involved in this project activity and the electricity required for the running of the equipments will come from biogas combustion.

Project emissions due to degradable organic carbon in treated wastewater, to anaerobic decay of the final sludge produced, to dissolved methane in treated wastewater are not considered for the calculations, since that in the baseline scenario will not change in comparison to the proposed project activity scenario.

A 90% default value is chosen for the combustion realized in the enclosed flares (emergency operation in case of the failure of the engine-generator system). According to AMS III.H - "Methane Recovery in Wastewater Treatment", Version 09 of 28 March 2008 /9/, the continuous check of the manufacturer's specifications (temperature and biogas flow rate) of the flares will be conducted. If in any specific hour any of the parameters is out of the range of the specifications 50% of a default value should be used for this specific hour. If at any given time the temperature of the flare is below 500°C, 0% default value should be used for this period. The operation time of the flares will be measured and recorded automatically by the Control and Acquisition Data System – SCADA as well as all the other parameters monitored (temperature and biogas flow rate).

Based on the requests for review rose by three Board members and the CDM EB 47th meeting - end note 6, further information is provided regarding the emission reduction calculation, as per the previously submitted responses for the requests for review.

For the purpose of the calculation ex-ante of the project emissions and following the requirements of the methodology AMS III.H - *Methane Recovery in Wastewater Treatment* (Version 09, Sectoral Scope 13, 28 March 2008), a default value of 0.9 was used, given no other appropriate value for capture and utilization/combustion/flare efficiency (CFEs) of the methane recovery and combustion/utilization equipment in the sludge treatment, as it indicated in the methodology above mentioned.

According to paragraphs 12 and 16 of the methodology AMS III.H version 09 and having discarded some of the parameters of the equation (1), the project emissions should be calculated *ex-ante* according to the following equation:

$$PE_{y,fugitive,s} = (1 - CFE_{ww}) * MEP_{y,s,treatment} * GWP_{CH4} \text{ and}$$

$$MEP_{y,s,treatment} = S_{y,untreated} * DOC_{y,s,untreated} * DOCF * F * 16/12 * MCF_{s,treatment}.$$

The only parameters not taken as a default were $S_{y,untreated}$, calculated based on the amount of wastewater entering the PTAR-C and $DOC_{y,s,untreated}$, estimated *ex-ante* based on the dry matter content in sludge of the PTAR-C for the years 2006 and 2007 (please see the spreadsheet "*IIIIH EMCALI Emission calculations_v.val 2.xls*").

According to the applied methodology, the calculation was made in line with all the requirements given and based on the real historical data that were made available to the validator during the validation process.



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As to the *ex-ante* calculation of the baseline emissions, requirements of the paragraphs 23 (iii) and 24b were followed. Following the same logic as explained for the *ex-ante* project emissions calculation and considering that the characteristics of treated wastewater and its potential to generate methane are equal in the baseline and the proposed project activity, the baseline emissions were calculated as follows (part B.6.3. of the PDD):

$$BE_y = MEP_{y,s,treatment} * GWP_{CH4}$$

$$MEP_{y,s,treatment} = S_{y,untreated} * DOC_{y,s,untreated} * DOC_F * F * (16/12) * MCF_{s,treatment}$$

Similar to the explanation given above, only $S_{y,untreated}$ and $DOC_{y,s,untreated}$ were calculated based on the historical data of the plant. The other parameters were taken as default. Please see the explanation given above.

Similar as in the case of the *ex-ante* project emission calculation, the *ex-ante* baseline emission calculation was made in line with all the requirements given in the methodology and based on the real historical data that were made available to the validator during the validation process. All the input data can be observed in the spreadsheet “*IIH EMCALI Emission calculations_v.val 2.xls*” /7/.

Following the provisions of paragraph 34 of the methodology AMS.III.H version 09, the monitoring plan of the project (described in the PDD, part B.7.2.) is based on the direct measurement of:

- Volumetric biogas flow rate carried to the engines of the electric generators, carried for combustion in the flare or in water heater (m³/h);
- Temperature of biogas flared, fed into the engines of the electric generators and fed into the water heater (K/°C);
- Average volumetric fraction of methane in biogas fed into the engines of the electric generators, combusted in water heater or combusted in flares (μV/V);
- Pressure of biogas fed into the engines of the electric generators, flared or fed into the water heater (psi, kg/cm² or Pa);
- Temperature in the exhaust gas of the flares (K/°C).

These parameters were presented with the same nomenclature as the parameters employed in the formulae's of the “*Tool to determine project emissions from flaring gases containing methane*”, to be applied for *ex-post* emissions calculations.

The measurement points can be clearly observed in Figure 5 - “*Monitoring Plan Graph*” of the PDD (please see mentioned figure in the validation report, item 3.3). The technical characteristics and quality assurance / quality control of the equipments used for the measurement of the above mentioned parameters were clearly described in the part B.7.1. of the PDD.

The implemented technology does not imply in any changes into the anaerobic treatment system of sludge neither of wastewater as consists exclusively of the equipment installed after the process of the anaerobic sludge treatment is completed and therefore, the implemented technology does not influence in any way the amount of methane produced per unit of COD removed in comparison with the baseline situation which, in other words, means that the efficiency of the anaerobic digesters' is not influenced by the introduction of the CDM project activity technology. The Wastewater Treatment Plant – PTAR records the waste water quality



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parameters as a monitoring routine of the plant, such as COD, BOD, flow, TSS, SVS before and after treatment, which can be observed in the spreadsheet “*IIH EMCALI Emission calculations_v.val 2.xls*” /7/.

As per paragraph 36 of the applied methodology, “*the amount of methane recovered, fuelled, flared or utilized (e.g. injected into natural gas distribution grid or distributed via a dedicated piped network) shall be monitored ex-post, using continuous flow meters. The fraction of methane in the gas should be measured with a continuous analyzer or, alternatively, with periodical measurements at a 95% confidence level. Temperature and pressure of the gas are required to determine the density of methane combusted.*” – all the parameters required by this paragraph are monitored by continuous analyzers (see the monitored parameters previously mentioned and the description of the monitoring equipment given in part B.7.1. of the PDD).

According to the paragraph 38 of the applied methodology, 90% combustion efficiency was adopted for the contingency operation of the flares (the contingency operation of the flares is described in the Emergency Procedures in part B.7.2. of the PDD). To ensure a continuous measurement (*ex-post* monitoring), temperature and biogas flow rate will be monitored as foreseen in the Monitoring Plan (see the monitored parameters previously mentioned).

Furthermore, in order to determine project emissions from methane flaring, the 7-step approach of the methodological “*Tool to determine project emissions from flaring gases containing methane*” was followed (description given in part B.7.2. of the PDD). According to the indications of the above mentioned methodological Tool, as a simplified approach, only the volumetric fraction of methane will be measured and the difference to 100% will be assumed as Nitrogen (N₂) -see the description on Step 1- therefore only the volumetric fraction of methane in biogas and the biogas flow is necessary to be measured, as it is planned in the Monitoring Plan.

Furthermore, to monitor the flare efficiency (step 6), the operation time of the flares will be measured and recorded automatically by the Control and Acquisition Data System – SCADA as well as all the other monitored parameters (temperature and volumetric biogas flow rate).

As it can be observed, all the necessary parameters for the *ex-post* monitoring of the project activity, according to the requirements of the methodology AMS.III.H version 09 and the “*Tool to determine project emissions from flaring gases containing methane*”, are included and clearly described in the Monitoring Plan. Furthermore, the technical characteristics as well as quality assurance and quality control of the equipment used for the measurement of the above mentioned parameters are clearly described in the part B.7.1. of the PDD.

3.5 Environmental Impacts

The project has already received a “No-objection letter” /4/ from the Ministry of the Environment, Housing and Territorial Development of Colombia (the Colombian DNA), dated 09 January 2007 which states that the Ministry has no objection to the project.

An independent evaluation of the positive and negative environmental as well as the social and technological impacts of the proposed project activity of biogas capture and combustion in the installations of the PTAR-C has been performed in October 2006 (PDD-item D.1, table 5). Five environmental aspects of the product activity have been identified. These relate to water, air quality, other contaminants, ground conditions and biodiversity. None of these are of significance in the context of the project. For its implementation purposes the Gold Standard criteria, tailored to the projects of biogas capture and high efficiency combustion, were followed.



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The project has no significant negative impacts on the environment and no transboundary impacts have been envisaged from this project activity.

According to the Decree no. 1220 of 2005, art.9 /34/, which does not impose any obligation to obtain environmental licenses for the activity of biogas capture, combustion or electricity auto-generation, the construction and operation of the wastewater system for towns over or equal 200,000 inhabitants requires an environmental license. According to this, PTAR-C obtained such license through the Resolution 0064 of 2002 /32/ granted by the MAVDT.

According to the Decree no. 1220 of 2005 (art. 3) such license will contain implicit all the necessary permits, authorizations and/or concessions for the usage, exploitation and/or affectation of the natural renewable resources that are necessary for the project, work or activity development and operation. As a requirement of the license granted, the PTAR-C had to obtain the license for the disposal of the biosolids generated during the wastewater treatment process, which PTAR-C obtained through the Resolution 0370 of 30 April 2002 /35/.

According to the above stated, the PTAR-C effectively counts with all the necessary and binding licenses and permits.

The assessment of the Wastewater Treatment Plant of Cañaveralejo is evidenced by an Environmental Audit Report /33/ (“Informe de Interventoría Ambiental”, dated December 2006) covering the period February-July 2006, that, among other things, verified the attendance to the Environmental Management Plan and Monitoring Program.

3.6 Comments by Local Stakeholders

According to the Resolution 0453 of 2004 of the Ministry of Environment, Housing and Territorial Development /30/, as one of the requirements to apply for the Letter of Approval, the project should demonstrate that local stakeholders were invited for comments. Nonetheless, there is no definition of what specific (or minimum) local stakeholders should be invited.

The stakeholder consultations have been carried out through two public meetings, carried out in the beginning of the year 2007 and on 28 May 2007, at the project site.

The most representative leaders from the surrounding communities attended the 28 May 2007 meeting, evidenced by Minutes of meeting /25/ (“Reunión MDL”) dated 28/05/2007. The meeting was complemented with a visit to the PTAR-C facilities. The invitation was also extended to institutions, such as: DAGMA (Departamento Administrativo de Gestión del Medio Ambiente de Cali - environmental authority of Cali), Climate Change Mitigation Group from the Ministry of Environment, Housing and Territorial Development, and the Carvajal Foundation. No negative comments or worries specifically related the proposed project activity were received.

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

The PDD of 10 March 2008 was made publicly available on RINA’s climate change website (www.rina.org) and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 02 April 2008 to 01 May 2008. No comments were received.



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5 VALIDATION OPINION

RINA has performed a validation of the “Introduction of the recovery and combustion of methane in the existing sludge treatment system of the Cañavalejo Wastewater Treatment Plant of EMCALI in Cali, Colombia” project in Colombia. The validation was performed on the basis of UNFCCC criteria and host country criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The review of the project design documentation (PDD Version 1, dated 10 March 2008, subsequently revised to Version 2, dated 11 June 2008) and the subsequent follow-up interviews have provided RINA with sufficient evidence to determine the fulfillment of stated criteria.

The project participant is Empresas Municipales de Cali, EMCALI, EICE ESP of Colombia. The host Party Colombia meets all relevant participation requirements. No participating Annex I Party is yet identified.

RINA has received a confirmation by the host Party, Colombia, that the project activity assists it in achieving sustainable development.

The project is within the eligibility requirements of the baseline methodology since the annual estimated emission reductions (56,632 tCO₂e) result in emission reductions of less than or equal to 60 ktCO₂e annually (type III project activities).

The project activity involves the capture and combustion of methane, present in biogas generated during the sludge treatment process in the Wastewater Treatment Plant of Cañavalejo, resulting in reductions of CH₄ emissions that are real, measurable and give long-term benefits to the mitigation of climate change. An analysis of the technological, prevailing practice and other barriers demonstrates that the proposed project activity is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity. Given that the project is implemented as designed, the project is likely to achieve the estimated amount of emission reductions during the selected 10 years fixed crediting period.

The validation is based on the information made available to us and the engagement conditions detailed in this report. The only purpose of this report is its use during the registration process as part of the CDM project cycle.

The project applies the approved baseline and monitoring methodology AMS III.H, i.e. “Methane Recovery in Wastewater Treatment”, Version 09 of 28 March 2008. The baseline methodology has been correctly applied and the assumptions made for the selected baseline scenario are sound. The monitoring methodology has been correctly applied and the monitoring plan sufficiently specifies the monitoring requirements.

In our opinion, the project, as described in the PDD of 23 July 2009, meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria. The “Introduction of the recovery and combustion of methane in the existing sludge treatment system of the Cañavalejo Wastewater Treatment Plant of EMCALI in Cali, Colombia” project will hence be recommended by RINA for registration as a CDM project activity.



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6 REFERENCES

Category 1 Documents:

The following documents that relate directly to the project were provided by the Client:

- /1/ Empresas Municipales de Cali, EMCALI, EICE ESP - EMCALI and PricewaterhouseCoopers Ltda. - PwC: CDM-PDD for the “Introduction of the recovery and combustion of methane in the existing sludge treatment system of the Cañaveralero Wastewater Treatment Plant of EMCALI in Cali, Colombia” project, Version 1 of 10 March 2008.
- /2/ Empresas Municipales de Cali, EMCALI, EICE ESP - EMCALI and PricewaterhouseCoopers Ltda. - PwC: CDM-PDD for “Introduction of the recovery and combustion of methane in the existing sludge treatment system of the Cañaveralero Wastewater Treatment Plant of EMCALI in Cali, Colombia” project, Version 2 of 11 June 2008.
- /3/ Empresas Municipales de Cali, EMCALI, EICE ESP - EMCALI and PricewaterhouseCoopers Ltda. - PwC: CDM-PDD for “Introduction of the recovery and combustion of methane in the existing sludge treatment system of the Cañaveralero Wastewater Treatment Plant of EMCALI in Cali, Colombia” project, Version 3 of 23 July 2009.
- /4/ Project No-objection letter from the Ministry of Environment, Housing and Territorial Development, dated 9 January 2007.
- /5/ Colombian DNA Letter of Approval, dated 29 April 2008.
- /6/ Clarification from the Colombian DNA regarding the Letter of Approval, dated 20 May 2008.
- /7/ “IIH EMCALI Emission calculations_v.val 2.xls” Excel sheet, dated 11 June 2008.

Category 2 Documents:

Background documents, related to the design and/or methodologies employed in the design or other reference documents:

- /8/ International Emission Trading Association (IETA) & the World Bank’s Prototype Carbon Fund (PCF): *Validation and Verification Manual*. <http://www.vvmanual.info>
- /9/ “Appendix B of the Simplified Modalities and Procedures for Small-Scale CDM project activities”- Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories: AMS III.H -“Methane Recovery in Wastewater Treatment”, Version 09 of 28 March 2008.
- /10/ “Appendix C of the Simplified Modalities and Procedures for Small-Scale CDM project activities”.
- /11/ “Attachment A to Appendix B of the simplified modalities and procedures for small-



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scale CDM project activities”.

- /12/ “Tool to determine project emissions from flaring gases containing methane” (EB 28 Meeting report-Annex 13).
- /13/ Official letter no. 300700-063-01 from EMCALI Strategic Programs Department (CDM Cogeneration meeting suggestion), dated 8 June 2001.
- /14/ Official letter no.300000-GAA-1376-03 - “CDM Methane capture and recovery projects – viability consultation” from the EMCALI Water and Sewer System Manager to the Ministry of Environment, Housing and Territorial Development, dated 2 July 2003.
- /15/ Communications between Mitsubishi and the Headquarters of the Department of Wastewater Treatment of EMCALI – Generation system failures, dated 01 June 2007.
- /16/ Records of the PTAR-C training sessions by Mitsubishi Corporation, dated March and May 2007.
- /17/ Purification and wastewater management plan 2007-2016, dated 8 May 2007.
- /18/ Biogas characteristics - Laboratory analysis (various, from 2002 to 2006).
- /19/ 2006 PTAR-C Energy Consumption data (SCADA - Control and data acquisition system), dated 8 March 2007.
- /20/ Agreement about pending items called "Not in Agreement" and assisted operation - Final closing agreement for Contract GO-505-97-ALC of 27 October 2004.
- /21/ Contract no. 300-GAA-OS-298-2007 between EMCALI EICE ESP and Soluciones Automaticas Ltda - Maintenance of SCADA, dated 3 September 2007.
- /22/ Technical specifications: gas transmitter, thermocouple, flow meters, pressure transmitter.
- /23/ Technical specifications of contingent biogas flare.
- /24/ Operational specifications of contingent biogas flare.
- /25/ List of participants and summary of comments of local stakeholders meeting, dated 28 May 2007.
- /26/ Technical specifications: Power generator with metric instrument to measure produced electricity.
- /27/ Tests in generators, of June 2007 & November 2005
- /28/ EMCALI Operation executive report of PTAR-C (2006)
- /29/ Methane concentration in biogas.xls Excel sheet, dated 10 September 2007.
- /30/ Resolution 0453 of 2004 of the Ministry of Environment, Housing and Territorial Development– Designated National Authority for Colombia
- /31/ Resolution 0456 from Corporación Autónoma Regional del Cauca - CVC, dated 12 June 1992 (Wastewater Plant Environmental License – Project Viability approval).



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- /32/ Resolution 0064 from the Ministry of Environment, Housing and Territorial Development, dated 22 January 2002 (Wastewater Plant Environment License - Design modifications approval).
- /33/ Environmental Audit Report (“Informe de Interventoria Ambiental”), dated December 2006)
- /34/ Decree 1220 from the Ministry of Environment, Housing and Territorial Development, dated 21 April 2005.
- /35/ Resolution 0370 from the Ministry of Environment, Housing and Territorial Development, dated 30 April 2002.
- /36/ Communication between Mitsubishi and EMCALI, dated 15 September 2006 – Ref. no. TOK/MBI-715.
- /37/ Resolution No. 1096, dated 17 November 2000, that adopts RAS (Technical Regulations for the Sector of Drinking Water and Basic Purification).
- /38/ Decree 948, dated 05 June 1995, which partially regulates the Act 23 of 1973, the articles 33, 73, 74, 75 and 76 of the Decree – Act 2811 of 1974; the articles 41, 42, 43, 44, 45, 48 and 49 of the Act 9 of 1979; and the Act 99 of 1993, with relation to the prevention and control of the atmospheric contamination and the protection of the air quality.
- /39/ PwC letter confirming its voluntary withdrawal from the proposed project activity, dated 28/05/2008.
- /40/ Mitsubishi letter - Payments (March 2002) related to the project activity, dated 10/06/2009.
- /41/ CDM consideration - EMCALI Internal Letter CDM1, dated 28/06/2001.
- /42/ Minutes of Meeting between EMCALI and the Contract Consortium - Final liquidation Act, dated 29/10/2004.
- /43/ Letter from Mr. José Ceron to Mr. Sergio Salas (PwC) - EMCALI letter to Mr. Sergio Salas, dated 25/10/2005.
- /44/ Agreement between PwC and EMCALI (confirms and corrects the date of the original agreement) - EMCALI_PwC Agreement_Date corrected to 06-06-2006, dated 12/09/2006.



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Persons interviewed:

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

- /45/ Mr. Sergio Salas - PwC Colombia Manager
- /46/ Mrs. Agnieszka Tarnawska - PwC Senior Consultant
- /47/ Mr. Roberto Pomar - EMCALI PTAR-C Director
- /48/ Mr. Freddy Rojas - EMCALI PTAR-C Electrical Area
- /49/ Mr. Rodolfo Madrid - EMCALI PTAR-C Mechanical Area
- /50/ Mr. Jose Bolanes - EMCALI PTAR-C Electrical Technician
- /51/ Mr. Orlando Valencia - EMCALI PTAR-C Instrumentation
- /52/ Mrs. Luz Helena Mora - EMCALI PTAR-C Sanitation Engineer – Process Area
- /53/ Mrs. Alexandra Lucero - EMCALI PTAR-C Chemical Engineer – Laboratory
- /54/ Mr. Daniel Varela - EMCALI PTAR-C SCADA Technician
- /55/ Mr. Jorge Gomes – Communities 6 & 7 Representant (Local stakeholders)

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APPENDIX A

CDM VALIDATION PROTOCOL

This document contains a generic Validation Protocol for small-scale CDM projects, which must be seen in conjunction with the Validation and Verification Manual and the Validation Report Template. The entries in the protocol should be adjusted and amended as appropriate to prepare for the validation of a particular project.

This validation protocol serves the following purposes:

- *It organizes, details and clarifies the requirements a CDM project is expected to meet; and*
- *It ensures a transparent validation process by inducing the Validator to document how a particular requirement has been validated and which conclusions have been reached;*

This protocol contains two tables with generic requirements for validation projects. Table 1 shows the requirements that the GHG emission reduction project will be validated against. Table 2 consists of a checklist with validation questions related to one or more of the requirements in Table 1. The checklist questions may not be applicable for all investors, and should not be viewed as mandatory for all projects. Where a finding is issued, a corrective action request or clarification request are stated. The resolution and final conclusions of these requests should be described in Table 3 of this protocol.

Before this generic validation protocol can be applied to validate a specific project, the Validator must review and adjust/amend the protocol to make it applicable to individual project characteristics and circumstances as well as individual investor criteria. The application of the validator's professional judgment and technical expertise should ensure that checklist amendments cover all necessary specific project requirements that have impact on project performance and acceptance of the project. Given the above, the checklist part of the protocol is neither exhaustive nor prescriptive.

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

Requirement	Reference	Conclusion	Cross Reference / Comment
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reductions commitment under Art. 3.	Kyoto Protocol Art.12.2	OK	Table 2, Section B.6.3, B.6.4. No Annex I party has yet been identified.
2. The project shall assist non Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof.	Kyoto Protocol Art. 12.2, Simplified Modalities and Procedures for Small Scale CDM Project Activities §23a	CAR-1 OK	Table 2, Section A.2.3. No-objection letter of the Environment, Housing and Territorial Development Ministry of Colombia has been received on January 9th, 2007. The “Cañaveralejo Wastewater Treatment Plant of EMCALI” project’s Letter of Approval from the Colombian DNA, 570HMAVDT-Ministerio de Ambiente, Vivienda y Desarrollo Territorial (Ministry of the Environment, Housing and Territorial Development), has to be provided. The letter of approval from the Colombian DNA, dated 29 April 2008 was received and verified. Furthermore, a clarification letter from the Colombian DNA, dated 20 May 2008, states the correct project’s name according to the published PDD.
3. The project shall assist non Annex I Parties in contributing to the ultimate objective of the UNFCCC.	Kyoto Protocol Art.12.2.	OK	Table 2, Sections A.4.3, B.6.3, B.6.4.
4. The project shall have the written approval of voluntary participation from the designated national authorities of each party involved.	Kyoto Protocol Art.12.5a, Simplified Modalities and Procedures for Small Scale CDM Project Activities §23a	CAR-1 OK	Table 2, Section A.2.3. The “Cañaveralejo Wastewater Treatment Plant of EMCALI” project’s Letter of Approval from the Colombian DNA, 570HMAVDT-Ministerio de Ambiente, Vivienda y Desarrollo Territorial (Ministry of the Environment, Housing and

Requirement	Reference	Conclusion	Cross Reference / Comment
			Territorial Development), has to be provided. The letter of approval from the Colombian DNA, dated 29 April 2008 was received and verified. Furthermore, a clarification letter from the Colombian DNA, dated 20 May 2008, states the correct project’s name according to the published PDD.
5. The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.	Kyoto Protocol Art. 12.5b	OK	Table 2, Section B.6.1.1 and B.6.3.1.
6. Reductions in GHG emissions shall be additional to any that would occur in absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity.	Kyoto Protocol Art. 12.5c, Simplified Modalities and Procedures for Small Scale CDM Project Activities §23a	OK	Table 2, Section B.5.
7. Potential public funding for the project from Parties in Annex I shall not be a diversion of official development assistance (ODA).	Marrakech Accords	OK	Table 2, Section A.4.4. The validation did not reveal any information that indicates that the project can be seen as a diversion of official development assistance (ODA) funding towards Colombia.
8. Parties participating in the CDM shall designate a national authority for the CDM.	Marrakech Accords, CDM Modalities §29	OK	Yes, Colombia has designated the Ministry of Environment, Housing and Territorial Development as Designated National Authority for Colombia.
9. The host country and the participating Annex I Party shall be a Party to the Kyoto Protocol.	Marrakech Accords, CDM Modalities §30	OK	Yes, Colombia has ratified the protocol on 30 November 2001 and is allowed to participate. http://maindb.unfccc.int/public/country.pl?country=CO
10. The participating Annex I Party’s assigned amount	CDM Modalities and	OK	No Annex I party has yet been identified.

Requirement	Reference	Conclusion	Cross Reference / Comment
shall have been calculated and recorded.	Procedures §31b		
11. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7.	CDM Modalities and Procedures §31b	OK	No Annex I party has yet been identified.
12. Comments by local stakeholders shall be invited, a summary of these provided.	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22b	OK	Table 2, Section E The relevant stakeholders have been invited to public meetings. A summary of comments is provided.
13. 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	OK	Table 2, Section D An environmental impact assessment (EIA) is not required for this project activity in Colombia.
14. The proposed project activity shall confirm to one of the project categories defined for small scale CDM project activities and uses the simplified baseline and monitoring methodology for that project category.	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22e	OK	Table 2, Section B.2.
15. The proposed project activity shall meet the eligibility criteria for small scale CDM project activities set out in § 6 (c) of the Marrakesh 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	OK	Table 2, Section A.4.5.
16. 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.	Marrakech Accords, CDM Modalities, §40	OK	The PDD of 10 March 2008 was published for public comments in the period of 02 April 2008 to 01 May 2008 on www.rina.org and comments were invited via the UNFCCC CDM website. No comments were received.
17. The project design document shall be in conformance with the UNFCCC CDM-SCC-PDD format.	Marrakech Accords, CDM Modalities, Appendix B, EB Decisions	OK	PDD is in accordance with CDM-SSC-PDD (version 03 of 22 December 2006).

Table 2 Requirements Checklist

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
A. Introduction of methane recovery and combustion to the existing sludge treatment system <i>The project design is assessed.</i>					
A.1. Methane Recovery in Wastewater Treatment					
A.1.1. Title of the project activity, version number and date of document (PDD).	/1/	DR	The title of the small-scale project activity is “Introduction of the recovery and combustion of methane in the existing sludge treatment system of the Cañaveralejo Wastewater Treatment Plant of EMCALI in Cali, Colombia”, Version 1 of 10 March 2008.	OK	OK
A.2. Introduction of methane recovery and combustion to an existing sludge treatment system					
A.2.1. Is the purpose of the project activity included?	/1/	DR	Yes, the project involves the capture and combustion of methane, present in biogas generated during the process of treatment of sludge in the Wastewater Treatment Plant of Cañaveralejo (PTAR-C), where methane is burned in the internal combustion engine of the electric generator with the purpose of generation of energy for the internal use of the above mentioned Plant.	OK	OK
A.2.2. Is it explained how the project activity reduces greenhouse gas emissions, i.e. technology, measures?	/1/	DR	Yes, the sludge coming from the floatation thickener tanks is redirected to four anaerobic digestion tanks (digesters) with the purpose of obtaining more stable end-product and of capturing and combusting biogas, avoiding greenhouse gas emissions. Basic technical	OK	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			specifications of the biogas flare, water heater, dehumidicator and generator’s engine were presented, as well measures of content of methane (between 57% and 64% according to the latest analyses undergone in PTAR-C).		
A.2.3. Contribution to Sustainable Development. <i>Table 1 - 2</i>					
A.2.3.1. Is the project in line with relevant legislation and plans in the host country?	/1/ /32/		At the time of the development of the proposed CDM, combustion of biogas is not regulated by any national environmental law. EMCALI-PTAR-C has been granted an environment availability permit, usually known as environmental license (MAVDT- Resolution N° 0064, dated 22/02/2002). In Colombia there is no regulation or mandatory policy related to the capture or combustion of for electricity purposes.	OK	OK
A.2.3.2. Is the project in line with host-country specific CDM requirements?	/1/ /25/ /30/		According to the Principles, Requirements and Criteria for the national approval of the projects that apply for CDM (Resolution 0453 of 2004 of the Ministry of Environment, Housing and Territorial Development– Designated National Authority for Colombia /30/), the proposed project activity supports the sustainable development through its contribution to the principles of above mentioned Resolution. Through a Sustainable Development Program, EMCALI is attending to the principles of the above mentioned Resolution. The contribution to the long term improvement of the social and	CAR-1	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			<p>economical well-being of the local communities and the society in general, it is assured by EMCALI's investment in educational and environmental protection programs. The continuation of such programs should be ensured by the creation of the Committee of Sustainable Development integrated by the representatives of the local stakeholders and PTAR-C representatives.</p> <p>The project's activity promotes the implementation of cleaner production by using cleaner equipment, technology, processes and introducing a good practice into the wastewater treatment system.</p> <p>The “Cañaveralejo Wastewater Treatment Plant of EMCALI” project's Letter of Approval from the Colombian DNA, 570HMAVDT-Ministerio de Ambiente, Vivienda y Desarrollo Territorial (Ministry of the Environment, Housing and Territorial Development), has to be provided.</p>		
A.2.3.3. Is the project in line with sustainable development policies of the host country?	/1/ /25/ /30/		See A.2.3.2.	CAR1	OK
A.2.3.4. Will the project create other environmental or social benefits than GHG emission reductions?	/1/ /25/		The contribution to the long term improvement of the social and economical well-being of the local communities and the society in general, it is assured by EMCALI's investment in educational and environmental protection programs. The continuation of such programs should be ensured by the creation of the Committee of Sustainable Development	OK	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			integrated by the representatives of the local stakeholders and PTAR-C representatives. The project's activity promotes the implementation of cleaner production by using cleaner equipment, technology, processes and introducing a good practice into the wastewater treatment system.		
A.3. Project participants.					
A.3.1. Are Party (ies) and private and / or public entities involved in the project activity listed?	/1/	DR	Project participants are Empresas Municipales de Cali, EMCALI, EICE ESP and PricewaterhouseCoopers Ltda.. Please clarify in the proper table (PDD – A.3 table) that Colombia is the host Country and that PricewaterhouseCoopers Ltda is also a private entity.	CL-8	OK
A.3.2. Is the contact information provided in Annex 1 of the PDD, using the (proper table) tabular format?	/1/	DR	Yes, contact information has been provided in the proper tabular format.	OK	OK
A.4. Technical description of the small-scale project activity.					
A.4.1. Is the location of the project activity clearly defined, including details of the physical location and information allowing the unique identification of this small-scale project activity (ies)?	/1/	DR	The “Cañaveralejo Recovery and combustion of methane of EMCALI” project (PTAR-C) in Colombia, is located in the city of Cali, Valle del Cauca Department, within the area of EMCALI. The plant coordinates are: 3° 28' 10.06538" N, 76° 28' 44.03571" W, at 995 meters above sea level.	OK	OK
A.4.2. Is (are) the type(s) and category(ies) and technology/measure of the proposed small-	/1/	DR	Yes. The proposed project activity PDD specifies Project category H-Methane recovery	CL-2 CL-7	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
scale project activity specified?			<p>in wastewater treatment category, Type III - Other project activities and Sectoral Scope 13- Waste handling and disposal.</p> <p>Further explanation and reference to the technology/measure (applicable option and application) of the proposed small-scale project activity is needed.</p> <p>The project participants are requested to describe how environmentally safe and sound technology and know how is being applied by the project activity <i>inter alia</i> technology transfer to Colombia for application in the project activity, as required in the “Guidelines For Completing The Simplified Project Design Document” (CDM-SSC-PDD Version 05 of 14 September 2007).</p>		
A.4.3. Estimated amount of emission reductions over the chosen crediting period.					
A.4.3.1. Is the chosen crediting period, total and annual estimated reductions defined and presented in a (proper table) tabular format? (<i>check these figures against item B.6.4 figures</i>)	/1/ /7/	DR	<p>Yes.</p> <p>The project is expected to reduce CO₂ emissions to the extent of 566,325 tCO₂e (56,632 tCO₂e / year average) over the fixed 10 years crediting period.</p>	OK	OK
A.4.4. Public funding of the project activity.					
A.4.4.1. Is it indicated whether public funding from Parties included in Annex 1 is involved in the proposed project activity?	/1/	DR	Please clarify that no public funding from Parties included in Annex I has been received for the proposed project activity. It's not clear why it has been specified that they're not available.	CL-5	OK
A.4.4.2. If public funding is involved, is information	/1/		See A.4.4.1.	CL-5	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
on sources of public funding for the project activity is provided in Annex 2, including an affirmation that such funding does not result on a diversion of official development assistance and is separate from and is not counted towards the financial obligations of those Parties?					
A.4.5. Confirmation that the SSC project is not a debundled component of a large scale project activity. <i>(Appendix C to the simplified modalities and procedures for the small-scale CDM project activities)</i>					
A.4.5.1 The small scale project activity is not a debundled component of a larger project activity?	/1/ /10/	DR	The proposed project activity is not a debundled component of a large project activity as there is no small scale CDM project activity or an application registered in the same project category and technology/measure in the last two years within 1 km of the project boundary of the proposed small-scale project activity.	OK	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
B. Application of a baseline and monitoring methodology. <i>The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.</i>					
B.1. Baseline and Monitoring Methodology. <i>It is assessed whether the project applies an appropriate baseline & monitoring methodology (number, title and version). “Appendix B of the Simplified Modalities and Procedures for Small-Scale CDM project activities”.</i>					
B.1.1. Is the selected baseline and monitoring methodology previously approved by the CDM Methodology Panel and in line with the relevant project category?	/1/ /9/	DR	The project applies the following approved small scale baseline methodology: AMS III.H - “Methane Recovery in Wastewater Treatment”, Version 09 of 28 March 2008.	OK	OK
B.1.2. Is the baseline and monitoring methodology applicable to the project being considered?	/1/ /9/	DR	<p>Yes. The proposed project activity falls under Project category H-Methane recovery in wastewater treatment category, Type III - Other project activities and Sectoral Scope 13-Waste handling and disposal and qualifies as a small scale CDM project activity as the annual estimated emission reductions (56,632 tCO₂e) result in emission reductions of less than or equal to 60 ktCO₂e annually (type III project activities).</p> <p>This methodology category is applicable as the project recovers methane from biogenic organic matter in wastewaters by means of the introduction of methane recovery and combustion to an existing sludge treatment system (option iii).</p>	OK	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
B.1.3. Are other methodologies or tools drawn up by the approved methodology mentioned?	/1/ /9/ /12/	DR	Yes, the “Tool to determine project emissions from flaring gases containing methane” (EB 28 Meeting report-Annex 13).	OK	OK
B.2. Justification of the choice of the project category					
B.2.1. Does the project qualify as a small scale CDM project activity as defined in Decision 1/CMP.2, paragraph 28 – “Further guidance relating to the CDM” (revision of paragraph 6 (c) of decision 17/CP.7 on the modalities and procedures for the CDM)?	/1/	DR / I	Yes. The “Cañaderalejo Recovery and combustion of methane of EMCALI” project is within the eligibility requirements of the baseline methodology since the annual estimated emission reductions (56,632 tCO ₂ e) result in emission reductions of less than or equal to 60 ktCO ₂ e annually (type III project activities).	OK	OK
B.2.2. Does proposed project activity confirm to one of the project categories defined for small scale CDM project activities?	/1/ /9/	DR / I	Yes. The proposed project activity confirms as a Project category H-Methane recovery in wastewater treatment category, Type III - Other project activities.	OK	OK
B.3. Description of the project boundary.					
B.3.1. Are the project’s spatial (geographical) boundaries clearly defined?	/1/	DR / I	The proposed project boundary is the physical, geographical site where the wastewater and sludge treatment takes place.	OK	OK
B.3.2. Are the project’s system (components and facilities used to mitigate GHGs) boundaries clearly defined and do they sufficiently cover sources for baseline emissions?	/1/	DR / I	Please clarify the system boundaries of the project and provide a complete technical description of the included equipments, particularly of flare(s).	CL-9	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
B.4. Description of how baseline scenario is identified. Baseline Determination. <i>The choice of baseline will be validated with focus on whether the baseline is a likely scenario, whether the project itself is not a likely baseline scenario, and whether the baseline is complete and transparent.</i>					
B.4.1. Is the application of the methodology and the discussion and determination of the chosen baseline scenario transparent?	/1/ /9/	DR / I	The baseline was determined as paragraph 23-(iii) The existing sludge treatment system without methane recovery and combustion, from methodology AMS III.H - “Methane Recovery in Wastewater Treatment”, Version 09 of 28 March 2008.	OK	OK
B.4.2. Has the baseline been determined using conservative assumptions where possible?	/1/ /9/	DR / I	See B.4.1.	OK	OK
B.4.3. Has the baseline been established on a project-specific basis?	/1/	DR	See B.4.1.	OK	OK
B.4.4. Does the baseline scenario sufficiently take into account relevant national and / or sectoral policies, macro-economic trends and political aspirations?	/1/	DR	Further information on Colombia policies and circumstances relevant to the baseline is needed.	CL-10	OK
B.4.5. Is the baseline determination compatible with the available data?	/1/	DR / I	See B.4.2.	OK	OK
B.4.6. Does the selected baseline represent the most likely scenario among other possible and/or discussed scenarios?	/1/	DR / I	See B.4.1.	OK	OK
B.4.7. Have the major risks to the baseline been identified? (<i>Are uncertainties in the GHG emission estimates properly addressed in the documentation?</i>)	/1/	DR / I	The calculation of the sludge generated is related to the amount of influent wastewater and to its quality in terms of Total Suspended Solids. Both these parameters are characterized	CL-12	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			by evaluation and measurement uncertainty. Moreover, it has been demonstrated that digester performances (biodegradation kinetic, biogas production and methane yield) are highly sensitive to operational conditions, such as temperature and the organic loading rate, as well as to the characteristics of the influent sludge. Therefore, the quality of the feed and the operational conditions could influence the methane emission potential and the baseline. Further information is needed on how the risks to the baseline calculation due to the uncertainties in sludge generation and methane emission potential of the sludge treatment system have been taken into account.		
B.4.8. Is all literature and sources clearly referenced?	/1/	DR	Yes, all literature and sources are clearly referenced.	OK	OK
B.4.9. Background information or documentation, including tables with time series data, documentation of measurement results and data sources are properly addressed? (<i>check Annex 3</i>)	/1/	DR	Yes, in Table 8: “The flow and charges of influent wastewater entering the PTAR-C due to new inversions” and Table 2: “Average percentage of dry matter in untreated sludge 2006”. Please provide a series of data from 2007 and 2005 (from the last 3 years), in addition to the 2006 table, for the average of the “dry matter” parameter.	CL3	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered CDM project activity (<i>Assessment and demonstration of additionality</i> - “Attachment A to Appendix B of the simplified modalities and procedures for small-scale CDM project activities”).					
B.5.1. Does the PDD follow all the steps required in the methodology to determine the additionality? (<i>Is an approved additionality tool required / used?</i>)	/1/ /11/	DR / I	Yes, the PDD follows all the steps required in the “Attachment A to Appendix B of the simplified modalities and procedures for small-scale CDM project activities”.	OK	OK
B.5.2. Is the discussion on the additionality clear and have all assumptions been conservative, supported by transparent and documented evidence for all steps?	/1/ /11/	DR / I	<p>The project’s additionality is demonstrated by project participants as per the “Attachment A to Appendix B of the simplified modalities and procedures for small-scale CDM project activities”, through an explanation of the following barriers: (a) technological barriers and (b) barriers due to prevailing practice, to show that the project activity would not have occurred anyway due to at least one of the mentioned barriers.</p> <p>The barriers faced by the project and assessed by RINA are:</p> <p>(a) <i>Technological barriers:</i></p> <p>The project argues that difficulties due to the variation in the humidity of biogas and stabilization of the generators needed the support of specialized technical staff from Mitsubishi in order to start up the project activity as well as to develop the internal</p>	CAR-2	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			<p>technical capacity of PTAR-C staff for the adequate functioning of the generation system.</p> <p><i>(b) Barriers due to prevailing practice:</i></p> <p>The project rises that the PTAR-C renewable energy (biogas) power generation plant will be one of the first biogas combustion systems in a Colombian wastewater treatment plant, aiming to reduce greenhouse gas emissions. It has been verified that there is no binding regulation that imposes the capture and combustion of biogas in Colombia. The project activity is not common practice in the proposed area of implementation.</p> <p>Please clarify project alternatives (Section B.5). Furthermore, presented barriers analysis needs more elaboration (574H“Attachment A to Appendix B of the simplified modalities and procedures for small-scale CDM project activities”).</p>		
B.5.3. Is it demonstrated / justified that the project activity itself is not a likely baseline scenario? <i>(e.g. through (a) a flow-chart or series of questions that lead to a narrowing of potential baseline options, (b) a qualitative or quantitative assessment of different potential options and an indication of why the non-project option is more likely, (c) a qualitative or quantitative assessment of one or more barriers facing the proposed project activity or (d) an indication that the project type is not common practice in the proposed area of</i>	/1/ /11/	DR / I	<p>The project activity is not common practice in the proposed area of implementation, and not required by Colombia’s legislation/regulations. Please see B.5.2.</p>	CAR-2	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
<i>implementation, and not required by a Party's legislation/regulations)</i>					
B.5.4. If the starting date of the project activity is before the date of validation, is the evidence for the consideration that the incentive from CDM was seriously considered in the decision to proceed with the project activity, provided, adequate and sufficient to justify it?	/1/ /11/ /13/ /14/	DR / I	The project's starting date is defined as 08/11/2004. Evidences that the incentive from the CDM was seriously considered are the Official letter no. 300700-063-01 from EMCALI Strategic Programs Department (CDM Cogeneration meeting suggestion), dated 8 June 2001 and the Official letter no.300000-GAA-1376-03 - “CDM Methane capture and recovery projects – viability consultation” from the EMCALI Water and Sewer System Manager to the Ministry of Environment, Housing and Territorial Development, dated 2 July 2003. The project proponent is requested to confirm and provide evidences of the starting date of the project activity, defined as 579H08/11/2004.	CAR-5	OK
B.5.5. Is the above evidence based on official, legal and / or other corporate document that was available at, or prior to, the start of the project activity?	/1/ /11/	DR / I	See B.5.4.	CAR-5	OK
B.6. Emission Reductions. <i>Validation of baseline GHG emissions will focus on methodology transparency and completeness in emission estimations.</i>					
B.6.1. Explanation of methodological choices.					
B.6.1.1. Have the project, baseline and leakage emissions and emission reductions been properly explained and determined using the	/1/ /7/ /9/ /19/	DR	Yes, methane emissions through the presence of degradable organic carbon in the sludge treatment system, methane emissions from the	OK	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
same appropriate methodology and conservative assumptions?			decay of the sludge generated by the treatment systems and methane fugitive emissions through inefficiencies in capture and flare systems were properly explained.		
B.6.1.2. Does the proposed project clearly state which equations for the calculation of emission reductions are used, as given by the approved / applied methodology?	/1/ /9/ /12/	DR	Yes, the proposed project clearly used the same equations as that given by the approved methodology and mentioned tools.	OK	OK
B.6.1.3. Are the demonstration / justification for the choice of the chosen scenario (for example, in ACM0006) or case, option / method (for example in ACM0002) adequate and sufficient?	/1/	DR	The proposed project activity falls under option (iii), as it opts to recover and combust methane generated in the sludge digestion tanks already existing in the wastewater treatment plant of the project category.	OK	OK
B.6.1.4. Are the demonstration / justification for the chosen default values adequate and sufficient?	/1/	DR/I	Please provide a series of data from 2007 and 2005 (from the last 3 years), in addition to the 2006 table, for the average of the “dry matter” parameter.	CL-3	OK
B.6.2. Data and parameter those are available at validation. <i>Data that is calculated with equations provided in the methodology or default values specified in the methodology should not be included in the compilation.</i>					
B.6.2.1. Is the list of the <i>ex-ante</i> data and parameters used by the project -including data from other sources- complete, transparent, documented and available? (<i>measurements after the implementation of the project activity should not need to be included here but in the tables in section B.7.1</i>)	/1/ /12/	DR/I	Yes, the flow of wastewater entering the plant (m ³ /year), the dry matter in primary sludge (%), the average concentration of SST in wastewater entering the plant in 2004 – 2006 (kg/m3), as well the population projection were provided.	OK	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
B.6.2.2. Is the chosen value or, where relevant, the qualitative information for each supporting data or parameter(s) provided in a (proper table) tabular form and the choice for the source of data explained / justified with clear and transparent references or additional documentation? (<i>check Annex 3</i>)	/1/	DR/I	Please provide a series of data from 2007 and 2005 (from the last 3 years), in addition to the 2006 table, for the average of the “dry matter” parameter.	CL-3	OK
B.6.2.3. If values were measured, a description of measurement methods and procedures (standards), indicating the responsible(s) for carrying out the measurement(s), dates and results of measurement(s) was provided? (<i>check Annex 3</i>)	/1/	DR/I	The flow and charges of influent wastewater entering the PTAR-C and the average percentage of dry matter in untreated sludge from 2006 were presented in tables Please provide a series of data from 2007 and 2005 (from the last 3 years), in addition to the 2006 table, for the average of the “dry matter” parameter. Please, provide the description of measurements methods and procedures as well the responsible for carrying out the measurements of the flow and charges of influent wastewater entering the PTAR-C due to new inversions and the average percentage of dry matter in untreated sludge.	CL-3 CAR-3	OK
B.6.3. <i>Ex-ante</i> calculation of emission reductions. Table 1 - 1, 3					
B.6.3.1. Is the <i>ex-ante</i> calculation of the expected project, baseline and leakage emissions transparent, conservative, accurate, and documented and as per the approved / applied methodology (equations) of the project activity?	/1/ /7/ /12/	DR / I	The project is within the eligibility requirements of the baseline methodology since the annual estimated emission reductions (56,632 tCO ₂ e) result in emission reductions of less than or equal to 60 ktCO ₂ e annually (type III project activities).	CL-18	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			Please clarify the calculations according to the 608H “Tool to determine project emissions from flaring gases containing methane” 609H(EB 28 Meeting report-Annex 13)(610H(EB 28 Meeting report-Annex 13)) is needed (seven steps shall be applied and clearly mentioned). Furthermore, variables / parameters names and symbols should be named according to the applicable methodology, tool and guidelines.		
B.6.3.2. Sufficient background information and / or data to assess the calculation(s) and enable its reproduction, including electronic files (i.e. spreadsheets), was provided? (<i>check Annex 3</i>)	/1/	DR / I	Please provide a series of data from 2007 and 2005 (from the last 3 years), in addition to the 2006 table, for the average of the “dry matter” parameter. See B.4.9.	CL-3	OK
B.6.4. Summary of <i>ex-ante</i> estimation of emission reductions. Table 1 - 1, 3					
B.6.4.1. Is all <i>ex-ante</i> estimation of emission reductions summarized in a (proper table) tabular form for all years of the crediting period? (<i>Check against A.4.3.1 figures</i>)	/1/	DR	Estimation of emission reductions is summarized in a proper tabular. Please clarify the calculation of the attended population reduction (e.g., 25% in 2008) and of the wastewater entry flow projections.	CL-16	OK
B.7. Application of monitoring methodology and description of the monitoring plan.					
B.7.1. Data and parameters monitored. (<i>background documentation in Annex 4</i>)					
B.7.1.1. Specific information on how the data and parameters that need to be monitored would actually be collected during monitoring for the project activity is provided? (<i>measurements after the implementation of</i>	/1/	DR / I	The collecting procedures are properly described for all the monitored data and parameters.	OK	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
<i>the project activity should be included here)</i>					
B.7.1.2. Are all the parameters and its sources of data reliable, specified and documented in a (proper table) tabular form?	/1/	DR / I	Yes, the parameters were specified and documented in a (proper table) tabular form.	OK	OK
B.7.1.3. Where data or parameters are supposed to be measured, are measurement methods and procedures, including a specification of which accepted industry standards or national or international standards will be applied, specified?	/1/	DR / I	Yes, measurement methods and procedures, including a specification of which accepted industry standards were applied, were specified.	OK	OK
B.7.1.4. Are the measuring instruments / equipments, measurement methods, accuracy and interval, measurement responsible(s) and calibration procedures specified?	/1/	DR / I	Yes, measuring instruments / equipments, measurement methods, accuracy and interval, measurement responsible(s) and calibration procedures were specified.	OK	OK
B.7.1.5. Are the QA / QC procedures applied described and complying with existing good practice? <i>(The parameters related to the performance of the project will be monitored using meters and standard testing equipment, which will be regularly calibrated following standard industry practices)</i>	/1/	DR / I	Yes, the QA / QC procedures applied were described and comply with existing good practice.	OK	OK
B.7.2. Description of monitoring plan. <i>The monitoring plan review aims to establish whether all relevant project aspects deemed necessary to monitor and report reliable emission reductions are properly addressed.</i>					
B.7.2.1. Is the monitoring methodology previously approved by the CDM Methodology Panel?	/1/ /9/	DR / I	The project applies the approved simplified monitoring methodology for selected small-scale CDM project activity categories, AMS	OK	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			III.H - “Methane Recovery in Wastewater Treatment”, Version 09 of 28 March 2008, for Type III – Other project activities and Sectoral Scope 13- Waste handling and disposal.		
B.7.2.2. Is the monitoring methodology the one deemed most applicable for this project and is the appropriateness justified?	/1/	DR / I	This methodology category is applicable as the project recovers methane from biogenic organic matter in wastewaters by means of the introduction of methane recovery and combustion to an existing sludge treatment system (option iii). See B.2.1.	OK	OK
B.7.2.3. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas emissions within the project boundary during the crediting period?	/1/	DR / I	Please, include those parameters to be monitored: 1) The degradable carbon content of the wastewater and/or sludge before and after treatment (Cody, untreated, CODy,ww,treated, Cody, removed, DOCy,s,untreated, DOCy,s,treated), and 2) The flow of wastewater and/or sludge treated (Qy,ww, Sy, final and Sy,untreated).	CAR-4	OK
B.7.2.4. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	/1/	DR / I	There are no specific leakages to be considered for this project activity as per the AMS III.H - “Methane Recovery in Wastewater Treatment”, Version 09 of 28 March 2008.	OK	OK
B.7.2.5. Is the authority and responsibility of project management clearly described?	/1/	DR / I	Management structure of monitoring plan is clearly described (Figure 6).	OK	OK
Is the authority and responsibility for registration, monitoring, measurement and reporting clearly described?	/1/	DR / I	The authority and responsibility for registration, monitoring, measurement and reporting is clearly described. The Director of PTAR-C will be responsible for	OK	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			the coordination and approval of the Monitoring and Verification Plan (MVP) that will be managed by the following four areas of the PTAR-C: Instrumentation, Process, Mechanical and Electricity. The organizational structure, authority and responsibilities for measuring, recording, reporting, monitoring, and controlling of the monitored parameters and review of performance have been clearly defined. All data will be archived in both paper and electronic format until two years after the crediting period. Back-up of data is clearly defined.		
B.7.2.6. Are procedures identified for training of monitoring personnel?	/1/	DR / I	It's not clear whether any procedure has been identified for training of monitoring personnel (operation, maintenance, calibration and monitoring of equipments and installation under project activity).	CL-11	OK
B.7.2.7. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/	DR / I	Yes, emergency operation of the flares and water heater were identified.	OK	OK
B.7.2.8. Does the monitoring plan reflect good monitoring and reporting practices?	/1/	DR / I	It's not clear whether the monitoring plan reflects good monitoring and reporting practices.	CL-13	OK
B.7.2.9. Is the discussion and selection of all required monitoring parameters and / or data variables (for example, project emissions, project electricity generation, baseline grid / captive power emission factor) of the	/1/	DR / I	No, see B.7.2.3.	CAR-4	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
monitoring plan according to the approved / applied methodology transparent?					
B.8. Date of completion of the application of the baseline and monitoring methodology and the name of responsible person(s) / entity(ies).					
B.8.1. Is the date of completion of the application of the methodology to the project activity provided and mentioned in the format <i>DD / MM / YYYY</i> ?	/1/	DR / I	Yes, the date of completion of the application of the methodology to the project activity is 22/10/2007.	OK	OK
B.8.2. Is the contact information of the person(s) / entity(ies) responsible for the baseline and monitoring methodology to the project activity provided? <i>If applicable, are they indicated as project participants in Annex 1?</i>	/1/	DR / I	The contact information of the person(s) / entity(ies) responsible for the baseline and monitoring methodology to the project activity is provided and the responsible are: PTAR-C and PricewaterhouseCoopers Ltda.. They are indicated in Annex 1.	OK	OK
C. Duration of the Project activity / Crediting Period. <i>It is assessed whether the temporary boundaries of the project are clearly defined.</i>					
C.1. Duration of project activity.					
C.1.1. Starting date of project activity.					
C.1.1.1. Is the project's activity starting date (implementation, construction or real action) clearly defined and reasonable?	/1/	DR / I	The project's starting date is defined as 08/11/2004. The project proponent is requested to confirm and provide evidences of the starting date of the project activity, defined as 579H08/11/2004.	CAR-5	OK
C.1.1.2. If the project activity started between 01 January 2000 and 31 December 2005, a documented evidence for the project's starting date is provided?	/1/	DR / I	See C.1.1.1.	CAR-5	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
C.1.2. Expected operational life time of the project.					
C.1.2.1. Is the project's operational lifetime (mentioned in years and months) clearly defined and reasonable? (<i>check against crediting period and equipment lifetime</i>)	/1/	DR / I	The expected operational lifetime of the project is 25 years, and deemed reasonable. Please, provide further information on project's equipments lifetime.	CL-4	OK
C.2. Choice of crediting period. <i>The crediting period may only start after the date of registration of the proposed activity as a CDM project activity.</i>					
C.2.1. Is the chosen crediting period clearly defined (mentioned in years and months) and its starting date mentioned in the format <i>DD / MM / YYYY</i> ? (<i>renewable crediting period of seven years with two possible renewals or fixed crediting period of 10 years with no renewal</i>)	/1/	DR / I	A fixed 10 years crediting period, with no renewal, was selected, starting on 01/06/2008. The project selects a fixed crediting period of 10 years starting from 594H01/06/2008. As the crediting period may only start after the date of registration of the proposed activity as a CDM project activity, project participants should confirm that the crediting period will only start after the date of registration.	CL-6	OK
D. Environmental impacts. <i><u>If required by the host party</u>, documentation on the analysis of the environmental impacts will be assessed, and if deemed significant, an EIA should be provided to the Validator.</i>					
D.1. Documents on Environmental impacts, including transboundary impacts.					
D.1.1. Has an analysis of the environmental impacts of the project activity been sufficiently described?	/1/	DR / I	An independent evaluation of the positive and negative environmental as well as the social and technological impacts of the proposed project activity of biogas capture and	CL-17	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			combustion in the installations of the PTAR-C has been performed in October 2006. Five environmental aspects of the product activity have been identified. These relate to water, air quality, other contaminants, ground conditions and biodiversity. None of these are of significance in the context of the project. For its implementation purposes the Gold Standard criteria, tailored to the projects of biogas capture and high efficiency combustion, were followed. Further information on the independency of the impacts evaluation is requested.		
D.1.2. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved?	/1/ /32/ /33/	DR / I	By means of the Resolution 0064 of 2002 of the Ministry of Environment, EMCALI is authorized to execute the changes with relation to the definite designs of the Cañaveralejo Wastewater Treatment Plant. The last assessment of the Wastewater Treatment Plant of Cañaveralejo is evidenced by an Environmental Audit Report (“Informe de Interventoria Ambiental”, dated December 2006) covering the period February-July 2006, that, among other things, verified the attendance to the Environmental Management Plan and Monitoring Program. An environmental impact assessment (EIA) is not required for this project activity in Colombia. Please provide evidences (date of completion)	CL-1	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			of the project activity impacts’ assessment.		
D.1.3. Will the project create any adverse environmental effects?	/1/	DR / I	The Environment Management Plan is comprised of different activities that have been accomplished in conformity with the advance performance of the various stages of the PTAR-C project. None of them makes direct reference to negative impacts in connection with the biogas capture and combustion.	OK	OK
D.1.4. Are transboundary environmental impacts considered in the analysis?	/1/ /32/	DR	No transboundary impacts have been envisaged from this project activity. The project proponent is requested to include considerations about transboundary environmental impacts in the PDD.	CL 14	OK
D.1.5. Have identified environmental impacts been addressed in the project design?	/1/ /32/	DR / I	The project has already received a “No-objection letter” /4/ from the Ministry of the Environment, Housing and Territorial Development of Colombia (the Colombian DNA), dated 09 January 2007 which states that the Ministry has no objection to the project. An independent evaluation of the positive and negative environmental as well as the social and technological impacts of the proposed project activity of biogas capture and combustion in the installations of the PTAR-C has been performed in October 2006 (PDD-item D.1, table 5). Five environmental aspects of the product activity have been identified. These relate to water, air quality, other contaminants, ground conditions and biodiversity. None of these are of significance in the context of the project. For its	OK	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			implementation purposes the Gold Standard criteria, tailored to the projects of biogas capture and high efficiency combustion, were followed.		
D.1.6. Does the project comply with the environmental legislation in the host country?	/1/	DR / I	Further information on Colombia policies and circumstances relevant to the baseline is needed. Please, see item B.4.4.	CL-10	OK
E. Stakeholders' comments. <i>The Validator should ensure that stakeholders' comments have been invited and that due account has been taken of any comments received.</i>					
E.1. Description of how comments by local stakeholders have been invited and compiled. <i>The local stakeholder process shall be completed before submitting the proposed project activity to a DOE for validation.</i>					
E.1.1. Have relevant stakeholders been consulted / invited for comments?	/1/ /25/	DR / I	The communities' representatives, entities and other participants have been invited to public meetings. The invited list and attendance list is presented.	OK	OK
E.1.2. If a stakeholder consultation process is required by regulations / laws in the host country, has the stakeholders' consultation process been carried out in accordance with such regulations / laws?	/1/ /25/ /30/	DR / I	According to the Resolution 0453 of 2004 of the Ministry of Environment, Housing and Territorial Development /30/, as one of the requirements to apply for the Letter of Approval, the project should demonstrate that local stakeholders were invited for comments. Nonetheless, there is no definition of what specific (or minimum) local stakeholders should be invited.	OK	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
E.1.3. Was the stakeholders' consultation process conducted, within a reasonable time for comments submission, in an open and transparent manner to facilitate comments and properly described?	/1/ /25/	DR / I	<p>The stakeholder consultations have been carried out through two public meetings, carried out in the beginning of the year 2007 and on 28 May 2007, at the project site.</p> <p>The most representative leaders from the surrounding communities attended the 28 May 2007 meeting, evidenced by Minutes of meeting /25/ (Reunión MDL) dated 28/05/2007. The meeting was complemented with a visit to the PTAR-C facilities. The invitation was also extended to institutions, such as: DAGMA (Departamento Administrativo de Gestión del Medio Ambiente de Cali - environmental authority of Cali), Climate Change Mitigation Group from the Ministry of Environment, Housing and Territorial Development, and the Carvajal Foundation. No negative comments or worries specifically related the proposed project activity were received.</p>	OK	OK
E.2. Summary of comments received.					
E.2.1. Are the stakeholders who made comments identified (addresses provided / available)?	/1/ /25/	DR / I	<p>The stakeholders who made comments have been identified.</p> <p>Please: (a) provide evidences of invitations to the Institutions (local stakeholders meetings); (b) clarify/revise the meeting date May 28, 2006 mentioned in PDD – E.2.</p>	CL-15	OK
E.2.2. The summary of the stakeholders' comments received is provided / available?	/1/ /25/	DR / I	Yes.	OK	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
E.3. Report on how due account was taken of any comments received.					
E.3.1. Has due account been taken of any stakeholders' comments received?	/1/ /25/	DR / I	Yes, there were no negative comments or worries about the project that may require a decision taking action plan from EMCALI for the project planning or operation stages.	OK	OK
Annex 1. (contact information on project participants)					
• Are the Names of all organization given? (as listed in section A.3)	/1/	DR	Yes.	OK	OK
• Name of contact person, Street, City, Post fix / ZIP, Country, Telephone Fax or e-mail <u>mandatory fields</u> are filled?	/1/	DR	Yes.	OK	OK
Annex 2. (Information regarding public funding)					
• Is information from Parties included in Annex I on sources of public funding for the project activity provided?	/1/	DR	Please clarify that no public funding from Parties included in Annex I has been received for the proposed project activity. It's not clear why it has been specified that they're not available.	CL-5	OK
• Does the information provided above include an affirmation that such funding does not result in a diversion of ODA and is separate from and is not counted towards the financial obligation of those Parties?	/1/	DR	See above item.	CL-5	OK
Annex 3. (Baseline information).					
• Is any needed further background information used in the application of the baseline methodology, i.e. tables with time series data, documentation of measurement results and data sources, provided?	/1/	DR	Please provide a series of data from 2007 and 2005 (from the last 3 years), in addition to the 2006 table, for the average of the “dry matter” parameter. See B.4.9.	CL-3	OK
Annex 4. (Monitoring information)					

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
<ul style="list-style-type: none"> Is any needed further background information used in the application of the monitoring methodology, i.e. tables with time series data, documentation of measurement results and data sources, provided? 	/1/	DR	NA. Please see item B.7.	OK	OK

Table 3 Resolution of Corrective Action and Clarification Requests

Draft report clarifications and corrective action requests	Ref. to table 2	Summary of project participants' response	Validation team conclusion
CAR-1 The “Cañaveralejo Wastewater Treatment Plant of EMCALI” project’s Letter of Approval from the Colombian DNA, MAVDT-Ministerio de Ambiente, Vivienda y Desarrollo Territorial (Ministry of the Environment, Housing and Territorial Development), has to be provided.	Table1 - 2 and 4 A.2.3.2	The LoA is being attached to the present table. According to the changes suggested by RINA to the original version of the LoA, the additional letter with clarifications of DNA is also being attached to the present table. Please see attachment “CAR 1_III.H”.	The letter of approval from the Colombian DNA, dated 29 April 2008 was received and verified. Furthermore, a clarification letter from the Colombian DNA, dated 20 May 2008, states the correct project’s name according to the published PDD. This CAR is therefore closed.
CAR-2 Please clarify project alternatives (Section B.5). Furthermore, presented barriers analysis needs more elaboration (“Attachment A to Appendix B of the simplified modalities and procedures for small-scale CDM project activities”).	B.5.2	The text was reviewed in section B.5. of the PDD “Demonstration of additionality of a proposed CDM project activity”. See the attachment to the present table “CAR 2_III.H”.	Revised text clearly identifies project alternatives and barriers analysis were presented in a more elaborated way and considered appropriate. No investment barrier(s) have been presented but, considering that: (a) more than one of the presented barriers were considered appropriate, (b) that the “Attachment A to Appendix B of the simplified modalities and procedures for small-scale CDM project activities” states that project participants shall provide an explanation to show that the project activity would not have occurred anyway <u>due to at least one of the following barriers</u> : Investment, Technological, Prevailing practice or Other and (c) that a CDM project is additional if anthropogenic emissions of greenhouse gasses by sources are reduced below those that would have occurred in the absence of the registered CDM project activity (the presented

Draft report clarifications and corrective action requests	Ref. to table 2	Summary of project participants' response	Validation team conclusion
			alternative 1), the absence of the investment barrier should not change the result of the additionality assessment. This CAR is therefore closed.
CAR3 Please, provide the description of measurements methods and procedures as well the responsible for carrying out the measurements of the flow and charges of influent wastewater entering the PTAR-C due to new inversions and the average percentage of dry matter in untreated sludge.	B.6.2.3	<p>The estimation of the amount of the inflow wastewater entering the PTAR-C due to new inversions was based on the extensive study elaborated by the Planning Department of EMCALI “Sanitation and wastewater management plan for the years 2007-2016”. This study was conducted in accordance with the requirements of the Ministry of Environment, Housing and Territorial Development of Colombia.</p> <p>The study in its section 7 “Decontamination goal” provides an explanation on the three components used for the determination of the inflow wastewater to the PTAR-C in the period of 2007-2016. The three components mentioned above are: (1) definition of the decontamination projects, (2) evaluation of the growth of the population of Cali in the following years and (3) the identification of the optimization and maintenance activities in the city.</p> <p>The inflow quantities for the baseline calculations were taken from the table 7.17, p. 288 of a mentioned above study.</p>	Complementary explanations and procedures (LAR-PTA-007 and 008) were provided to RINA’s satisfaction. This CAR is closed.

Draft report clarifications and corrective action requests	Ref. to table 2	Summary of project participants' response	Validation team conclusion
		<p>It needs to be emphasized that the increase of wastewater inflow is NOT due to the activity of the proposed CDM project but due to the three components already mentioned above inherent to the development of the city of Cali.</p> <p>To preserve a conservative approach and taking into consideration the risks to the baseline calculation, a 2% uncertainty level over the initial projections provided in the “Sanitation and wastewater management plan for the years 2007-2016” was adopted for the years 2009-2018 and 25% in the year 2008.</p> <p>The inflow wastewater to the PTAR-C is and will be measured directly on the entrance to the Plant. The data will be stored digitally in SCADA (Control and Acquisition Data System) – for the description of the system please refer to Section B.7.2 of the PDD. The systems security is guaranteed by a multilevel password.</p> <p>All the measurements of COD and BOD in the inflow and effluent wastewater as well as the measurement of dry matter in untreated sludge are made by the Laboratory of the PTAR-C. The person in charge of the mentioned above measurements is the Administrative</p>	

Draft report clarifications and corrective action requests	Ref. to table 2	Summary of project participants' response	Validation team conclusion
		Analyst of the Laboratory of the PTAR-C. Procedures and methods of the measurement of the charges of the influent and effluent wastewater are being attached to the present table “CAR 3_III.H”.	
CAR 4 Please, include those parameters to be monitored: 1) The degradable carbon content of the wastewater and/or sludge before and after treatment (Cody, untreated, CODy,ww,treated, Cody, removed, DOCy,s,untreated, DOCy,s,treated), and 2) The flow of wastewater and/or sludge treated (Qy,ww, Sy, final and Sy,untreated).	B.7.2.3 B.7.2.9	Please refer to the explanation given in the attachment “CAR 4_III.H”.	The explanations adequately describes that the technology implemented does not employ any changes into the anaerobic treatment system of sludge neither of wastewater as consists exclusively of the equipment installed after the process of anaerobic sludge treatment is completed and therefore, the technology introduced does not influence in any way the amount of methane produced per unit of COD removed in comparison with the baseline situation which in other words means that the efficiency of the anaerobic digesters' is not influenced by the introduction of the technology of the CDM project activity. The mentioned parameters though do not need to be monitored and this CAR is closed.
CAR 5 The project proponent is requested to confirm and provide evidences of the starting date of the project activity, defined as 08/11/2004.	B.5.4 C.1.1.1	See the description of the starting date of the project activity given in the attachment “CAR 5_III.H” (word file) and other supports to this description in folder “CAR 5_III.H” Please see the evidence of the starting date in “CAR 5_III.H” (pdf file).	The project proponent has confirmed 02 July 2003 as the project's starting date. Official letter no.300000-GAA-1376-03 - “CDM Methane capture and recovery projects – viability consultation” from the EMCALI Water and Sewer System Manager to the Ministry of Environment,

Draft report clarifications and corrective action requests	Ref. to table 2	Summary of project participants' response	Validation team conclusion
			Housing and Territorial Development, dated 02 July 2003 is presented as project's starting date evidence and considered appropriate. This CAR is closed.
CL1 Please provide evidences (date of completion) of the project activity impacts' assessment.	D.1.2	The following text was added in section D.1 of the PDD. PricewaterhouseCoopers Ltda., as an independent and advisory entity for the development of this CDM project, evaluated in October 2006 the positive and negative environmental, social and technological impacts of the proposed project activity of biogas capture and combustion in the installations of the PTAR-C. The outcome of the study is presented in the table 5 of the PDD. For its implementation purposes the Gold Standard criteria, tailored to the projects of biogas capture and high efficiency combustion, were followed.	Clarifications and PDD additions at section D.1 considered appropriate. This CL is closed
CL2 Further explanation and reference to the technology/measure (applicable option and application) of the proposed small-scale project activity is needed.	A.4.2	The following clarification was added in section A.4.2 of the PDD. “The proposed project activity conforms to the measures that recover methane from biogenic organic matter in wastewaters by means of the “Introduction of methane recovery and combustion to an existing sludge treatment system” according to the option (iii) of the approved	Clarifications and PDD additions at section A.4.2 considered appropriate. This CL is closed.

Draft report clarifications and corrective action requests	Ref. to table 2	Summary of project participants' response	Validation team conclusion
		<p>methodology Methane Recovery in Wastewater Treatment (AMS III.H, Version 09, Scope 13, Mar 28, 2008).”</p> <p>The recovered methane from the above measure will be utilized for the direct electrical energy generation, conform to the application (a) of the approved methodology Methane Recovery in Wastewater Treatment (AMS III.H, Version 09, Scope 13, Mar 28, 2008). In abnormal condition biogas will be combusted in flares or water heater.</p>	
<p>CL3</p> <p>Please provide a series of data from 2007 and 2005 (from the last 3 years), in addition to the 2006 table, for the average of the “dry matter” parameter.</p>	<p>B.4.9 B.6.1.4 B.6.2.2 B.6.2.3 B.6.3.2 Annex 3</p>	<p>The table with the data of “dry matter” of 2007 is being attached to the present table together with the original source of the data of the PTAR-C “CL 3_III.H” – excel file. The data of the year 2005 are not representative because the Plant had not been still in the real operation. The Plant had been in the process of stabilization. Therefore, the data of the year 2005 and earlier were not taken into consideration when preparing the PDD of the proposed project activity.</p>	<p>2007 data received and considered appropriate.</p> <p>As a result of the request, calculations were revised applying a new average value (%DM) of 1,210 instead of the previous one of 1,066.</p> <p>Clarifications provided to RINA’s satisfaction.</p> <p>This CL is closed.</p>
<p>CL4</p> <p>Please, provide further information on project’s equipments lifetime.</p>	<p>C.1.2.1</p>	<p>The information on the project’s equipment lifetime is being attached to the current table “CL 4_III.H”</p> <ul style="list-style-type: none"> - Waukesha engine of the electric generator – reply of the official representative of Waukesha Engine Dresser in Colombia 	<p>Clarifications provided to RINA’s satisfaction.</p> <p>This CL is closed.</p>

Draft report clarifications and corrective action requests	Ref. to table 2	Summary of project participants' response	Validation team conclusion
		<p>(PEGSA Ltda): <u>20 and more years</u> of the lifetime of the equipment</p> <ul style="list-style-type: none"> - Water heater – official reply of the producer (Kayanson Engineers): <u>25 years</u> of the lifetime of the equipment - Enclosed flares – reply of one of the distributors of the enclosed flares, based on the reference of the equipment with similar specifications: <u>20 and more years</u> of the lifetime of the equipment - Dehumidificator – reply from the representative of DEGREMONT in Colombia that installed this equipment in the PTAR-C – B.A.S. Ingeniería S.A: 5-7 years of the lifetime of the equipment - storage tanks – according to the estimations of the operating staff of the PTAR-C, the storage tanks installed in the Plant have an average lifetime of 5 years. <p>It is important to emphasize that although the lifetimes of the dehumidificator and biogas storage tanks are foreseen to be shorter than the duration of the CDM project activity, in case it is necessary to replace them within this period, the project proponents will ensure their replacement</p>	

Draft report clarifications and corrective action requests	Ref. to table 2	Summary of project participants' response	Validation team conclusion
		<p>with the equipment of equal or similar technical and operational specifications. This way it will be ensured that the amount of the emission reductions achieved by the CDM project during the crediting period will not increase due to the replacement of the existing equipment of the mentioned above project activity.</p> <p>On the other hand, all the equipments of the project are included within the program of preventive and corrective maintenance which will keep ensuring its proper functioning. Furthermore, at the moment of its reparation or replacement, the time of the installation of the substitute equipment will be reduced to minimum to avoid eventual interference in the continuity of the project activity and in the meantime biogas will be combusted in a contingency way in the flares and/or water heater as described in section B.5 of the present document.</p>	
<p>CL-5</p> <p>Please clarify that no public funding from Parties included in Annex I has been received for the proposed project activity. It's not clear why it has been specified that they're not available.</p>	<p>A.4.4.1 Annex 2</p>	<p>The sentence has been rephrased in Section A.4.4: No public funding was involved in financing of the proposed project activity.</p>	<p>Clarifications provided to RINA's satisfaction. This CL is closed.</p>
<p>CL-6</p>	<p>C.2.1</p>	<p>The note was added in section A 4.3.</p>	<p>The explanations adequately describes that</p>

Draft report clarifications and corrective action requests	Ref. to table 2	Summary of project participants' response	Validation team conclusion
The project selects a fixed crediting period of 10 years starting from 01/06/2008. As the crediting period may only start after the date of registration of the proposed activity as a CDM project activity, project participants should confirm that the crediting period will only start after the date of registration.		and C.1.1: “The crediting period is of 10 years and is planned to start in August 1 st 2008 or at the moment of the project's registration.”	the starting date of the project activity is 01 August 2008 or at the moment of the project's registration. Clarifications provided to RINA's satisfaction. This CL is closed.
CL7 The project participants are requested to describe how environmentally safe and sound technology and know how is being applied by the project activity <i>inter alia</i> technology transfer to Colombia for application in the project activity, as required in the “Guidelines For Completing The Simplified Project Design Document” (CDM-SSC-PDD Version 05 of 14 September 2007).	A.4.2	The following information has been added to the section A.4.2 of the PDD: “In order to ensure the project adequate implementation and its subsequent operation a multi-facet approach for the sound and safe technology and know-how transfer was introduced. This approach involved careful identification and qualification of appropriate technology/services providers (world wide acknowledged companies such as Mitsubishi Corporation, Degremont S.A., Waukesha, Leroy Somer and Kayanson), adequate selection of the technology solution, supervision of the complete project installation, the PTAR-C staff training and the development and implementation of a complete Monitoring Plan. As part of this process a technology solution that would be self sustaining (i.e., highly reliable, low maintenance, and operate with little or no user intervention) had been implemented. Furthermore, the project	Clarifications provided to RINA's satisfaction. This CL is closed.

Draft report clarifications and corrective action requests	Ref. to table 2	Summary of project participants' response	Validation team conclusion
		<p>executer ensures sound and safe application, operation and maintenance of all the equipment implemented in the PTAR-C for the purposes of the CDM project activity (see the attachment to the present table“CL 7_III.H”) and will carefully monitor the data collection, recording processes and environmental and health safety (e.g. the equipments are fit with flame traps, H₂S detectors, methane detectors, depressurization valves, flame controls, thermal protection of all the associated engines, fire hazard protection system, etc). Moreover, it will ensure that the staff acquires appropriate expertise and resources to operate the system on an ongoing/continuous basis.</p> <p>For more information please refer to the description given in section B.5 of the PDD.”</p> <p>For further reference see the websites of the companies involved in the manufacturing/providing/installing technology for the PTAR-C:</p> <p>Mitsubishi Corporation www.mitsubishicorp.com Degrémont Colombia S.A. www.degremont.com Waukesha www.waukesha.com</p>	

Draft report clarifications and corrective action requests	Ref. to table 2	Summary of project participants' response	Validation team conclusion
		Leroy Somer www.leroy-somer.com and Kayanson www.kayanson.co.uk	
CL-8 Please clarify in the proper table (PDD – A.3 table) that Colombia is the host Country and that PricewaterhouseCoopers Ltda is also a private entity.	A.3.1	The clarifications were added to the table A.3. In addition, it was clarified that PwC is not included as a project participant.	Clarifications provided to RINA's satisfaction. PwC is not longer considered as project participant. A letter from PwC confirming its voluntary withdrawal from the proposed project activity was received. This CL is closed.
CL-9 Please clarify the system boundaries of the project and provide a complete technical description of the included equipments, particularly of flare(s).	B.3.2	The Project boundary has been revised; Figure 3 of the PDD was adequately changed. Storage tanks, dehumidificator and engines of the electric generators where the biogas will be burnt are included as well as the flares and water heater, where biogas will be burnt in case of abnormal situations. The boundary includes as well the national electric grid in case when the consumption of this electricity occurs (normal operation of the project does not need the national electric grid, nevertheless, in case of emergency, such consumption, consisting exclusively of the consumption for the operation of the flares, will be monitored and subtracted from the total reduction of GHG emissions achieved by the project). - The storage tanks were included in the technical description of the equipment	Clarifications provided to RINA's satisfaction. This CL is closed.

Draft report clarifications and corrective action requests	Ref. to table 2	Summary of project participants' response	Validation team conclusion
		included in the boundaries of the Project. Technical specifications of Waukesha engine, dehumidicator, HAAT flares and DRAGON SHELL water heater are being attached to the present table – “CL 9_III.H”.	
CL-10 Further information on Colombia policies and circumstances relevant to the baseline is needed.	B.4.4 D.1.6	The text in part “Fulfilling environmental regulations” of the PDD was reviewed and completed”. Please see the attachment to the following table “CL 10_III.H”. Additionally the following phrase has been added in the section B.6.2 – parameter Qy “At the moment of the preparation of the present document, no other policies, plans, strategies or regulations are known to present risks to the calculation of the baseline emissions and therefore no higher uncertainty level to the one already included in the estimation of the amount of the inflow wastewater (25% in 2008 and 2% in the rest of the years of the crediting period) was included in the calculation.”	Clarifications provided to RINA’s satisfaction. This CL is closed.
CL-11 It’s not clear whether any procedure has been identified for training of monitoring personnel (operation, maintenance, calibration and monitoring of equipments and installation under project activity).	B.7.2.6	The following text was added to the section B.7.2 of the PDD: “Training procedure of the PTAR-C staff The procedure for the training of the personal of the PTAR-C with respect to	Clarifications provided to RINA’s satisfaction. This CL is closed.

Draft report clarifications and corrective action requests	Ref. to table 2	Summary of project participants' response	Validation team conclusion
		<p>the operation, maintenance, calibration and monitoring of equipment under the project activity is the following:</p> <p>The provider in person of the technical expert who installs or delivers to the PTAR-C any system, equipment, instrument, etc., has the responsibility to adequately train the staff of the PTAR-C or a representative group with respect to its operation and/or maintenance.</p> <p>Training is considered adequate when the trained personal shows sufficient skills for the operation and/or maintenance of the equipment or system received.</p> <p>When it is considered convenient, a heterogeneous group from among all the personal that requires training is being selected by the Chief of each of the Plant's Area taking into consideration their skills, level of responsibility and education as well as the participation in the process. This group compromise themselves to convey the information received during the training to the rest of the respective personal of the Plant.</p> <p>The evidence of the training received by the personal in question is being archived by the Chief of each respective Area (please see the respective forms attached to the PDD – Annex 4).</p>	

Draft report clarifications and corrective action requests	Ref. to table 2	Summary of project participants' response	Validation team conclusion
		The monitoring of the performance of the equipment itself as well as the personal that interacts with them is being performed with the purpose to indicate whether the works conduct by the technical personal is sufficient and adequate to the training given and whether any further training of such personal is required. The assessment is being undergone by the Chief of each Area based on the outcome of the corrective and preventive Job Orders (Ordenes del trabajo).	
<p>CL-12</p> <p>Further information is needed on how the risks to the baseline calculation due to the uncertainties in sludge generation and methane emission potential of the sludge treatment system have been taken into account.</p>	B.4.7	Please see the explanation given to CL 16.	Clarifications provided to RINA's satisfaction. This CL is closed.
<p>CL-13</p> <p>It's not clear whether the monitoring plan reflects good monitoring and reporting practices.</p>	B.7.2.8	<p>Nevertheless the Monitoring Plan presented in the PDD to monitor the CDM project activity hasn't been yet fully introduced into the daily activities of the PTAR-C, in accordance with what has been decided by EMCALI, it will be executed in its totality once the project obtains the registration.</p> <p>On the other hand, the Monitoring Plan covers within its scope the following aspects of the data and process quality control as well as the continuous</p>	Clarifications provided to RINA's satisfaction. This CL is closed.

Draft report clarifications and corrective action requests	Ref. to table 2	Summary of project participants' response	Validation team conclusion
		<p>improvement of the monitoring program:</p> <ul style="list-style-type: none"> - CDM project activity monitoring data storage, security, back-up and analysis - Control of the performance of the CDM project equipment and project monitoring instrumentation (preventive and corrective maintenance as well as the calibration in case of the monitoring instrumentation) - Control and evaluation of the performance of the PTAR-C staff involved in the Monitoring Plan of the CDM project - Training program for the PTAR-C staff involved in the Monitoring Plan of the CDM project - Periodical revision of the Monitoring Plan by the Director of the PTAR-C <p>All the information with respect to the above mentioned aspects of the Monitoring Plan are described in detail in section B.7.1 and B.7.2 of the presented PDD (additional parts for the training of the PTAR-C staff and continuous improvement has been added to the PDD according to requirement of</p>	

Draft report clarifications and corrective action requests	Ref. to table 2	Summary of project participants' response	Validation team conclusion
		RINA).	
CL14 The project proponent is requested to include considerations about transboundary environmental impacts in the PDD.	D.1.4	<p>The text in section D.1 was reviewed in the following manner:</p> <p>“PricewaterhouseCoopers Ltda., as an independent and advisory entity for the development of this CDM project, evaluated in October 2006 the positive and negative environmental, social and technological impacts of the proposed project activity of biogas capture and combustion in the installations of the PTAR-C. The outcome of the study is presented in the table 5 of the PDD. For its implementation purposes the Gold Standard criteria, tailored to the projects of biogas capture and high efficiency combustion, were followed.</p> <p>In conclusion, project participants do not consider that the activity of the proposed CDM project generate significant direct neither transboundary negative environmental impacts.”</p>	<p>Clarifications provided to RINA's satisfaction.</p> <p>This CL is closed.</p>
CL15 Please: (a) provide evidences of invitations to the Institutions (local stakeholders meetings); (b) clarify/revise the meeting date May 28, 2006 mentioned in PDD – E.2.	E.2.1	<p>The Following documents are being attached to the present table:</p> <ul style="list-style-type: none"> - the list of stakeholders invited to the meeting of 28 of May, 2007, - the minutes of the meeting in question with the signatures of the stakeholders that participated in it 	<p>Although it was not possible to recover the invitations letters (prior to the meeting), the minutes of meeting signed by all present stakeholders and further letters sent to all stakeholders invited are considered appropriate evidences. Furthermore, this point is also checked by the Colombian DNA in the process to issue the Letter of Approval.</p>

Draft report clarifications and corrective action requests	Ref. to table 2	Summary of project participants' response	Validation team conclusion
		<p>- the letters addressed to the stakeholders that were invited to the meeting in question and did not participated in it with the decisions taken during this meeting</p> <p>It is important to emphasize that the letters with decisions of the meeting in question were sent to the stakeholders that were invited but did not participate in the meeting and no comment with respect to the CDM project planning or its operation either comments regarding the decisions of the meeting were received from them (this statement has been also added to the section E.1 of the PDD).</p> <p>See the folder attached “CL 15_III.H”</p> <p>The date of the meeting is 28 of May, 2007. The necessary correction was introduced to the PDD.</p>	<p>PDD revised and date corrected.</p> <p>This CL is closed.</p>
<p>CL 16</p> <p>Please clarify the calculation of the attended population reduction (e.g., 25% in 2008) and of the wastewater entry flow projections.</p>	B.6.4.1	<p>The data for the calculation of the baseline emission reduction for the proposed project activity were based on the extensive study elaborated by the Planning Department of EMCALI “Sanitation and wastewater management plan for the years 2007-2016”. This study was conducted in accordance with the requirements of the Ministry of Environment, Housing and Territorial</p>	<p>Clarifications provided to RINA's satisfaction.</p> <p>This CL is closed.</p>

Draft report clarifications and corrective action requests	Ref. to table 2	Summary of project participants' response	Validation team conclusion
		<p>Development of Colombia.</p> <p>The study in its section 7 “Decontamination goal” provides an explanation on the three components used for the determination of the inflow wastewater to the PTAR-C in the period of 2007-2016. The three components mentioned above are: (1) definition of the decontamination projects, (2) evaluation of the growth of the population of Cali in the following years and (3) the identification of the optimization and maintenance activities in the city.</p> <p>The inflow quantities for the baseline calculations were taken from the table 7.17, p. 288 of a mentioned above study. To preserve a conservative approach and taking into consideration the risks to the baseline calculation, a 2% uncertainty level over the initial projections provided in the “Sanitation and wastewater management plan for the years 2007-2016” was adopted for the years 2009-2018 and 25% in the year 2008.</p> <p>This higher uncertainty level of 25% for the year 2008 was adopted due to the unexpected delay in the planned by EMCALI for this year maintenance and expansion of the sewer system grid.</p>	

Draft report clarifications and corrective action requests	Ref. to table 2	Summary of project participants' response	Validation team conclusion										
		<p>These works are delayed in function of other constructions being developed in Cali by the municipality (for example, the constructions of massive transportation system for Cali – MIO by acronyms in Spanish). It is foreseen that this delay resulting in the lower wastewater inflow to the PTAR-C will extend only over the year 2008 and therefore, the following years would continue with the 2% uncertainty level. Conform to the information provided by EMCALI a conservative estimation of the inflow of wastewater to the PTAR-C for the year 2008 will be 4.46 m³/s. This corresponds to 75% of the initial value of the wastewater inflow given in the study (25% of uncertainty level). The table below presents more detailed increase of the wastewater inflow rate during the year 2008.</p> <table><tr><th>Year 2008</th><th>Wastewater inflow m³/s</th></tr><tr><td>Jan</td><td>3.67</td></tr><tr><td>Feb-Nov</td><td>4.4</td></tr><tr><td>Dec</td><td>5.9</td></tr><tr><td>Average</td><td>4.46</td></tr></table> <p>The “<i>Project population</i>” worksheet of the “<i>IIH EMCALI Emission calculations_v.val 1.xls</i>” spreadsheet was corrected, as the uncertainty levels do not only correspond to the population</p>	Year 2008	Wastewater inflow m³/s	Jan	3.67	Feb-Nov	4.4	Dec	5.9	Average	4.46	
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Draft report clarifications and corrective action requests	Ref. to table 2	Summary of project participants' response	Validation team conclusion
		growth but as well to two other components that influence the wastewater inflow to the PTAR-C: (1) definition of the decontamination projects, and (3) the identification of the optimization and maintenance activities in the city.	
<p>CL17 Further information on the independency of the impacts evaluation is requested.</p>	D.1.1	<p>The respective corrections were made to the part D.1 and D.2 of the PDD.</p> <p>PricewaterhouseCoopers Ltda., as an independent and advisory entity for the development of this CDM project, evaluated in October 2006 the positive and negative environmental, social and technological impacts of the proposed project activity of biogas capture and combustion in the installations of the PTAR-C. The outcome of the study is presented in the table 5 of the PDD. For its implementation purposes the Gold Standard criteria, tailored to the projects of biogas capture and high efficiency combustion, were followed.</p> <p>In conclusion, project participants do not consider that the activity of the proposed CDM project generate significant direct neither transboundary negative environmental impacts.</p> <p>Additionally, a correction to the table 5 of the PDD <i>Assessment matrix of the</i></p>	<p>Clarifications provided to RINA's satisfaction.</p> <p>This CL is closed.</p>

Draft report clarifications and corrective action requests	Ref. to table 2	Summary of project participants' response	Validation team conclusion
		<p><i>sustainable performance of the project's activity in part Air quality (additional emissions to GHG) was made as the purification of biogas is not a consequence of the project activity of biogas capture and high efficiency combustion. The clarification is as follows:</i></p> <p>At the moment of the preparation of the present PDD, there is no law regulating emissions from the biogas combustion. Nevertheless, having in mind that biogas is mainly composed of:</p> <ul style="list-style-type: none"> ▪ methane, carbon dioxide and oxygen (in total 89%, according to the analysis of biogas generated in the PTAR-C of 8 and 15 of May 2006) which during the combustion decompose to the substances not regulated by any law in Colombia, i.e. water vapor and carbon dioxide (methane decompose in a following manner: $\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$), and ▪ traces of hydrogen, nitrogen and H_2S (in total 11%) that are considered negligible <p>the environmental impact of the emissions to the air is considered <u>low</u>.</p>	

Draft report clarifications and corrective action requests	Ref. to table 2	Summary of project participants' response	Validation team conclusion																														
		<p>On the other hand, according to the Colombian law, emissions of natural gas which composition is similar to biogas (besides containing higher amount of methane), does not require emission permits conform to the article 73, paragraph 5o of the Decree 948 of 1995, as the environmental impact of the emissions to the air is considered low and by the analogy so is the impact of the emissions from the combustion of biogas.</p> <p>Analysis of biogas composition generated in the PTAR-C of May 8th and 15th of 2006:</p> <table><tr><td></td><td>Digester B</td><td>Digester C</td><td>Digester E</td><td>Average</td></tr><tr><td></td><td>%</td><td>%</td><td>%</td><td>%</td></tr><tr><td>CO₂</td><td>27.60</td><td>27.20</td><td>26.40</td><td>27.07</td></tr><tr><td>CH₄</td><td>64.20</td><td>60.30</td><td>56.80</td><td>60.43</td></tr><tr><td>O₂</td><td>0.50</td><td>2.30</td><td>3.00</td><td>1.93</td></tr><tr><td>Total</td><td>92.30</td><td>89.80</td><td>86.20</td><td>89.43</td></tr></table>		Digester B	Digester C	Digester E	Average		%	%	%	%	CO ₂	27.60	27.20	26.40	27.07	CH ₄	64.20	60.30	56.80	60.43	O ₂	0.50	2.30	3.00	1.93	Total	92.30	89.80	86.20	89.43	
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CL-18 Please clarify the calculations according to the “Tool to determine project emissions from flaring gases containing methane” (EB 28 Meeting report-Annex 13)((EB 28 Meeting report-Annex 13)) is needed (seven steps shall be applied and clearly mentioned). Furthermore, variables / parameters names and	B.6.3.1	<p>The text in section B.7.2 referring to the calculations of the emissions from flaring biogas has been changed adequately to the 7 step approach of the methodological “Tool to determine project emissions from flaring gases containing methane”.</p> <p>Furthermore, the numeration of the</p>	<p>Calculations provided and applying the seven steps.</p> <p>Clarifications provided to RINA’s satisfaction.</p> <p>This CL is closed.</p>																														

Draft report clarifications and corrective action requests	Ref. to table 2	Summary of project participants' response	Validation team conclusion
symbols should be named according to the applicable methodology, tool and guidelines.		monitoring points (Figure 5 of the PDD) has been reviewed and the correct numeration was applied. The monitoring of the generators engines and water heater efficiency (efficiency of the methane destruction) has been better described in the PDD. Please refer to the attachment to the present table “CL 18_III.H”.	