

**SANTA ANA HYDROELECTRIC PLANT**

**(UNFCCC REGISTRATION REF. No. 0275)**

**EMPRESA DE ACUEDUCTO Y ALCANTARILLADO DE BOGOTÁ - EAAB  
(COLOMBIA)**

**EDF TRADING LIMITED  
(UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND)**

**MGM CARBON PORTFOLIO, S.A.R.L.  
(SWITZERLAND)**

**VERIFICATION PERIOD  
01/08/2011 TO 31/07/2012**

**REPORT NO. CDMVE-13-001-01**

**DECEMBER, 2013**

# VERIFICATION REPORT VVS



<i>Date of first issue:</i>	06/12/2013	<i>Project No.:</i>	UNFCCC REGISTRATION REF. No. 0275	
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<i>Project title:</i>	SANTA ANA HYDROELECTRIC PLANT	<i>Report No:</i>	CDMVE-13-001-01	
<i>Version No.:</i>	01	<i>Last version date:</i>	December 2013	
<i>Sectoral scope</i>	1: Energy industries (renewable / non renewable sources)	<i>Monitoring period number/Duration</i>	7	01/08/2011 to 31/07/2012
<i>Client:</i>	Empresa de Acueducto y Alcantarillado de Bogotá (EAAB).	<i>Client ref.:</i>	CDMVE-13-001	

## Summary:

ICONTEC performed the seventh periodic verification of the registered CDM project: Santa Ana Hydroelectric Plant in Colombia (Registration Number: N°0275; Registration Date: 11th of May 2006) on the basis of UNFCCC criteria referred to Article 12 of the Kyoto Protocol and CDM modalities and procedures according to the Marrakech Agreement, the criteria of the CDM Executive Board and the Host country, as well as the operational and technical monitoring criteria specific to this type of project. The applied methodology is AMS I.D, version 7 "Renewable Electricity Generation for a Grid".

The project activity under this verification process is a small run-of-river type hydroelectric plant with an installed capacity of 13.43 MW, introduced into the municipal potable water supply system of Bogotá – Colombia, located on the outskirts of the city. It was scheduled to begin operations in the second semester of 2005. In this framework, the management of Empresa de Acueducto y Alcantarillado de Bogotá (EAAB) in Colombia, is responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions on the basis set out within the project monitoring and verification plan indicated in the updated PDD version 3.0, submitted with this verification report.

A step by step description of dates in which the activities related to the project will be carried out, as:

28/02/2013	Onsite visit and interview with stakeholders
01/03/2013	Audit team sent raised findings to PP
26/11/2013	Response of the project owner with the new version of MR, updated PDD and action plan for findings
03-06/12/2013	Writing of the draft verification report by the audit team
06/12/2013	Audit team sent draft report to internal technical review.
09-11/12/2013	Technical review
12/12/2013	Audit team corrected the raised findings during the technical review and sent final verification report for comments to PP.
24/12/2013	Upload the project documentation to the UNFCCC web page for request for issuance.

## VERIFICATION REPORT VVS



During the seventh verification, 15 findings occurred that consisted of 14 Clarifications (CL) and a FAR, which were treated by the project owner and clarified in the latest version of the MR.

Documentation review, interviews and onsite visit allowed ICONTEC to collect enough evidence to completely assess the verification criteria and determine that the project is implemented as planned and as described in the updated PDD version 3.0; emissions reductions were correctly calculated based on the updated PDD as well as the monitoring plan and methodology AMS-I.D version 7, installed equipment essential for generating emissions reductions runs reliably; and the monitoring system is in place and is calibrated appropriately. ICONTEC can confirm that the GHG emissions reductions are calculated without material misstatements, so complying with the requirements set by UNFCCC.

Based on the information we have seen and evaluated can be confirmed the following statement:

*Reporting period:* From 01/08/2011 to 31/07/2012

*Baseline emissions:* 10,801 tCO<sub>2</sub> equivalents

*Project emissions:* 0 tCO<sub>2</sub> equivalents

*Leakage emissions:* 0 tCO<sub>2</sub> equivalents

*Emission reductions:* 10,801 tCO<sub>2</sub> equivalents

*Verified emission in the previous reporting period:* 15,604 tCO<sub>2</sub> equivalents

<i>Work verified by</i>	Francy Ramirez ICONTEC CDM and Technical Reviewer	<input checked="" type="checkbox"/> No distribution without permission from the Client or responsible organizational unit <input type="checkbox"/> Limited distribution <input type="checkbox"/> Unrestricted distribution
<i>Technical review date:</i>	09/12/2013 to 11/12/2013	
<i>Number of pages:</i>	56	

This report should not be read without reference to the annexed Verification Protocol.

## Abbreviations

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CERs	Certified Emission Reductions
CL	Clarification Request
tCO <sub>2</sub> e	Equivalent Carbon Dioxide Tonnes
DNA	Designated National Authority
DOE	Designated Operational Entity
FAR	Forward Action Request
GHG	Greenhouse Gases
ICONTEC	Colombian Institute of Technical Standards and Certification (Instituto Colombiano de Normas Técnicas y Certificación)
IPCC	Intergovernmental Panel on Climate Change
PDD	Project Design Document
PP	Project Participant
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation and Verification Standard
EAAB – E.S.P	Water and Sewage Company of Bogotá (Empresa de Acueducto y Alcantarillado de Bogotá)
EMGESA	Electricity Market Agent (Empresa Generadora de Energía Eléctrica S.A.)
XM	Abbreviation for “Market Experts”. XM is a company of the ISA Group that provides integral services. <a href="http://www.xm.com.co">www.xm.com.co</a>
CAM	American Multiservice Company (Compañía Americana de Multiservicios), is a company that provides services to EMGESA for interrogation and recording of the meters located in commercial frontiers. Additionally CAM is an accredited laboratory in Colombia for the revision of power meters.
ASIC	Administrator of the Colombian Power Commercial Exchange System (Administrador del sistema de intercambio comercial)
CND	Colombian National Dispatch Center (Centro Nacional de Despacho)
UPME	Colombian Mining and Energy Planning Unit (Unidad de planeación minero energética)
CREG	Colombian Regulatory Commission of Energy and Gas (Comisión de Regulación de Energía y Gas)

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## 1. INTRODUCTION

Empresa de Acueducto y Alcantarillado de Bogotá (EAAB – ESP), commissioned ICONTEC to perform the 7<sup>th</sup> verification of emission reductions of its registered CDM project: Santa Ana Hydroelectric Plant (hereafter called “the project”).

ICONTEC reviewed the GHG data collected for the period from 01/08/2011 to 31/07/2012. This report contains the findings of the project as well as the verification and certification statements for the certified emission reductions.

The verification was performed on the basis of UNFCCC criteria referred in Article 12 of the Kyoto Protocol and CDM modalities and procedures according to the Marrakech Agreement, the criteria of the CDM Executive Board and the host country, as well as criteria given for consistent project operations, monitoring and reporting.

The project activity under verification process consists of energy generation by the Santa Ana Hydroelectric Plant. The energy is sent into the national interconnected grid in accordance to power market regulations, environmental and operational authorizations. A key objective of the project is to reduce greenhouse gas emissions from the national interconnected system of Colombia.

### 1.1 OBJECTIVE

According to CDM Modalities and Procedures (Decision 17/CP.7, paragraph 62), the purpose of this verification process is the periodical independent review and ex-post determination of the monitored reductions which have occurred as a result of the registered CDM project activity during the verification period.

Based on the applicable requirements of paragraph 62 of the CDM modalities and procedures, this assessment shall:

- a. Ensure that the project activity has been implemented and operated as per the registered PDD and that all physical features (technology, project equipment, and monitoring and metering equipment) of the project are in place;
- b. Ensure that the monitoring report (MR) and other supporting documents provided are complete and in accordance with the latest applicable version of the completeness checklist for requests of issuance of CERs and verifiable and in accordance with applicable CDM requirements;
- c. Ensure that the actual monitoring system and procedures comply with the monitoring system and procedures described in the monitoring plan and the approved methodology;
- d. Evaluate the data recorded and stored as per the monitoring methodology.
- e. Significance of reporting risks and risks of material misstatements.

As a result of this process, a written certification of the emission reduction achieved and verified is prepared by the DOE for the specified time period.

## 1.2 SCOPE

The scope of verification is that the project activity has been implemented and operated as per the updated PDD and that all physical features of the project are in place, ensure that actual monitoring systems and procedures comply with the monitoring systems and procedures described in the monitoring plan and the approved methodology and that the data reported are complete and transparent. The verification scope is defined as an independent and objective review of the PDD, the projects monitoring plan and other relevant documents. The information in these documents is reviewed against Kyoto Protocol requirements, UNFCCC rules and associated interpretations.

ICONTEC, based on its ethics code and internal procedures for carrying out validation, verification and certification audits of CDM project activities (the internal procedures are based on the Validation and Verification Standard version 05.0) focused on the identification of significant risks for CER generation, and verification of the mitigation.

Verification does not signify any consulting for the project participants. However, stated requests for clarifications and/or corrective, forward actions may have provided input for improvement of the project design.

## 1.3 DESCRIPTION OF THE PROJECT ACTIVITY

Project participants:	Empresa de Acueducto y Alcantarillado de Bogotá (EAAB – ESP), Colombia EDF Trading Limited, United Kingdom of Great Britain and Northern Ireland MGM Carbon Portfolio, S.a.r.l., Switzerland
Project title:	Santa Ana Hydroelectric Plant
Registration date:	11 May 2006
UNFCCC registration No:	027
Project owner:	Empresa de Acueducto y Alcantarillado de Bogotá (EAAB – ESP)
Location of the project activity:	Northern Bogotá City, Colombia
Geo coordinates:	110324.65 North and 105849.56 East
Crediting period:	01 Aug 2005 - 31 Jul 2015 (Fixed)
Verification period:	01/08/2011 to 31/07/2012
Project starting date:	01/08/2005

Santa Ana Hydroelectric Plant is a small run-of-river type hydroelectric plant, with an installed capacity of 13.43 MW, introduced into the municipal potable water supply



system of Bogotá – Colombia, located on the outskirts of the city. The project began operations in the second semester of 2005.

Santa Ana Hydroelectric Plant project is installed at the base of the Usaquén Alternate tunnel. The power house consists of a hydroelectric power conversion equipment, that turbines the water passing from the Wiesner water treatment plant into the distribution storage system of the city, producing clean electricity to be placed into the Colombian National Interconnected Grid, following local existing electricity market regulations and required environmental and operational permits.

A key objective of the project is to reduce Greenhouse Gas Emissions that would have otherwise been generated by the National Interconnected System of Colombia.

The power capacity is 13.43 MW and the energy generation of Santa Ana Hydroelectric Plant is transmitted to the national grid through a short 34.5 kV line connecting the power plant with the Usaquén Electrical Substation, which could generate until 90 GWh/year<sup>1</sup>, owned by the local operator CODENSA. Just before this point (Usaquén Electrical Substation), in the same location, there is a step down transformer 34.5/11.4 kV, owned by EAAB, where the power is adjusted to the voltage level required for connection to Usaquén Electrical Substation of CODENSA. Besides that, in Usaquén EAAB installations there are two meters (main and back up) used for EAAB to verify and validate measurements of Santa Ana Hydroelectric Plant input registered by the meters of commercial frontier in Usaquén Electrical Substation of CODENSA.

In order to establish the correspondence between the power registered at Usaquén Electrical Substation and the power generated by Santa Ana Hydroelectric Plant, the connection between them was physically verified by ICONTEC according to the single line diagram /21/. ICONTEC confirmed that the maintenance of the transmission line is responsibility of CODENSA<sup>2</sup>.

The verification team checked during onsite assessment that there were no other electrical connections, different from the main connection, through which could be energy feedback counted from other systems. This verification was based on a review of electrical connections inside the power plant control room.

The GHG emissions relevant to the project activity are CO<sub>2</sub> emissions displaced by generated energy with water.

The project activity is based on the methodology AMS I.D. version 7 “Renewable electric power generation for a grid” /18/.

The impact in global warming generated for the seventh monitoring period of the crediting period of the plant was a generated and delivered energy of 24.593 GWh/year to the national interconnected grid of Colombia, reducing the emissions in 10,801 tCO<sub>2</sub>e.

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<sup>1</sup> The reduction in water demand of the city, the implementation of different measures to increase efficiency in its use, as well as measures to ensure the required water supply for the city, have reduced energy generation expectations which is estimated today between 30 GWh/year and 48 GWh /year.

<sup>2</sup> <http://www.codensa.com.co/>

## 2. METHODOLOGY

The verification consists of the following phases:

1. Desk review and investigation of secondary sources of information,
2. Onsite assessment
3. Reporting of findings
4. Issuance of the final verification report with the conclusion on the emission reduction achievements

The verification protocol resulting from the verification of “*Santa Ana Hydroelectric Plant*” is enclosed in Annex A of this report.

### 2.1 VERIFICATION TEAM

The verification team consists of the personnel described in table 1:

**Table 1: Verification Team**

Role/Qualification	Last Name	First Name	Country	Type of involvement			
				Desk review	Site Visit/ Interviews	Reporting	Technical Review
Lead Auditor	Santos	Diana	Colombia	x	x	x	
Technical Expert	Grisales	Cristian	Colombia	x	x	x	
CDM and technical reviewer	Ramirez	Francy	Colombia				x

The verification team is qualified in accordance with the ICONTEC qualification scheme for CDM validation and verification. (See in the Annex B the CVs).

### 2.2 DESK REVIEW AND INVESTIGATION OF SECONDARY SOURCES OF INFORMATION

In order to carry out the desk review, the following documents were requested to the project participants:

- PDD version 02 /1/.
- Emission reductions calculation file for the seventh crediting period /4/
- Monitoring report (7<sup>th</sup> Monitoring Period) /3/
- Reports and records of daily, monthly and annual monitoring data on the items defined in the monitoring plan and the Monitoring Report for the crediting period under verification (01/08/2011 to 31/07/2012). /7/ and /8/.
- Previous verification report for the sixth monitoring period /6/.

The whole documentation was reviewed and a verification audit plan was completely carried out during the verification activities.

During the desk review it was confirmed that the Monitoring Report fulfills with the monitoring report form F-CDM-MR, version 03.1.

The monitoring report version 1 /3/ of the seventh crediting period was made publicly available at UNFCCC web site on February 4<sup>th</sup>, 2013.

## 2.2.1 Consideration of Materiality in Planning the Verification

During the desk review step, corrective and clarification action requests were categorized as a possible material risk sources. Possible sources of misstatements detected and their associated findings were:

- Lack of information in the MR (CL 3, CL 6, CL 8, CL 9, CL 11, )
- Typographical mistakes (CL1, CL 4, CL 5, CL 7, )

ICONTEC took into account these findings to deepen during the onsite visit. The topics related with the raised findings during desk review, were reviewed with major depth during the onsite visit.

No sampling plan was designed by the audit team since it is possible to trace the whole set of data about energy generation of this hydroelectric power plant. Thus is possible to identify with reliability and truthfulness the sources of misstatements in emissions reduction calculations.

## 2.3 ONSITE VISIT

A site visit to the project Santa Ana Hydroelectric Plant was undertaken between 28/02/2013 and 01/03/2013. Interviews were conducted with EAAB representatives, personnel of operation and maintenance. Other project stakeholders were also interviewed (see list below). ICONTEC audited in particular the procedures for data recording, processing, reporting and associated QA/QC procedures.

During the onsite visit the following people were interviewed:

**Table 2: Interview List**

Entity	Name	Position
EAAB	Luis Eduardo Silva	Division Manager
EAAB	Martha Patricia Cruz	Specialized Professional
EAAB	Juan Carlos Sanchez	Specialized Professional
EAAB	Jose Javier Jimenez	EAAB's Professional
EAAB	Mauricio Velástegui	Supply Manager
EAAB	Alfonso Cubillos	Maintenance Manager
EAAB	Lina Maria Ojeda	Environmental Sanitation Division
EAAB	Jose Lopez	Control and Planning Division
EAAB	Mauricio Jimenez	Aqueduct Network Matrix Direction
EAAB	Sara Usme	Sanitation Division Manager

The verification process was carried out using the verification protocol included in Annex A. The use of this checklist ensures a fully completed verification process, allows the obtaining of information necessary in the development of this report and demonstrates how emission reductions have been verified and the manner in which such verifications were confirmed.

ICONTEC, after the evaluation of the findings raised during the desk review and onsite visit stages, determined that there were not material individually or in aggregate misstatements in the information provided by the PP that require further audit procedures.

### 2.4 REPORTING OF FINDINGS

Findings established during the verification can be seen as:

- A non-fulfillment of verification protocol criteria, or
- An identified risk to the fulfillment of the project objectives

The findings could take the form of a Corrective Action Request (CAR), Forward action Request (FAR) or a Clarification Request (CL).

A Corrective Action Request (CAR) shall be raised if one of the following situations occurs: (VVS version 05.0, paragraphs 219-224)

- a) Non-compliance with the monitoring plan or methodology are found in monitoring and reporting and has not been sufficiently documented by the project participants, or if the evidence provided to prove conformity is insufficient;
- b) Modifications to the implementation, operation and monitoring of the registered project activity has not been sufficiently documented by the project participants;
- c) Mistakes have been made in applying assumptions, data or calculations of emission reductions which will impact the quantity of emission reductions;
- d) Issues identified in a FAR during validation to be verified during verification have not been resolved by the project participants.

A Clarification Request (CL) shall be raised if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

A Forward Action Request (FAR) is issued for actions if the monitoring and reporting require attention and/or adjustment for the next verification period.

During this verification, the issues identified related to the monitoring, implementation or operations of the proposed CDM project activity that could impair the capacity of the

proposed CDM project activity to achieve emission reductions or influence the reporting of emission reductions are been discussed and concluded on this verification report.(VVS version 05.0, paragraph 219).

This report includes all CARs, CLs and FARs raised in this verification. The reporting of these is undertaken in a transparent manner that allows the reader to understand the issue raised, the responses provided by the project participants, the means of verification of such responses and references to any resulting changes in the monitoring report or supporting annexes. (VVS v 05.0, paragraph 224)

### **3. VERIFICATION OF COMPLIANCE**

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

As a result of this assessment 14 CLs and 1 FAR were raised, which are described in sections 3.1 to 3.6 of this report and in the Table A2.

The Project Participants sent the respective documents and information to resolve the raised findings by the DOE during the verification process. The action plan was approved by ICONTEC on 02/12/2013.

All the changes and corrections requested by ICONTEC were verified in the latest version of the MR /3/, updated PDD /2/ and latest version of the spreadsheet of ERs /4/.

#### **3.1 REMAINING ISSUES AND FARS FROM PREVIOUS VALIDATION/ VERIFICATION**

There are no remaining open issues from the previous verification process.

During the onsite visit CL 14 and FAR 1 were raised in order to request the inclusion of the procedures for attention of non-predicted episodes and their effective control in the company's quality management system. The PP prepared a strategy /11/ to face the raised FAR /11/ and close CL 14, which was evaluated by ICONTEC and considered appropriate to resolve effectively the findings. The proposed action plan was approved by ICONTEC on 27/11/2013 and shall be implemented in next monitoring period to attend FAR 1.

#### **3.2 COMPLIANCE OF THE PROJECT IMPLEMENTATION WITH THE REGISTERED PROJECT DESIGN DOCUMENT**

The status of implementation, progress and starting date of operation for each phase is shown on the next table:

**Table 3: Implementation Status**

<i>Phase/Site</i>	<i>Status of implementation</i>	<i>Progress</i>	<i>Operation</i>	<i>Comments</i>
Energy Generation	Completed	100%	The power plant began operations in the second semester of 2005.	No comments
Power Delivery to the Grid	Completed	100%	The delivery of power to the grid began on August 1 <sup>st</sup> 2005.	No comments

There are not pending activities for implementation. The activity project is operating normally.

The events that happened during the seventh crediting period were:

- There was a damage in the Pratt Valve. The power generation was suspended since 11/06/2011 until 15/12/2011. The plant returned to operations on 16/12/2011 but stopped again since 21/12/2011 until 28/02/2012.
- Decreasing in the power generation since 29/02/2012 until 14/03/2012 caused by a lower water flow availability<sup>3</sup> with a further reduction in the production rate of the Wiesner plant. The same decreasing affected the power generation since 05/06/2012 until 30/06/2012 as well.
- Power generation was suspended since 09/06/2012 until 26/06/2012 due to operational movements required in the water system for the construction of Suba Hydroelectric Plant.
- Decreasing in the power generation on 25/07/2012 and 29/07/2012 due to the closure of the conduction pipeline of 69" *Usaquén – Santa Lucia*,

ICONTEC verified the above mentioned issues by reviewing the reports of generated energy during the reported date /7/ and the official values of electricity delivered to the grid issued by the Colombian Grid Operator XM<sup>4</sup> /8/.

ICONTEC raised CL 10 in order to ask about validity of the agreement "*Acquisition by EMGESA<sup>5</sup> of all the energy generated by Santa Ana Hydroelectric Plant owned by EAAB*", which is the PPA between EAAB and the Grid Operator. The PP correctly demonstrated that the agreement still is valid /9/, /10/ and the finding was closed.

During the onsite visit, ICONTEC confirmed the events that affected the project operation during the 7<sup>th</sup> monitoring period and that they were correctly registered by PP on monitoring report (Section B).

<sup>3</sup> Due to restrictions on water treatment in Wiesner plant, it was necessary to reduce the production rate of 10.5 m<sup>3</sup>/s to 9.5 m<sup>3</sup>/s, increasing the production in the Tibitoc plant of 4.5 m<sup>3</sup>/s to 5.5 m<sup>3</sup>/s.

<sup>4</sup> <http://www.xm.com.co/Pages/Home.aspx>

<sup>5</sup> <http://www.emgesa.com.co/en/Pages/home.aspx>

The starting date of the Crediting Period was on August 1<sup>st</sup> 2005 (00:00:00, Colombian time, GMT -5). The project was registered on May 11<sup>th</sup> 2006. This information can be verified in the following web page: <http://cdm.unfccc.int/Projects/DB/TUEV-SUED1140544492.1/view>.

ICONTEC raised CL 4 and CL 5 in order to ask about the events above mentioned, which were correctly explained by PP in the latest version of the MR. both findings were closed.

The crediting period corresponding to this monitoring period is 01/08/2005 to 31/07/2015.

The information (data and variables) provided in the monitoring report is not different from that stated in the updated PDD /3/.

ICONTEC can confirm that:

- The implementation of the project is consistent with the information provided in the updated PDD.
- The project is operated as per the updated PDD by the PP.
- Information provided in the latest version of the MR is in accordance with that stated in the updated PDD.

### 3.3 COMPLIANCE OF THE MONITORING PLAN WITH THE MONITORING METHODOLOGY INCLUDING APPLICABLE TOOL(S)

According to the updated PDD/2/, the CDM Project Activity “*Santa Ana Hydroelectric Plant*” was monitored following the guidelines of the approved monitoring methodology:

- Approved consolidated monitoring methodology AMS I.D “*Renewable electricity generation for a grid*”, version7.

According to the specification given in the above mentioned methodology, the monitoring shall consist of metering the electricity generated by the renewable technology.

ICONTEC through documental review verified that the latest version of the MR for the 7<sup>th</sup> monitoring period /3/, complies with the latest approved versions of “*Guidelines for completing the monitoring report form*” version 04.0 and form (F-CDM-MR), version 03.1.) /14/.

ICONTEC raised CL 1, 2 and 3 associated with typographical mistakes and missing information in the previous versions of MR /3/. The PP corrected the typographical mistakes and added the missed information and the findings were closed.

ICONTEC verified the monitoring plan, including the data and parameters to be monitored, measurement procedures, monitoring frequency and QA/QC procedures as



described in the updated PDD /2/ and is able to confirm that the monitoring plan is in accordance with the approved methodology applied by the project /18/.

## 3.4 COMPLIANCE OF MONITORING ACTIVITIES WITH THE REGISTERED MONITORING PLAN

The monitoring parameters related to the GHG emission reductions in the project activity have been implemented in accordance with the monitoring plan contained in the updated PDD /2/.

Table 5 describes the parameters that were determined ex-ante and not monitored. The values of these parameters were determined in the updated PDD /2/.

**Table 4: Parameters Determined Ex-Ante in the Updated PDD**

Parameter	Description	Value	Source
EF <sub>Grid</sub>	Emission factor of the national interconnected grid of Colombia.	0.4392 kgCO <sub>2</sub> e /KWh	Resolution 181421 dated on 2005, issued by the Colombian Ministry of Mines and Energy and the UPME <sup>6</sup> .

ICONTEC raised CL 7 in order to ask about the “Purpose of Data” reported in the MR section D.1 for the parameter EF<sub>Grid</sub>. The PP correctly updated MR and included the correct option in accordance with the ones offered by the Guideline for Completing the Monitoring Report Form /14/.

The following table includes all parameters monitored and describes how ICONTEC verified the fulfillment of each parameter including the information flow and the values as reported in the latest version of the MR /3/.

**Table 5: Parameters Verification**

<b>Baseline Parameters</b>	<b>Description</b>	<b>Value</b>	<b>Means of verification</b>
<b>KWh generated and delivered daily to the national interconnected grid of Colombia.</b>	<b>Amount of electricity generated and delivered to the national interconnected national grid of Colombia.</b>	24,593 MW/h <sup>7</sup>	<p><b>Source of date and frequency:</b></p> <p>Records of the meters located in the Usaqué electrical substation (commercial frontier), owned by CODENSA<sup>8</sup>.</p> <p>ICONTEC verified that, according to the procedures established in the regulatory framework (CREG Resolution 006 of 2003)<sup>9</sup>, the measurements of meters installed in the commercial frontier are reported to the CND and to ASIC.</p>

<sup>6</sup> [http://www.icbf.gov.co/cargues/avance/docs/resolucion\\_minminas\\_181421\\_2005.htm](http://www.icbf.gov.co/cargues/avance/docs/resolucion_minminas_181421_2005.htm)

<sup>7</sup> See file “CO<sub>2</sub>e Emissions Reductions Santa Ana Hydroelectric Plant (01-08-2011 to 31-07-2012).xls”, cell D23. /4/

<sup>8</sup> CODENSA and EMGESA are both companies of ENDESA Colombia. The grid operator in the project site is CODENSA. <http://corporativo.codensa.com.co/en/conocenos/Pages/home.aspx>

<sup>9</sup> <http://apolo.creg.gov.co/Publicac.nsf/Indice01/Resolucion-2003-Creg006-2003>



Baseline Parameters	Description	Value	Means of verification
			<p>The generated power is hourly measured and read remotely every 24 hours using tele-measurement technology. The information is sent to the National Dispatch Centre (CND).</p> <p>The data of generated power are registered and they are available for consultation (with password) on the website of XM<sup>10</sup>.</p> <p><b>Used equipment:</b></p> <p>Energy meter AMETEK, type JEMSTAR, accuracy class 0.2S. See Table 6. Equipment.</p> <p><b>Data cross checking:</b></p> <p>ICONTEC verified the values of daily generated power, reported in the file of ERs /4/ against the ones published in the official source XM /8/. It was not identified any material misstatement.</p> <p><b>Consistency between the QA/QC defined in the methodologies:</b></p> <p>There is not any QA/QC defined in AMS I.D, version 7 for this parameter.</p> <p><b>Consistency between the QA/QC established by the project participants in the PDD:</b></p> <p>ICONTEC during the onsite visit verified the records of preventive and corrective maintenance performed in Santa Ana Hydroelectric Plant<sup>11</sup> where it was applied the relevant procedures of maintenance in each equipment. ICONTEC raised CL 8 in order to ask about missing information of "Data / Parameter" in MR, section D.2. The PP correctly included the missed information and the finding was closed.</p> <p><b>Verify application of default values:</b></p> <p>It does not apply.</p> <p><b>Findings:</b></p> <p>CL 8</p> <p><b>Conclusions:</b></p> <p>During the verification, ICONTEC confirmed that the parameter is properly applied</p>

<sup>10</sup> <http://www.xm.com.co/Pages/Home.aspx>

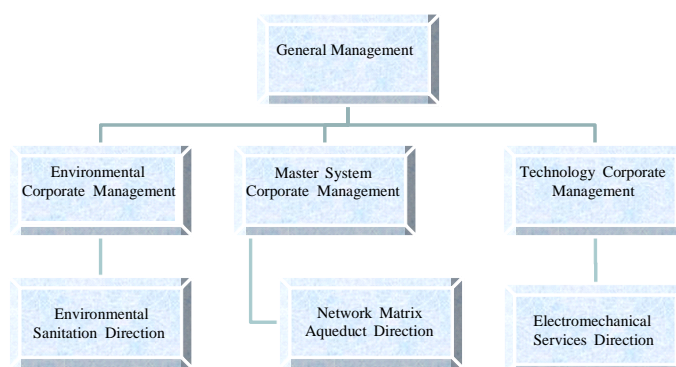
<sup>11</sup> During the onsite visit records of performed maintenance activities were downloaded and printed from the software SAP. The reviewed records correspond to activities performed during the evaluated monitoring period.

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<b>Baseline Parameters</b>	<b>Description</b>	<b>Value</b>	<b>Means of verification</b>
			<i>according to the monitoring plan and the updated PDD, and that the information is consistent with the secondary information sources used to verify the information.</i>

ICONTEC verified that the company has implemented the quality management system under the NTC-ISO 9001:2008.

The organizational structure responsible of the administration, operation, maintenance and monitoring of the CDM project Santa Ana Hydroelectric Plant, during the current monitoring period consists of:



ICONTEC raised CL12 given that roles of authority and responsibility for the monitoring plan reported on MR version 1, section C, table 4 /3/ did not correspond with the ones reported on the registered PDD/1/. The PP explained that the roles of authority currently in force had changed from the ones established in the registered PDD /1/ and corrected the registered PDD changing the outdated roles with the new ones. A post registration change (permanent change, correction) was presented with this report along with an updated / revised PDD<sup>12</sup>.

The authority and responsibility roles that were identified for different aspects associated with the monitoring plan of the project are presented below:

<b>Activity</b>		<b>Authority</b>	<b>Responsibility</b>
Measurement	Internal	Electromechanical Services Office Director	Plant Operator / Energy negotiator
	External	EMGESA	CAM
Registration	Internal	Electromechanical Services Office Director	Plant Operator / Energy negotiator
	External	EMGESA	CAM
Verification	Internal	Electromechanical Services Office Director	Control Center Chief/ Energy negotiator
	External	XM EMGESA CODENSA	CAM CODENSA EMGESA
Report	Internal	Electromechanical Services Office Director	Control Center Chief/ Energy negotiator
	External	EMGESA	CAM
Calibration and maintenance	Internal	Electromechanical Services Office Director	Control Center Chief/ Energy negotiator
	External	EMGESA CODENSA	CAM

<sup>12</sup> Given that the reported correction did not affect the design of the project activity, It was not requested prior approval by the board. ICONTEC along with this report submitted a revised/ updated PDD and a Validation Assessment describing the performed correction.

ICONTEC during the onsite visit verified that EAAB to prevent the occurrence of non-predicted episodes has a general procedure to perform preventive and corrective maintenance services to all electromechanical equipment including the power plant Santa Ana as is described below:

Macroprocess	Process	Procedure
<b>M4</b> Maintenance management	<b>M4FM</b> Electromechanical Maintenance.	<b>M4FM0101</b> Electromechanical preventive maintenance.
Macroprocess	Process	Procedure
<b>M4</b> Maintenance management	<b>M4FM</b> Electromechanical Maintenance.	<b>M4FM0102</b> Electromechanical corrective maintenance.

ICONTEC raised CL 14 given that into the EAAB's quality management system were not documented the procedures for attention of non-predicted episodes and your effective control in accordance with the registered monitoring plan /1/. In the latest version of the MR /3/ the PP adjusted the explanation about the existing procedures in terms of how they currently are supporting the attention of non-predicted episodes and the finding was closed.

In conclusion the process of data management, transfer, storage and reporting was carried out in compliance with the monitoring plan, the revised PDD /2/ and the methodology AMS I.D "*Grid connected renewable electricity generation*", version 7.

ICONTEC can thus conclude that:

- The monitoring has been carried out in accordance with the monitoring plan contained in the updated PDD.
- All parameters stated in the monitoring plan of the updated PDD have been correctly and sufficiently monitored and listed. The monitored data for required parameters have been verified by ICONTEC and have been found complete, reliable and consistent by checking the whole procedure for data aggregation.

### 3.5 COMPLIANCE WITH THE CALIBRATION FREQUENCY REQUIREMENTS FOR MEASURING INSTRUMENTS

Table 6 includes these parameters, and the information about equipment identification and calibration records. The DOE verified that the dates of certified calibrations covered the entire 7<sup>th</sup> monitoring period from 01/08/2011 to 31/07/2012.

**Table 6: Equipment**

Parameter	Equipment	Calibration frequency	Calibration records	Date of Calibration
<i>KWh generated and delivered daily to the national</i>	<i>CODENSA's Main meter: AMETEK S/N 102013561 Accuracy class: 0.2S</i>	<i>In accordance with the Manufacturer's Specification<sup>13</sup></i>	<i>Calibration certificate CAM-IM1010-020007, issued by CAM</i>	<i>27/10/2010<sup>14</sup></i>

<sup>13</sup> ICONTEC verified that neither in the registered PDD /1/ nor in the applied methodology /18/ there are calibration frequencies defined for electricity meters. However the PP has adopted the calibration frequencies established by

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interconnected grid of Colombia.			/22/.  Acts of installation N° AT 07771 and AT 07772 issued by CAM, dated on 03/11/2010 /23/.	
	CODENSA's Supporting meter AMETEK S/N 102013562 Accuracy class: 0.2S	In accordance with the Manufacturer's Specification <sup>12</sup>	Calibration certificate CAM-IM1010-020003, issued by CAM /24/.  Acts of installation N° AT 08025 and AT 08027 issued by CAM, dated on 30/11/2010 /25/.	26/10/2010 <sup>13</sup>
	EAAB's Main meter <sup>15</sup> AMETEK S/N 14600821 Accuracy Class: 0.2S	In accordance with the Manufacturer's Specification <sup>12</sup>	Calibration certificate CAM-IM1003-001400 issued by CAM /27/.	16/03/2010
	EAAB's Supporting meter <sup>14</sup> AMETEK S/N 14600822 Accuracy Class: 0.2S	In accordance with the Manufacturer's Specification <sup>12</sup>	Calibration certificate CAM-IM1004-002887 issued by CAM /28/.	15/04/2010

ICONTEC concluded that the calibration is conducted in accordance with the Meter's Manufacturer Manual /29/, the Colombian Regulatory Framework /30/, the registered PDD /1/ and the approved revised monitoring plan /2/.

### 3.6 ASSESSMENT OF DATA AND CALCULATION OF EMISSION REDUCTIONS

In accordance with AMS I.D, version 7, the baseline is the kWh produced by project activity (Santa Ana Hydroelectric Plant) multiplied by the emission factor of the national interconnected grid of Colombia.

ICONTEC during the onsite visit verified that the baseline of Santa Ana Hydroelectric Plant uses the official emission factor of national interconnected grid (0.4392 kg CO<sub>2</sub>e/kWh.) defined in the Resolution 181421 of November 2005, issued by Ministry of Mines and Energy of Colombia.

The project emissions by sources of GHG due to the project activity are considered to be zero by AMS I.D, version 7.

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the grid operator CODENSA, which in turn has adopted the recommendations from the meter's manufacturer /26/, /29/ and /30/.

<sup>14</sup> ICONTEC verified the conformity certificates /26/ issued by the manufacturer AMETEK for the meters 102013561 and 102013562. The conformity certificates support the performing of the meters since 05/10/2010 until 05/10/2013 (period where is included the evaluated monitoring period). Additionally before the installation of the meters, the company contracted by the grid operator for calibration activities (CAM) made the calibration of each one of the meters (102013562 and 102013561) on 26/10/2010 and 27/10/2010 respectively.

<sup>15</sup> These meters are used as internal cross check by EAAB and do not report the official measure.

Given that, Leakages are to be considered only when transferring existing renewable energy technology from another activity and Santa Ana Hydroelectric Plant is not transferring existing renewable energy technology from another activity, leakages are considered as zero.

Hence:

$$ER_y = BE_y$$

$$BE_y = EG_y \times EF = 24,593 \text{ [MWh/year]} \times 0.4392 \text{ [kg CO}_2\text{e/kWh]} = 10,801 \text{ tCO}_2\text{e.}$$

ICONTEC verified that the file of Emission Reductions Calculation /4/ contains all information on the performed calculations, information which is in compliance with AMS I.D, version 7 and the monitoring plan included in the updated PDD /2/.

ICONTEC verified that emission reductions achieved during this monitoring period were lower than the calculated ex-ante value of emissions reduction in the registered PDD /1/ or revised approved PDD /2/.

ICONTEC verified by reviewing the reports of generated energy /7/, /8/ and by the given explanations about the happened failures during the current monitoring period that there was a significant impact in the availability of the project, which in turn affected the energy generation.

All aspects related to direct and indirect emissions, including project emission parameters, baseline emission parameters, leakage, assumptions, appropriate emission factor, and also the reductions claimed were covered during the verification. ICONTEC verified the correct application of the formulae according with the applied methodology /18/, and the data sources for each parameter and the application of default values.

ICONTEC can confirm that:

- a) The data used for determination of the emission reductions are available and monitored in accordance with the updated monitoring plan and the methodology AMS I.D, version 7.
- b) The data used in the calculation of anthropogenic emission reductions for this monitoring period have been verified and found consistent with those in the updated PDD /2/.
- c) The appropriate methods and formulae for calculating baseline emissions, project emissions and leakages have been followed in accordance with the updated PDD /1/.
- d) The assumptions, emission factors and default values applied in the MR and the calculations were correctly justified by PP in the latest version of the MR /3/.

## 4. POST REGISTRATION CHANGES

### 4.1 TEMPORARY DEVIATIONS FROM THE REGISTERED MONITORING PLAN AND /OR MONITORING METHODOLOGY

There are no deviations from the registered monitoring plan and/or methodology.

## **4.2 CORRECTIONS**

There were 2 corrections to project information or parameters fixed at validation, which were described in the updated/revised PDD /2/ and in the validation assessment submitted along with this report.

ICONTEC during the onsite visit and by reviewing the corrections proposed by PP in the updated version of the PDD /2/ could verify that those corrections accurately reflect both the actual roles and responsibilities of EAAB's professionals with the monitoring of the project and the correct number of procedures for maintenance and operation currently approved.

## **4.3 CHANGES TO THE START DATE OF THE CREDITING PERIOD**

The project participant has not changed the start date of the crediting period.

## **4.4 PERMANENT CHANGES FROM THE REGISTERED MONITORING PLAN OR MONITORING METHODOLOGY**

There are no permanent changes from the registered monitoring plan and/or methodology.

## **4.5 CHANGES TO THE PROJECT DESIGN OF A REGISTERED PROJECT ACTIVITY**

There are no proposed or actual changes to the project design of the registered CDM project activity.

## 4.6 VERIFICATION STATEMENT

ICONTEC has been engaged by Empresa de Acueducto y Alcantarillado de Bogotá (EAAB – ESP) to verify the greenhouse gas (GHG) emission reductions reported by the CDM project Santa Ana Hydroelectric Plant, project registration number 0275, owned by PP for the period 01/08/2011 to 31/07/2012, equating to 10,801 tonnes of CO<sub>2</sub> equivalent.

The verification was performed based on the requirements set by the CDM and relevant guidance provided by CMP and the CDM Executive Board. ICONTEC considers that the project's GHG emissions and resulting GHG emissions reductions reported in the monitoring report version 3 dated on 29/11/2013, are fairly stated. ICONTEC confirms that the project is implemented as described in the revised PDD. Installed equipment essential for generating emission reductions are running reliably and calibrated appropriately. The monitoring system is in place and the project is generating GHG emission reductions as a CDM project.

Santa Ana Hydroelectric Plant is responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions on the basis set out within the project's monitoring and verification plan. Santa Ana Hydroelectric Plant is responsible for developing and keeping records and reporting procedures in accordance with the monitoring plan.

ICONTEC received the information and asked for explanations we deemed necessary to provide enough evidence that the amount of GHG emission and the calculation of the GHG emission reductions, based on the Monitoring Report, are fairly stated for the reporting period. The verification consisted of the three following phases: i) desk review of the PDD, the MR and the monitoring plan ii) follow-up interviews with project stakeholders; iii) resolution of outstanding issues and the issuance of the final verification report and opinion.

It is ICONTEC's responsibility to set an independent GHG verification opinion on the GHG emissions from the project and approved a baseline for the monitoring period.

ICONTEC utilizes a risk-based approach that draws on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate them. ICONTEC's examination process includes test-based assessments of all evidence relevant to the amounts and disclosures of a project's GHG emissions and the calculations of such reductions for the reporting period.

ICONTEC can confirm that the GHG emissions reductions are calculated without material misstatements. Our opinion applies to the project's GHG emissions and the resulting GHG emissions reductions reported and related to the validated and registered baseline, as well as the monitoring plan and its associated documents. ICONTEC confirms the following statement:

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CDM project:	Santa Ana Hydroelectric Plant, reg. number 0275
Reporting period:	01/08/2011 to 31/07/2012
Baseline emissions:	10,801 tCO <sub>2</sub> equivalents
Project emissions:	0 tCO <sub>2</sub> equivalents
Leakage:	0 tCO <sub>2</sub> equivalents
Emission Reductions:	10,801 tCO <sub>2</sub> equivalents

Bogotá D.C, December 23<sup>th</sup> 2013

A handwritten signature in black ink, appearing to read 'Monica Vivas'.

Monica Vivas  
Director of Conformity Assessment Services  
ICONTEC



## 5. REFERENCES

- /1/ CDM Project Design Document, version 02, dated on 10/01/2006. File:
  - PDD\_SantaAna\_Final.pdf
- /2/ Updated CDM Project Design Document, version 03.0, dated on 29/11/2013. File:
- /3/
  - 061213 PDD\_Santa Ana hydroelectric plant- V3 CLEAN - VVS.pdf
 Monitoring report for the seventh verification of the project *Santa Ana Hydroelectric Plant*, issued by Empresa de Acueducto y Alcantarillado de Bogotá (EAAB – ESP), version 1 dated on 29/12/2012, version 2 dated on 25/11/2013 and version 3, dated on 29/11/2013. Files:
  - MR 7 Santa Ana Hydroelectric Plant (v1)ajustada.pdf
  - 251113 MR Santa Ana Hydroelectric Plant\_EAAB V2 - CLEAN.pdf
- /4/
  - 061213 MR Santa Ana Hydroelectric Plant\_EAAB V3 - CLEAN.pdf
 Emission reductions calculation file, issued by Empresa de Acueducto y Alcantarillado de Bogotá (EAAB – ESP), dated on 01/03/2013. File:
  - CO2e Emissions Reductions Santa Ana Hydroelectric Plant (01-08-2011 to 31-07-2012).xls
- /5/ Monitoring report for the sixth verification of the project *Santa Ana Hydroelectric Plant*, issued by Empresa de Acueducto y Alcantarillado de Bogotá (EAAB – ESP), version 2, dated on 16/04/2011. File:
- /6/
  - Monitoring Report No.pdf
 Verification report for the sixth periodic verification of the project *Santa Ana Hydroelectric Plant*, issued by ICONTEC INTERNACIONAL, version 01, dated on November 2012. File:
  - Verification Report Santa Ana Nov2012.pdf
- Technical report of generated energy by Santa Ana Hydroelectric Plant during the period 2011-2012, issued by Empresa de Acueducto y Alcantarillado de Bogotá (EAAB – ESP), dated on September 2012. File:
  - Informe técnico Santa Ana 2011-2012.pdf
- /8/ Records of generated energy by Santa Ana Hydroelectric Plant during the period (01/08/2011 - 31/07/2012), issued by XM, dated on 02/01/2013. File:
  - Energia real (01-08-2011 a 31-07-2012).pdf
- Contract 1-10-26300-0842-2011 of electrical connection between EAAB and CODENSA, dated on 30/12/2011. File:
  - 301211 Contract 1-10-26300-0842-2011.pdf
- /10/ Act of service commencement for the contract 1-10-26300-0842-2011 signed by EAAB and CODENSA, dated on 02/05/2012. File:
  - 020512 Initiation act\_contract 1-10-26300-0842-2011.pdf
- /11/ Report with the proposed strategy for the correction of the FAR raised during the seventh verification of the project *Santa Ana Hydroelectric Plant*, issued by Empresa de Acueducto y Alcantarillado de Bogotá (EAAB – ESP), dated on 27/11/2013. File:
  - 181113 Plan de acción indicativo\_FAR 14 verificación MDL PCH Santa

Ana.xls

Maintenance procedures for the project Santa Ana Hydroelectric Plant, issued by Empresa de Acueducto y Alcantarillado de Bogotá (EAAB – ESP), dated on June 2013. Files:

- M4FM0102P-02 Mantenimiento Correctivo electromecánico.pdf
- M4MA0407I01 01 Puesta en marcha y operacion PCH.pdf
- M4MA0407I02 01 Medicion y analisis de datos.pdf
- M4MA0407I03 01 Rechazo de carga de la PCH Santa Ana.pdf
- M4MA0407I04 01 Conciliacion de resultados.pdf
- /13/ • M4MA0407P 01\_Generación de Energía.pdf
- M4MA0504P-01\_Mantenimiento Preventivo PCH.pdf
- /14/ • MAFM0101P-02 Mantenimiento Preventivo Electromecánico.pdf
- Procedimiento TM-PR-08 CAM.pdf
- /15/ Guidelines for Sampling and Surveys for CDM Project Activities and
- /16/ Programme of Activities, version 02.0.
- /17/ Guidelines for Completing the Monitoring Report Form, version 04.0 and
- /18/ Monitoring report form (F-CDM-MR), version 03.1.
- /19/ CDM Validation and Verification Standard, version 05.0.
- /20/ CDM Project Cycle Procedure, version 05.0
- CDM Project Standard, version 05.0
- /21/ Methodology AMS I.D “*Grid connected renewable electricity generation*”, version 7.
- /22/ Guideline on the Application of Materiality in Verifications, version 01.0.
- Standard for Sampling and Surveys for CDM Project Activities and Programme
- /23/ of Activities, version 03.0.
- Single Line Diagram for *Santa Ana Hydroelectric Plant*, issued by CODENSA
- /24/ S.A E.S.P, dated on 2012.
- Calibration certificate CAM-IM1010-020007, issued by CAM for the meter
- /25/ AMETEK 102013561, dated on 27/10/2010.
- Acts of installation for meter AMETEK 102013561 N° AT 07771 and AT 07772
- /26/ issued by CAM, dated on 03/11/2010.
- Calibration certificate CAM-IM1010-020003, issued by CAM for the meter
- AMETEK 102013562, dated on 26/10/2010.
- Acts of installation for meter AMETEK 102013562 N° AT 08025 and AT 08027
- /27/ issued by CAM, dated on 03/11/2010.
- /28/ Manufacturer Conformity for Meters AMETEK type JEMSTAR, Model JS-
- /29/ 09R6010-31, issued by AMETEK Power Systems & Instruments, dated on 05/10/2010. Serial numbers:
- S/N 102013561
- S/N 102013562
- /30/ Calibration certificate CAM-IM1003-001400 issued by CAM, dated on 16/03/2010.
- Calibration certificate CAM-IM1004-002887 issued by CAM, dated on 15/04/2010.
- JEMSTAR Digital Multifunction Electricity Meter User Manual, issued by AMETEK Power Instruments, dated on August 2010, pages 83-99. File:

“JEMStar\_Manual.pdf”. See:

<http://www.ametekpower.com/download.aspx?AttributeFileId=6194bec4-1100-4b36-9596-91a5b0a00ed0>

Colombian                      Electrical                      measuring                      code

<http://apolo.creg.gov.co/Publicac.nsf/Indice01/Codigos-1995-RES.025-1995.COD..REDES.-.COD.MEDIDA>

## **6. ANNEXES**

**Annex A**

**Verification Protocol**

The audit team conducted a thorough, independent assessment of the registered project activities.

The next table contains questions that the audit team shall follow in order to determine whether the project activity complies with the requirements of paragraph 62 of the CDM modalities and procedures. The audit team ensures that the only verification activities undertaken after the publication of the monitoring report on the UNFCCC CDM website were used as a basis for the DOE to conclude their verification and submit a request for issuance of CERs to the board.

Questions were answered on the right column using the following scores:

- Full: When the audit team had full access to the required information, the information is complete and satisfactory
- Partial: When the audit team did not have access to the information, or the information is incomplete, or not satisfactory. In this case, indicate finding type and number.
- Resolved: When a partial score is assigned, indicate the date when the finding was closed
- N/A: Shall be used when the question does not apply.

When raising a clarification request, corrective action request and forward action, it is in accordance to VVS version 05.0, paragraphs 219-224.

**Table A1: VERIFICATION PROTOCOL**

A. Completeness of information and quality of evidence	REFERENCES	Score
<p><b>A.1. In desk review</b></p> <p><i>Verify completeness of information, both quantitative and qualitative, in accordance to VVS Art 209-216, 217(a),218</i></p> <p><i>In addition to monitoring documentation, did the auditor review the following:</i></p> <ul style="list-style-type: none"> <li>a) <i>The registered PDD and the monitoring plan, including any approved revised monitoring plan and/or changes from the registered PDD, and the corresponding validation opinion</i></li> <li>b) <i>The validation report</i></li> <li>c) <i>Previous verification reports, if any</i></li> <li>d) <i>The applied monitoring methodology</i></li> <li>e) <i>The monitoring report to verify that it is as per the standardized format (EB 54, annex 34)</i></li> <li>f) <i>Any other information and references relevant to the project activity's emissions reductions (e.g. IPCC reports, data on electricity generation in the national grid or laboratory analysis and national regulations).</i></li> </ul>	See section 2.2	Full

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<i>In addition to reviewing the monitoring documentation, the DOE shall determine whether the project participants have addressed the FARs identified during the validation or previous verification(s). VVS v 05.0 art 213.</i>	See section 3.1	Partial See FAR 1
<i>Determine whether the project status is specified in the monitoring report; otherwise, it may be confirmed through an e-mail to the project participant.</i>	See section 3	Full
<b>A.2. Quality of evidence</b> <i>When assessing the audit trail, did the auditor:</i> <ul style="list-style-type: none"> <li>a) <i>Address whether there is sufficient evidence available, both in terms of frequency (time period between evidence) and coverage (in covering the full monitoring the full monitoring period).</i></li> <li>b) <i>Address the source and nature of the evidence (external or internal, oral or documented).</i></li> <li>c) <i>Cross-check the monitoring report against other sources such as comparable information, where available, from sources other than those used in the monitoring report to determine whether the stated figures are correct.</i></li> </ul>		

**A.3. On site visit**

*The on site visit assessment shall involve all means of verification specified on VVS V 05.0 Art 217 b If an onsite visit is not conducted, the DOE shall justify the rationale of the decision.*

- i. *An assessment of the implementation and operation of the registered project activity as per the registered PDD or any approved revised PDD;*
- ii. *A review of information flows for generating, aggregating and reporting the monitoring parameters;*
- iii. *Interviews with relevant personnel to determine whether the operational and data collection procedures are implemented in accordance with the monitoring plan in the PDD;*
- iv. *A cross check between information provided in the monitoring report and data from other sources such as plant logbooks, inventories, purchase records or similar data sources;*
- v. *A check of the monitoring equipment including calibration performance and observations of monitoring practices against the requirements of the PDD and the selected methodology and corresponding tool(s), where applicable;*
- vi. *A review of calculations and assumptions made in determining the GHG data and emission reductions;*
- vii. *An identification of quality control and quality assurance procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters.*
- viii. *Confirm project status during the visit*

See section 2.3

Full

**B. Verification of compliance in accordance to VVS v 05.0 art 225**

**B.1. Compliance of the project implementation with the registered project design document VVS v 05.0 art 226-228**

*Were there identified any concerns related to the conformity of the actual project activity and its operation with the registered project design document?*

See section 3.2

Partial  
See CL 4, CL 5 and CL 10

- a) *Has the implementation and operation of the project activity been conducted in accordance with the description contained in the registered PDD*
- b) *Did any deviation or the proposed or actual changes in the implementation or operation project activity comply with the*

See section 3.2

Partial  
See CL 4, CL 5 and CL 10



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requirements of the Project Standard?		
<b>B.2. Compliance of the monitoring plan with the monitoring methodology including applicable tool(s) VVS v 05.0 art 229-232</b>		
<p><i>Determine whether the monitoring plan of the project activity is in accordance with the applied methodology including applicable tool(s)</i></p> <p><i>Is the project implementation in accordance with the provisions of the registered PDD and/or an approved revised PDD?</i></p>	See section 3.3	Partial See CL1, CL2 and CL3
<p><i>For monitoring aspects that are not specified in the methodology, particularly in the case of small-scale methodologies (e.g. additional monitoring parameters, monitoring frequency and calibration frequency), the DOE should bring to the attention of the Board issues which may enhance the level of the accuracy and completeness of the monitoring plan, See VVS v 05.0 art 231.</i></p>	See section 3.3	Partial See CL1, CL2 and CL3
<b>B.3. Compliance of the monitoring activities with the registered monitoring plan VVS v 05.0 art 233-236</b>		
a) <i>Has the monitoring plan been properly implemented and followed by the project participants</i>	See section 3.4	Partial See CL7, CL8, CL12 and CL14
<p>b) <i>Have all parameters stated in the monitoring plan and relevant Board decisions been monitored and updated as applicable, including:</i></p> <ul style="list-style-type: none"> <li><i>i. Project emissions parameters</i></li> <li><i>ii. Baseline emissions parameters</i></li> <li><i>iii. Leakage parameters</i></li> <li><i>iv. Management and operational systems: the responsibilities and authorities for monitoring and reporting are in accordance with the responsibilities and authorities in the monitoring plan,</i></li> </ul>	See section 3.4	Partial See CL7, CL8, CL12 and CL14
c) <i>Was the equipment used for monitoring controlled and calibrated in accordance with the monitoring plan, the applied methodology, the Board guidance, local/national standards, or as per manufacture's specification?</i>	See section 3.4	Partial See CL7, CL8, CL12 and CL14

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d) <i>Were the monitoring results consistently recorded as per approved frequency?</i>	See section 3.4	Partial See CL7, CL8, CL12 and CL14
e) <i>Have quality assurance and quality control procedures been applied in accordance with the monitoring plan or the revised monitoring plan?</i>	See section 3.4	Partial See CL7, CL8, CL12 and CL14
<b>B.4. Compliance of the calibration frequency requirements for measuring instruments VVS v 05.0 art 237-243</b>		
<p><i>Was the calibration of measuring equipment, which have an impact on the claimed emissions reductions, conducted by the project participants at a frequency specified in the applied monitoring methodology and/or monitoring plan?</i></p> <p>a) <i>Were the calibrations results available, complete and shown in their original results? If not see 239 and 240</i></p> <p>b) <i>Were the calibrations of measuring equipment conducted at the time of verification at a frequency specified in the applied monitoring methodology and/or monitoring plan? If not see 240 and 241</i></p>	See section 3.5	Full
<b>B.5. Assessment of data and calculation of emission reductions VVS v 05.0 art 244-246</b>		
<p><i>The DOE shall determine whether:</i></p> <p>a) <i>A complete set of data for the specified monitoring period is available. If only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, the DOE shall either raise a CAR for the project participants to comply with the requirements of appendix 1 of the Project standard or submit a request for deviation prior to submitting the request for issuance, if appropriate;</i></p> <p>b) <i>Information provided in the monitoring report has been cross-checked with other sources such as plant logbooks, inventories, purchase records, laboratory analysis;</i></p> <p>c) <i>Calculations of baseline emissions, and project activity emissions and leakage, as appropriate, have been carried out in accordance with the formulae and methods described in the monitoring plan and the applied methodology document;</i></p>	See section 3.6	Full

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<p>d) Any assumptions used in emission calculations have been justified;</p> <p>e) Appropriate emission factors, IPCC default values and other reference values have been correctly applied.</p>		
<b>C. Post registration changes</b>		
<b>General VVS v 05.0 art 247-250</b>		
When the project participant has request post-registration changes, did the changes require prior approval by the board in accordance with appendix 1 of Project Standard?	See section 4	Partial See CL11 and CL12
Have post-registration changes submissions complied with the procedures for post-registration changes and the Project cycle procedure?	See section 4	Full
<b>C.1. Temporary deviation from the registered monitoring plan and/or monitoring methodology VVS v 05.0 251-256</b>		
Has the DOE identified that the project participants have deviated from the registered monitoring plan and/or methodology? VVS v 05.0 art 252	See section 4.1	Full
<b>C.2. Corrections VVS v 05.0 art 257-259</b>		
<p>If the DOE identifies that the project participants have made corrections to project information or parameters determined at validation, the DOE shall determine whether:</p> <p>a) The corrected information is an accurate reflection of actual project information; and/or</p> <p>b) The corrected parameters are in accordance with the applied methodology and/or selected monitoring plan.</p>	See section 4.2	Partial See CL11 and CL12
<b>C.3. Changes to the start date of the crediting period VVS v 05.0 art 260-261</b>		
<p>If the project participants wish to change the start date of the crediting period in accordance with section H of the Project standard:</p> <p>a) Has the proposed changes resulted in a less conservative baseline?</p>	See section 4.3	Full

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b) Have the requirements in the Project standard been met?		
<b>C.4. Permanent changes from the registered monitoring plan or monitoring methodology VVS v 05.0 art 262-268</b>		
The DOE shall determine whether the changes to the monitoring plan contained in the registered PDD proposed by the project participants are in compliance with the applied methodology and do not reduce the level of accuracy of the monitoring compared with the requirements contained in the registered monitoring plan (art 263)	See section 4.4	Full
In cases where the proposed changes refer to a later version of the applied methodology in the registered PDD, have the methodology version and tools changes in the registered PDD impacted the conservativeness of the monitoring and verification process, including the related emission reduction calculations? (art 264)	See section 4.4	Full
The DOE shall identify whether the project participants are unable to implement the monitoring plan contained in the registered PDD and if it will not be possible to monitor the registered CDM project activity in accordance with a monitoring plan (art 265)	See section 4.4	Full
The DOE shall determine whether the permanent changes are likely to lead to a reduction in the accuracy of the calculation of emission reductions (art 266)	See section 4.3	Full
<b>C.5. Changes to the project design of a registered project activity VVS v 05.0 art 269-282</b>		
If the DOE identifies that the project design in the implementation or operation of the project activity does not conform with the description contained in the registered PDD or the relevant provisions of appendix 1 of the Project standard, the DOE shall request guidance from the Board concerning the acceptability of the proposed or actual changes in accordance with the section on post registration changes in the Project cycle procedure. (art 270)	See section 4.5	Full
In case of actual changes, the DOE shall, by means of an onsite visit and review of	See section 4.5	Full

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<i>the submitted revised PDD by the project participants, which describes the nature and extent of the actual changes, determine whether this description accurately reflects the implementation, operation and monitoring of the modified project activity. (art 271)</i>		
<i>The DOE shall conduct an onsite inspection to assess the impacts of the actual changes on the compliance of the monitoring plan, the applied monitoring methodology and tools and/or the level of accuracy of the monitoring activity. (art 272)</i>	See section 4.5	Full
<i>The DOE shall, by means of reviewing the revised PDD against applicable additionality and methodological requirements, determine whether the proposed or actual changes would adversely affect the conclusions of the validation report of the registered PDD with regard to: (art 273)</i>  <i>Additionality of the project activity;</i>  <i>Scale of the project activity;</i>  <i>Applicability and application of approved baseline methodology under which the project activity has been registered; or</i>  <i>The compliance of the monitoring plan with the applied monitoring methodology.</i>	See section 4.5	Full
<i>If the proposed or actual changes affect the additionality of the project activity then the DOE shall confirm that: (art 274)</i> <i>In the case of investment analysis, project participants have only modified the key parameters in the original spreadsheet calculations affected by the proposed or actual changes to the project activity;</i> <i>In the case where only barriers have been claimed to demonstrate additionality, project participants have demonstrated that the barriers are still valid under the new circumstances.</i>	See section 4.5	Full
<i>In cases where the proposed or actual changes impact the implementation of the project activity and where the original methodology would no longer be applicable, and where the project participant applies a later version of the methodology or another methodology that is applicable to the project activity, the DOE shall confirm that the applied methodology and tools do not impact the conservativeness of the monitoring and verification process and the related emission reduction calculations.</i>	See section 4.5	Full

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(art 275)		
<i>The DOE shall assess whether the revised PDD complies with the applied monitoring methodology and tools or any later version of the methodology or the requirements of another methodology that is applicable to the project activity. (art 276)</i>	See section 4.5	Full
<b>D. Specific verification requirements VVS v 05.0 art 288-296</b>		
<b>D.1. Afforestation or reforestation project activities</b>		
<i>During the first verification, the DOE, in accordance with paragraph 34(d) of the CDM modalities and procedures of afforestation and reforestation project activities shall confirm those areas of land for which the control over A/R project activity has been established by the project participant since validation. (art 288)</i>	N/A	N/A
<i>As part of the first verification report, the DOE shall confirm that the boundary of the A/R project activity geographically delineates afforestation or reforestation project activity under the control of the project participants. (art 289)</i>	N/A	N/A
<b>D.2. Programme of activities</b>		
<p><i>If, subsequent to the registration of the programme of activities (PoA), a new coordinating/managing entity is added then the DOE that is undertaking the next inclusion of a CPA shall submit: (art 290)</i></p> <ul style="list-style-type: none"> <li><i>a) New letter(s) of authorization from each respective host Party stating the change in the coordinating/managing entity;</i></li> <li><i>b) A confirmation from the new coordinating/managing entity that the PoA will be developed and implemented with the same set framework as originally described in the CDM-PoA-DD; and</i></li> <li><i>c) A validation opinion regarding the compliance of the new coordinating/managing entity.</i></li> </ul>	N/A	N/A
<b>D.2.1. Post-registration change to boundary of programme of activities</b>		

<p><i>The DOE shall determine whether the boundary of the PoA is amended post-registration to expand the geographic coverage or to include an additional host Party provided: (art 291)</i></p> <ul style="list-style-type: none"> <li>a) <i>The existing registered PoA design document (CDM-PoA-DD) is revised to reflect the changes, in particular the eligibility criteria for inclusion of CPAs;</i></li> <li>b) <i>The baseline established in the CDM-PoA-DD is applicable to the extended PoA boundary; and</i></li> <li>c) <i>The DNA of the new host Party issues a letter of approval for the PoA and a letter of authorization for the coordinating/managing entity where the amended PoA boundary includes additional host Parties.</i></li> </ul>	<p>N/A</p>	<p>N/A</p>
<p><b>D.2.2. Request for issuance of certified emission reduction for PoA</b></p>		
<p><i>A DOE that has not performed validation activities for a PoA (validation of the PoA, inclusion of CPAs, renewal of the PoA, or renewal of crediting period of CPAs) shall (art 292)</i></p> <ul style="list-style-type: none"> <li>d) <i>Identify those CPAs that it shall consider for verification in accordance with the method/procedure to be used for verification of the amount of reductions of anthropogenic emissions by sources or removals by sinks of greenhouse gases achieved by CPAs under the PoA and determined in the PoA-DD;</i></li> <li>e) <i>Take into account the possible existence of CPAs complying with different versions of the PoA and the need to account for this in its sampling approach, to ensure that a statistically sound sample of CPAs from each version of the PoA are being verified;</i></li> <li>f) <i>Make the monitoring report received from the coordinating/managing entity publicly available in an immediate fashion in accordance with the Project cycle procedure;</i></li> <li>g) <i>Systematically verify and certify the correct implementation and operation of the record-keeping system.</i></li> </ul>	<p>N/A</p>	<p>N/A</p>

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<i>The DOE conducting the verification shall include in its verification report a description of how it applied the methods/procedures for the purpose of verification stipulated in the registered CDM-PoA-DD. The DOE shall include in its verification report a description/justification of the site visits undertaken. (art 293)</i>	N/A	N/A
<i>A DOE shall request issuance of CERs for a PoA in accordance with the Project cycle procedure. The request shall relate to all CPAs included in the PoA during the specified monitoring period. The monitoring periods shall be consecutive. A request for issuance shall relate to the certified emission reductions verified as per the above. (art 294)</i>	N/A	N/A
<i>A DOE shall not request issuance of CERs for a PoA within 90 days of the previous request for issuance. (art 295)</i>	N/A	N/A
<b>D.2.3. Review of erroneous inclusion of a CPA</b>		
<i>The DOE shall confirm that a CPA that has been excluded shall not be re-included again in that or any other PoA, or qualify as a project activity. (art 295)</i>	N/A	N/A



**Table A2: FINDINGS**

During this verification, the issues identified related to the monitoring, implementation or operations of the proposed CDM project activity that could impair the capacity of the proposed CDM project activity to achieve emission reductions or influence the reporting of emission reductions are been discussed and concluded on this verification report.(VVS version 05.0, paragraph 219)

This report includes all CARs, CLs and FARs raised in this verification. The reporting of these is undertaken in a transparent manner that allows the reader to understand the issue raised, the responses provided by the project participants, the means of verification of such responses and references to any resulting changes in the monitoring report or supporting annexes. (VVS version 05.0, paragraph 224).

## VERIFICATION REPORT VVS



Report clarifications and corrective action requests	Reference	Summary of project owner response	Verification conclusion
<p>CL 1</p> <p>In the MR's cover there are wrong format date for "Completion date of the monitoring report" and "Monitoring period number and duration of this monitoring period".</p>	<p>CDM VVS, version 05.0, paragraph 212 ( e )</p> <p>CDM VVS, version 05.0, paragraph 221</p> <p>Guideline for completing the MR form, version 04.0, section "Specific Guidelines"</p>	<p><i>On Monitoring Report cover, the format date of "Completion date of the monitoring report" and "Monitoring period number and duration of this monitoring period" have been corrected. The MR corrected is attached to this document and included into the dropbox as a share file.</i></p>	<p>Verification Team Response:</p> <p>The PP corrected the raised issues in the latest version of the MR.</p> <p>Verification Team Conclusion:</p> <p>Closed. 26.11.2013.</p>
<p>CL 2</p> <p>In the MR, section A.4 are not indicated the exact references (number, title, version) of any tools and other methodologies to which the applied methodologies refers. Also there is an explanation about the calculation of the Combine Margin EF, which is not requested in this section.</p>	<p>CDM VVS, version 05.0, paragraph 212 ( e )</p> <p>CDM VVS, version 05.0, paragraph 221</p> <p>Guideline for completing the MR form, version 04.0, section "A.4"</p>	<p><i>On section A.4 of MR, the complete reference of the methodology applied has been included (number, title and version) and the following text was included "No additional methodologies or tools were applied". In addition, the explanation of the Emission Factor calculation has been deleted in order to be consistent with the information requirements. The MR corrected is attached to this document and included into the dropbox as a share file.</i></p>	<p>Verification Team Response:</p> <p>It was indicated the exact reference of the applied methodology and it was deleted the explanation about the calculation of the Combine Margin EF, which was not requested in this section.</p> <p>Verification Team Conclusion:</p> <p>Closed. 26.11.2013</p>
<p>CL 3</p> <p>In the MR, section A.5 are not indicated neither the type of crediting period nor the length of the crediting period corresponding to this monitoring period. Also the format used for the "start date" is not in accordance</p>	<p>CDM VVS, versión 05.0, paragraph 212 ( e )</p> <p>CDM VVS, version 05.0, paragraph 221</p> <p>Guideline for completing the MR form, version 04.0, section "A.5"</p>	<p><i>On section A.5 of MR, has been added the type of crediting period and the length of the crediting period corresponding to this monitoring period. In addition the format date has been adjusted. The MR corrected is attached to this document and included into the dropbox as a share file.</i></p>	<p>Verification Team Response:</p> <p>In the latest version of the MR were correctly quoted the type of crediting period and the length of the crediting period corresponding to this monitoring period.</p> <p>Verification Team Conclusion:</p> <p>Closed. 26.11.2013</p>

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<b>Report clarifications and corrective action requests</b>	<b>Reference</b>	<b>Summary of project owner response</b>	<b>Verification conclusion</b>
with the one requested by the guideline for completing the MR form.			
<p>CL4</p> <p>In the MR, section B.1, page 9 there are inconsistencies between the reported dates of Pratt Valve's Damage Event (11/06/2011 until 15/12/2012.) and the plant start operation (16/12/2011).</p>	<p>CDM VVS, version 05.0, paragraph 217 ( a ) (i)</p> <p>CDM VVS, version 05.0, paragraph 221</p>	<p><i>On section B.1 there was a misprint, since the real period in which the power generation was suspended is "from 11/06/2011 (18:00 p.m.) until 15/12/2011"; therefore the reported dates for the Pratt Valve Damage Event and the power plant operation have been corrected in order to reflect the real operation conditions of the project (on the first paragraph of events was changed the date 15/12/2012 to 15/12/2011). The MR corrected is attached to this document and included into the dropbox as a share file.</i></p>	<p>Verification Team Response:</p> <p>In the latest version of the MR were corrected the inconsistencies between the reported dates of Pratt Valve's Damage Event (11/06/2011 until 15/12/2012.) and the plant start operation (16/12/2011).</p> <p>Verification Team Conclusion: Closed. 26.11.2013</p>
<p>CL 5</p> <p>There are inconsistencies between the information reported in the MR, section B.1, page 9 (the power generation was suspended from 11/06/2011 (18:00 p.m.) until 15/12/2012.) and the one reported in the file "CO2e Emissions Reductions Santa Ana Hydroelectric Plant (01-08-2011 to 31-07-2012).xls", cells D29:D126, where there are values of generated electricity.</p>	<p>CDM VVS, version 05.0, paragraph 217 ( a ) (i)</p> <p>CDM VVS, version 05.0, paragraph 221</p>	<p><i>On section B.1 there was a misprint, since the real period in which the power generation was suspended is "from 11/06/2011 (18:00 p.m.) until 15/12/2011"; therefore the reported dates for the power generation suspension (caused by the Pratt Valve Damage Event) and the power plant operation have been corrected in order to reflect the real operation conditions of the project reported on the file "CO2e Emissions Reductions Santa Ana Hydroelectric Plant (01-08-2011 to 31-07-2012).xls". The MR corrected</i></p>	<p>Verification Team Response:</p> <p>In the latest version of the MR were corrected the typographical mistakes made in the reported dates.</p> <p>Verification Team Conclusion: Closed. 26.11.2013</p>

## VERIFICATION REPORT VVS



<i>Report clarifications and corrective action requests</i>	<i>Reference</i>	<i>Summary of project owner response</i>	<i>Verification conclusion</i>
		<i>is attached to this document and included into the dropbox as a share file.</i>	

## VERIFICATION REPORT VVS



Report clarifications and corrective action requests	Reference	Summary of project owner response	Verification conclusion
<p>CL 6</p> <p>In the MR, section C there is not a line diagram (graphical schemes) showing all relevant monitoring points. Also, there were not described the emergency procedures for the monitoring system.</p>	<p>CDM VVS, version 05.0, paragraph 217 ( a ) (iii)</p> <p>CDM VVS, version 05.0, paragraph 221</p> <p>Guideline for completing the MR form, version 04.0, section "C".</p>	<p><i>On section C of MR, a single line diagram showing all relevant monitoring points has been included in order to reflect the project monitoring conditions. In addition, an explanation of procedures and actuations applied during emergencies in the monitoring were explained in the MR. The MR corrected is attached to this document and included into the dropbox as a share file.</i></p>	<p>Verification Team Response:</p> <p>It was included in the latest version of the MR a line diagram (graphical schemes) showing all relevant monitoring points along with the emergency procedures for the monitoring system.</p> <p>Verification Team Conclusion: Closed. 26.11. 2013</p>
<p>CL 7</p> <p>In the MR, section D.1, the "Purpose of Data" shown is not in accordance with the options offered by the Guideline for completing the monitoring report form ((a) Calculation of baseline emissions or baseline net GHG removals by sinks; (b) Calculation of project emissions or actual net GHG removals by sinks; (c) Calculation of leakage.)</p>	<p>CDM VVS, version 05.0, paragraph 217 ( a ) (ii)</p> <p>Guideline for completing the MR form, version 04.0, section "D".</p> <p>CDM VVS, version 05.0, paragraph 221</p>	<p><i>On section D.1 of MR, the table for "Data and parameters fixed ex ante or at renewal of crediting period" has been updated in order to show the field "Purpose of Data" according to the options offered by the Guideline for completing the monitoring report form (specifically "Calculation of baseline emissions"). The MR corrected is attached to this document and included into the dropbox as a share file.</i></p>	<p>Verification Team Response:</p> <p>In the latest version of the MR was updated the "Purpose of Data" in accordance with the options offered by the Guideline for completing the MR.</p> <p>Verification Team Conclusion: Closed.26.11.2013</p>

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<b>Report clarifications and corrective action requests</b>	<b>Reference</b>	<b>Summary of project owner response</b>	<b>Verification conclusion</b>
<p>CL8</p> <p>In the MR, section D.2, is missing the information about “Data / Parameter”. Also, there are inconsistencies between the information requested for the form and the one reported by the PP.</p>	<p>CDM VVS, version 05.0, paragraph 217 ( a ) (ii)</p> <p>CDM VVS, version 05.0, paragraph 221</p> <p>Guideline for completing the MR form, version 04.0, section “D”.</p>	<p><i>On section D.2 of MR, the table for “Data and parameters monitored” has been adjusted in order to reflect the real conditions of monitoring. The missing information and the inconsistencies were a misprint. The MR corrected is attached to this document and included into the dropbox as a share file.</i></p>	<p>Verification Team Response:</p> <p>In the latest version of the MR was included the information about “Data / Parameter” and the inconsistencies were corrected.</p> <p>Verification Team Conclusion: Closed. 26.11.2013</p>
<p>CL 9</p> <p>In the MR, section E.7, is missing the value of “Actual values achieved up to 31 December 2012”.</p>	<p>CDM VVS, version 05.0, paragraph 217 ( a ) (i)</p> <p>CDM VVS, version 05.0, paragraph 221</p> <p>Guideline for completing the MR form, version 04.0, section “E.7”.</p>	<p><i>On section E.7 of MR the table for “Actual values achieved up to 31 December 2012” has been updated in order to show the results achieved by the project in terms of emission reductions. The MR corrected is attached to this document and included into the dropbox as a share file.</i></p>	<p>Verification Team Response:</p> <p>In the latest version of the MR was included the value of “Actual values achieved up to 31 December 2012”.</p> <p>Verification Team Conclusion: Closed. 26.11.2013</p>
<p>CL 10</p> <p>Please clarify the validity of the agreement “Acquisition by EMGESA of all the energy generated by Santa Ana Hydroelectric Plant owned by EAAB”</p>	<p>CDM VVS, version 05.0, paragraph 17 (d)</p> <p>CDM VVS, version 05.0, paragraph 221</p>	<p><i>On section C of MR, the power purchase agreements signed with EMGESA have been updated in order to reflect the validity of the acquisition of all energy generated by the power plant Santa Ana (please see footnote 34 of MR). The MR updated and the contract 1-10-26300-0842-2011 are attached to this document and included into the dropbox as a share file.</i></p>	<p>Verification Team Response:</p> <p>In the latest version of the MR was clarified the validity of the agreement “Acquisition by EMGESA of all the energy generated by Santa Ana Hydroelectric Plant owned by EAAB”</p> <p>Verification Team Conclusion: Closed. 27.11.2013.</p>

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<b>Report clarifications and corrective action requests</b>	<b>Reference</b>	<b>Summary of project owner response</b>	<b>Verification conclusion</b>
<p>CL 11</p> <p>The PP should include all the procedures related to energy generation in MR, section C, table 3.</p>	<p>CDM VVS, version 05.0, paragraph 221</p>	<p><i>On section C of MR, the table 3 has been corrected in order to reflect only procedures and directions related to power generation (procedure MA0407P and instructive MA0407I01, MA0407I02, MA0407I03 and MA0407I04), which are applicable to the project. The MR corrected and procedures (including instructions) are attached to this document and included into the dropbox as a share file.</i></p>	<p>Verification Team Response:</p> <p>In the latest version of the MR were included the latest approved procedures related to energy generation. The corrections were made in section C and table 3.</p> <p>The corrections to the procedures also were made in an updated version of the PDD. The performed correction is submitted in a validation assessment with this report.</p> <p>Verification Team Conclusion: Closed. 27.11.2013</p>
<p>CL 12</p> <p>The roles of authority and responsibility for the monitoring plan reported on MR, section C, table 4 does not correspond with the ones reported on the registered PDD.</p>	<p>CDM VVS, version 05.0, paragraph 217 (b) (i), 225 (a)</p>	<p><i>On section B.2.2 of MR, a description of the correction made in the PDD has been included in order to reflect the current conditions at EAAB regarding "authority and responsibility for project monitoring" (This is according to Appendix 1. Changes that do not require prior approval by the board of CDM-EB65-A05-STAN Standard: Clean development mechanism project standard, Version 05.0). The MR corrected and the updated PDD are attached to this document and included into the dropbox as a share file.</i></p>	<p>Verification Team Response:</p> <p>The PP corrected the roles of authority and responsibility for the monitoring plan in an updated PDD. The performed correction is submitted in a validation assessment with this report.</p> <p>Verification Team Conclusion: Closed. 27.11.2013</p>

# VERIFICATION REPORT VVS



<b>Report clarifications and corrective action requests</b>	<b>Reference</b>	<b>Summary of project owner response</b>	<b>Verification conclusion</b>
<p>CL13</p> <p>The figure 2, page 11 “Single line diagram Santa Ana Hydroelectric Plant” should be updated with latest information.</p> <p>Also, there are 2 figures with the same name (Figure 2)</p>	<p>CDM VVS, version 05.0, paragraph 228 (b)</p>	<p><i>On section C of MR the figure “Single line diagram Santa Ana Hydroelectric Plant” has been updated according to the latest project information. In addition, numbering of figures has been edited. The MR corrected is attached to this document and included into the dropbox as a share file.</i></p>	<p>Verification Team Response:</p> <p>The line diagram was updated in the latest version of the MR</p> <p>Verification Team Conclusion: Closed. 27.11.2013</p>
<p>CL 14</p> <p>Into the EAAB’s quality management system are not documented the procedure for attention of non-predicted episodes and your effective control in accordance with the registered monitoring plan.</p>	<p>CDM VVS, version 05.0, paragraph 221</p>	<p><i>On section C of MR, an indication of the general procedures to control and attend non–predicted episodes has been included in order to clarify the conditions which are relevant to the operation of the power plant. The MR adjusted and the procedures are attached to this document and included into the dropbox as a share.</i></p>	<p>Verification Team Response:</p> <p>In the latest version of the MR were included the procedures for attention of non-predicted episodes and your effective control in accordance with the registered monitoring plan.</p> <p>Verification Team Conclusion: Closed. 27.11.2013</p>
<p>FAR 1</p> <p>Into the quality management system are not documented the procedures for attention of non-predicted episodes and your effective control in accordance with the information reported on the registered monitoring plan.</p> <p>Also, in the quality management system there is not enough evidence about</p>	<p>CDM VVS, version 05.0, paragraph 221</p>	<p><i>As a result of attending the CL14, the company identifies an opportunity for improvement since it can develop an specific procedures to control and attend non–predicted episodes thus, it established an indicative action plan in order to attend all aspects related to the business energy generation at EAAB (including a specific preventive and corrective maintenance of the power plant). The indicative action plan and the specific procedure (preventive</i></p>	<p>Verification Team Response:</p> <p>ICONTEC is agree with the action plan proposed to conduct the raised FAR 1.</p> <p>In the next verification of the project will be reviewed the implementation status of the proposed action plan for FAR 1.</p> <p>Verification Team Conclusion: Opened. 27.11.2013</p>



## VERIFICATION REPORT VVS



<b>Report clarifications and corrective action requests</b>	<b>Reference</b>	<b>Summary of project owner response</b>	<b>Verification conclusion</b>
the implementation of a quality control program with 21 procedures designed to monitor electricity generation at multiple levels, its delivery to the grid, and cross checking with the electricity purchaser and the regional distributor, in accordance with the established in the registered PDD.		<p><i>maintenance of Santa Ana Power plant) are attached to this document and included into the dropbox as a share.</i></p> <p><i>The quality management system is composed by several procedures and instructive which provide guidance on how the company must act during all activities related to the service of supply drinking water. To do this, the company has one specific procedure related to power generation (MA0407P) and several instructive (MA0407I01, MA0407I02, MA0407I03 and MA0407I04) which are applicable to the project; thus, the PDD has a mistake since there are only one general procedure which covers all energy generation and distribution activities. EAAB is evaluating whether to divide the procedure considering specific activities (perhaps 21 or more procedures) or maintain only one general document and develop more instructive.</i></p>	

**Table A3: FARs FROM THE PREVIOUS VERIFICATION PERIOD**

Forward action request	Reference	Summary of project owner response	Verification conclusion
N/A	N/A	N/A	N/A

**Annex B**

**Audit Team Experience and Knowledge**

**DIANA CAROLINA SANTOS**  
**CDM Lead Auditor**

Industrial Engineer, Los Andes University, Bogotá, Colombia 2002  
Post degree on Clean Production, Los Andes University, Bogotá, Colombia 2003  
Master on International cooperation for development, Pavia University. Italy – San Buenaventura University, Cartagena, Colombia 2007  
Specialization on Climate Change and Kyoto Protocol OEA 2011-ILC, Latin American Institute of Sciences, Perú, 2011  
Quality Management Systems Diploma, ISO 9000, 9001, 9004 y 14001  
Lead Auditor Sello Ambiental Colombiano, Sostenibilidad Turística, Auditor ISO 14001

**RELEVANTS**

Calculating the Carbon Footprint. ISO Comité 207, SC 07. ISO. Oslo, Noruega Junio 2011  
Roundtable on Verification of Afforestation / Reforestation (A/R) CDM Projects. Carbon Finance Unit - The World Bank, UNFCCC. Paris Francia. May 2011  
Regional work shop ISO / BAS life cycle analysis e ISO 14040 y 14064 Nov 2010  
Latin American and Caribbean Carbon Forum - BID2010 UNEP RISO CENTRE, Santo Domingo – Republica Dominicana Oct 2010  
CARBON MARKETS AND CLIMATE FINANCE CONFERENCE Green Power Academy and Action for Sustainable, Ciudad de México, México. Sept 2010  
Sustainable development indicators World Bank, CEPAL – United Nations, Los Andes University, Bogotá, Colombia Jul 2007

**RELEVANT WORK EXPERIENCE**

2008 –Actual ICONTEC: Climate Change Professional:  
CDM Management system support, Development of new services and innovate the current ones in order to meet the Climate Change market needs, control Support of Climate Change Product and Services.

2007 ECLAC –Economic Commission for Latin America and the Caribbean– Unit Nations Organization – UNO:  
Formulation and management Support of the projects, participate on the link enforcement with the UNICEF initiative of public investment for children; support on the management of the project Efectos y Costos de la Desnutrición Infantil en Colombia, currently in process, made in association with the Programa Mundial de Alimentos PMA, lead by CEPAL; y also support other projects for sustainable Development and environment.

2004-2005 ODES. Organización para el Desempeño Empresarial Sostenible:  
Professional on the development and implementation of PGIRS (Integrated Solid Waste Management) with the Tolima government and the Environmental authority.

**EXPERIENCE IN CDM ACTIVITIES:****Lead Auditor**

- Validation of La Venta II
- Verification of Santa Ana Hydroelectric Plant

### Auditor

- Validation of Estancia NINA Afforestation project
- Verification of PROCUENCA: Forestry Project to Restore the Watershed of the Chinchiná River, an Environmental and Productive Alternative for the City of Manizales and the Surrounding Region

### Technical Reviewer

- Validation of San Nicolas CDM Reforestation Project
- Validation of Providencia I: 1.8MW Small Hydro Power Generation Plant
- Validation of Providencia III: 9.11MW Small Hydro Power Generation Plant
- Verification of A joint venture project of cogeneration of electricity and hot water using natural gas and biogas produced from on-site wastewater biodigesters
- Verification of Reduction of energy consumption during the production of hydraulic lime for the construction industry through the addition of non-calcined mineral components and additives
- Verification of Fertinal Nitrous Oxide Abatement Project
- Validation of N2O Abatement at Austin Bacis Mexico Nitric Acid Plant
- Validation of Project LRT system in tunis
- Verification of Biogas energy plant from palm oil mill effluent
- Verification of Santa Ana Hydroelectric Plant
- Verification of Co-composting of EFB and POME project
- Verification of Methane recovery and effective use of power generation project Norte III-B Landfill
- Biogas Project, Olmeca III, Tecun Uman

### **CRISTIAN DARIO GRISALES BERNAL** **CDM SPECIALIST sector 1.2**

#### EDUCATION:

Master Executive in Renewable Energies  
EOI-Madrid, Spain  
At present

Certified ISO 14001  
ICONTEC  
May 2012

Certified ISO 9001  
ICONTEC  
August 2012

Electrical Engineer  
National University of Colombia  
Bogotá - Colombia  
July 2009

#### PROFESSIONAL BACKGROUND Professional of Climate Change ICONTEC

May 2012 – Today

Professional on developing validation and verification on CDM projects as lead auditor and as technical expert in the energy sector.

Electrical Maintenance Engineer  
EMGESA S.A ESP. Colombia  
November 2009 – May 2012

Electrical maintenance engineer in the Bogotá River Hydroelectric plants. Executing preventive, predictive and corrective maintenance of the generators, auxiliary services, power transformers and electrical substation. Developed the investment projects' inventory in accordance with the annual operating budget. Implementation of RCM maintenance programs. Monthly service availability in the plant, and full-time availability in failure care. Electrical testing of generators, transformers, motors and substation equipment.

Engineering Intern  
INGENIERIA ESPECIALIZADA

Commercial visits to different industries, sales, design and assembly of shielding systems, grounding grids, power quality studies, calculation of electrical installations, RETIE inspections, diagnostic grounding systems, implementation, supervision and maintenance of the developed projects.

### EXPERIENCE IN CDM ACTIVITIES:

Auditor and Specialist:

- Validation of Biogas project, Olmeca I, Santa Rosa, Guatemala
- Validation of CGR Catanduva Landfill Gas Project, Brazil
- Validation of Macaubas Landfill Gas Project, Brazil
- Validation of Taurichuco Hydropower Project, Perú
- Validation of Teresina Landfill Gas Project, Brazil
- Validation of Maceio Landfill Gas Project, Brazil
- Validation of Doña Teresa Hydroelectric Power Plant, Colombia
- Validation of SHPs Poço Fundo and Providência CDM Project (JUN1133), Brazil
- Validation of SHPs Tambaú, das Pedras and Rio do Sapo CDM Project (JUN1132), Brazil
- Verification of Amaime Minor Hydroelectric Power Plant, Colombia
- Verification of Ciudad Juarez Landfill Gas to Energy Project, Mexico
- Verification of Santa Ana Hydroelectric Plant, Colombia
- Verification of Biogas Project, Olmeca III, Tecún Uman, Guatemala
- Verification of Berlin Geothermal Project, Phase Two, San Salvador

Technical Reviewer:

- Validation of Thuan Nhen Phong Wind Farm, Viet Nam
- Validation of Phuong Mai 3 Wind Power Project, Viet Nam
- Validation of Chamelecón 280 Hydroelectric project, Honduras
- Validation of Providencia I: 1.8MW Small Hydro Power Generation Plant, Colombia
- Validation of Providencia III: 9.11MW Small Hydro Power Generation Plant, Colombia
- Validation of SHP Itaguacu CDM Project (JUN 1146), Brazil, Brazil
- Renewal of Aguafresca Multipurpose and Environmental Service Project, Colombia
- Validation of Feira de Santana Landfill Gas Project, Brazil
- Validation of SHP Morro Azul CDM Project (JUN1164), Colombia
- Verification of Santa Ana Hydroelectric Plant, Colombia
- Verification of Methane recovery and effective use of power generation project Norte III-B Landfill, Argentina

### **FRANCY MILENA RAMÍREZ TORRES** **CDM and Technical Reviewer**

Electrical Engineer. Universidad Los Andes, 2001  
Postgrade: Assessment of Social Projects. Universidad Los Andes, 2005  
University of Oxford. Course: Applying Knowledge Management, Principle and Practices (December 1 de 2009).

University of Oxford. Course: Successful Change Management for Engineers, Scientists and Staff in Hi-tech Companies (December 2 2009).

University of Oxford. Course: Essentials of Project Management for Engineers, Scientists and Staff in Hi-tech Companies (December 3 2009).

University of Oxford. Course: Advanced Project Management for Engineers, Scientists and Staff in Hi-tech Companies (December 4 2009).

Climate Change, Trade and Standardization - in a development perspective".  
Estocolmo, Suecia (23 and 25 November 2009)

ISO global workshop on Greenhouse Gas Schemes Addressing Climate Change - How ISO Standards Help, Estocolmo, Suecia. (20 and 21 November 2009)

### **PROFESSIONAL BACKGROUND** **ICONTEC. (2005 - Actually)**

Professional of Standardization, Planning, coordinate, implement and ensure compliance with the program of national standardization in technical committees among which are electrical installations, electrical power quality, electrical transformers, substations and equipment for medium and high voltage, lighting, appliances and electrical accessories, protection against lightning strikes and electrical equipment. Develop technical standards.

Develop and manage special projects assigned. Participate in programs of regional and international standardization.

### **CODENSA (2002 - 2005)**

Inspections and electrical works coordinator  
Supervise field work and download the results in the central information system, evaluate the inspections performed, reconciled with contractors, addressing the results of inspections to different areas of the company, charging inspections and electrical work to clients of the firm, coordination and support group field sales engineers, technical training for technical staff, administrative support to department business processes and lost control, maintenance of the database for internal management inspections. Project Leader for the Optimization of Technical Processes and Regional Trade in Cundinamarca.

### **EXPERIENCE IN CDM ACTIVITIES**

Verification of four crediting periods of Santa Ana Hydroelectric plant project  
Verification of two periods Agua Fresca Multipurpose and Environmental Services Project.  
Validation of Chamelecón 280 Hydroelectric Project

Validation of La Vegona Hydroelectric project  
Validation of Bonyic hydroelectric project  
Validation of Cambará and Embaúba SHPs and LOGICarbon CDM Project  
Validation of Pardos SHPs and LOGICarbon CDM Project  
Validation of Pequi and Sucupira SHPs and LOGICarbon CDM Project  
Validation of Rio Bonito and Baitaca SHPs and LOGICarbon CDM Project  
Validation of METALDOM Fossil fuel switch from reheat furnace.  
Verification of Los Algarrobos hydroelectric project  
Verification of Bio energy in General Deheza -Electric power generation from peanut hull and sunflower husk-  
Validation of Toachi - Pilaton Hydroelectric Project  
Validation of Energy efficiency at Malvinas Gas Plant  
Validation of Marañon Hydroelectric Project  
Validation of Santa Rita Hydroelectric Plant  
Validation of Ventana, Suba and Usaquén Hydroelectric CDM Bundled