



# VERIFICATION AND CERTIFICATION REPORT

- 1ST PERIODIC –

HIDRELÉTRICA MALAGONE S. A.

MALAGONE SHP CDM PROJECT, MINAS  
GERAIS, BRAZIL (JUN1122)

UNFCCC REF. No. : 4676

Monitoring Period: 2011-06-15 to 2012-03-31  
(incl. both days)

**Report No: 8834 – 12/251**

**Date: 2013-01-07**

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	<b>Verification No.:</b>			
	1st periodic verification			
	<b>Crediting period:</b>	<b>From:</b>	<b>To:</b>	
	<input checked="" type="checkbox"/> Renewable (7y) <input type="checkbox"/> Fixed (10y)	2011-06-15	2018-06-14	
	<b>Project Scale:</b>			
	<input checked="" type="checkbox"/> Large Scale <input type="checkbox"/> Small Scale			
<b>Project Participant(s):</b>	<b>Non Annex 1 country:</b>	<b>Annex 1 country:</b>		
	Brazil	-		
	<b>PP from non Annex 1 country:</b>	<b>PP from Annex 1 country:</b>		
	Carbotrader Assessoria e Consultoria em Energia Ltda Hidrelétrica Malagone S. A.	-		
<b>Applied methodology/ies:</b>	<b>Title:</b>	<b>No.:</b>	<b>Scope(s) / TA(s)</b>	
	"Consolidated baseline methodology for grid-connected electricity generation from renewable sources"	ACM0002 ver. 11	01 / 1.2	
<b>Monitoring period and monitoring report</b>	<b>Monitoring period (MP):</b>		<b>Monitoring Report:</b>	
	<b>From:</b>	<b>To:</b>	<b>No. of days:</b>	<b>Draft version:</b>
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	2012-04-30	2012-05-29	2012-05-28	2012-05-30
<b>Summary of Verification opinion</b>	<p>Hidrelétrica Malagone S. A. has commissioned the TÜV NORD JI/CDM Certification Program to carry out the 1st periodic verification of the project: "Malagone SHP CDM Project, Minas Gerais, Brazil (JUN1122)", with regard to the relevant requirements for CDM project activities.</p> <p>As a result of this verification, the verifier confirms that:</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> all operations of the project are implemented and installed as planned and described in the validated project design document,</li> <li><input checked="" type="checkbox"/> the monitoring plan is in accordance with the applied approved CDM methodology,</li> <li><input checked="" type="checkbox"/> the installed equipment essential for measuring parameters required for calculating emission reductions are calibrated appropriately,</li> <li><input checked="" type="checkbox"/> the monitoring system is in place and functional. The project has generated GHG emission reductions, and</li> <li><input checked="" type="checkbox"/> the GHG emission reductions are calculated without material misstatements in a conservative and appropriate manner.</li> </ul> <p>TÜV NORD JI/CDM CP herewith confirms that the project has achieved emission reductions in the above mentioned reporting period as listed below (verified amount).</p>			
<b>Emission reductions:</b>	<b>Verified amount</b>		<b>As per draft MR:</b>	<b>As per PDD:</b>
[t CO <sub>2e</sub> ]	16,239		24,203	21,965 (*)
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	FVR Malagone			69

(\*) estimated in the registered PDD for 291 days.

## Abbreviations:

<b>ANEEL</b>	<b>National Agency of Electric Energy</b>
<b>CA</b>	<b>Corrective Action / Clarification Action</b>
<b>CAR</b>	<b>Corrective Action Request</b>
<b>CDM</b>	<b>Clean Development Mechanism</b>
<b>CCEE</b>	<b>Chamber of Commercialization of Electric Energy - Brazil</b>
<b>CEMIG</b>	<b>Company of Energy of the State of Minas Gerais</b>
<b>CER</b>	<b>Certified Emission Reduction</b>
<b>CO<sub>2</sub></b>	<b>Carbon dioxide</b>
<b>CO<sub>2</sub>e</b>	<b>Carbon dioxide equivalent</b>
<b>CL</b>	<b>Clarification Request</b>
<b>DVerR</b>	<b>Draft Verification Report</b>
<b>ER</b>	<b>Emission Reduction</b>
<b>FAR</b>	<b>Forward Action Request</b>
<b>GHG</b>	<b>Greenhouse gas(es)</b>
<b>GPRS</b>	<b>General Package Radio System – Communication Global System</b>
<b>IPEM</b>	<b>Weights and Measures Institute</b>
<b>MP</b>	<b>Monitoring Plan</b>
<b>MR</b>	<b>Monitoring Report</b>
<b>MRT</b>	<b>Monitoring Report Template</b>
<b>ONS</b>	<b>National Operator of Electric System</b>
<b>PA</b>	<b>Project Activity</b>
<b>PDD</b>	<b>Project Design Document</b>
<b>PP</b>	<b>Project Participant</b>
<b>PPRA</b>	<b>Program of Prevention of Environmental Risks</b>
<b>QA/QC</b>	<b>Quality Assurance / Quality Control</b>
<b>SCDE</b>	<b>Energy Data Collection System</b>
<b>SEMAD</b>	<b>Secretary of State of Environment and Sustainable Development</b>
<b>SHPP</b>	<b>Small Hydro Power Plant</b>
<b>SIN</b>	<b>National Interconnected System</b>
<b>UNFCCC</b>	<b>United Nations Framework Convention on Climate Change</b>



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<b>VVS</b>	<b>Validation and Verification Standard</b>
<b>XLS</b>	<b>Emission Reduction Calculation Spread Sheet</b>

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## 1. INTRODUCTION

Hidrelétrica Malagone S.A. has commissioned the TÜV NORD JI/CDM Certification Program (CP) to carry out the 1st periodic verification of the project

*“Malagone SHP CDM Project, Minas Gerais, Brazil (JUN1122)”*

with regard to the relevant requirements for CDM project activities. The verifiers have reviewed the implementation of the monitoring plan (MP) in the registered CDM project.

GHG data for the monitoring period was verified in detailed manner applying the set of requirements, audit practices and principles as required under the Validation and Verification Standard<sup>/VVS/</sup> of the UNFCCC.

This report summarizes the findings and conclusions of this 1st periodic verification of the above mentioned UNFCCC registered project activity.

### 1.1. Objective

The objective of the verification is the review and ex-post determination by an independent entity of the GHG emission reductions. It includes the verification of the:

- implementation and operation of the project activity as given in the PDD,
- compliance with applied approved methodology and the provisions of the monitoring plan,
- data given in the monitoring report by checking the monitoring records, the emissions reduction calculation and supporting evidence,
- accuracy of the monitoring equipment,
- quality of evidence,
- significance of reporting risks and risks of material misstatements.

### 1.2. Scope

The verification of this registered project is based on the validated project design document<sup>/PDD/</sup>, the monitoring report<sup>/MR/</sup>, emission reduction calculation spread sheet<sup>/XLS/</sup>, supporting documents made available to the verifier and information collected through performing interviews and during the on-site assessment. Furthermore publicly available information was considered as far as available and required.

The verification is carried out on the basis of the following requirements, applicable for this project activity:

- Article 12 of the Kyoto Protocol<sup>/KP/</sup>,
- guidelines for the implementation of Article 12 of the Kyoto Protocol as presented in the Marrakech Accords under decision 3/CMP.1<sup>/MA/</sup>, and subsequent decisions made by the Executive Board and COP/MOP,
- other relevant rules, including the host country legislation,



- 
- CDM Validation and Verification Standard<sup>/VVS/</sup>
  - monitoring plan as given in the registered PDD<sup>/PDD/</sup>,
  - Approved CDM Methodology.



## 2. GHG PROJECT DESCRIPTION

### 2.1. Technical Project Description

The project activity consists in generating electricity by renewable sources, through the commissioning of a Small Hydro Power Plant (SHPP) called Malagone, developed by the Special Purpose Entity: Hidrelétrica Malagone S.A.

The SHPP has an installed capacity of 19MW with two 9.5 MW generators. It is located in Uberabinha River in Uberlândia City, State of Minas Gerais, southeast region of Brazil. The project has a small reservoir (1.72 km<sup>2</sup>) with no significant CH<sub>4</sub> emission.

The electricity generated in SHPP Malagone is connected to the National Interconnected System (SIN) and reduces GHG emissions by replacing thermal generation from fossil fuels associated to emission factor of the Brazilian Electric System by renewable energy source.

The SHPP Malagone uses hydro energy potential (gravitational) for the electricity generation to move the turbines and consequently, rotating generators which produce electricity.

All energy produced by SHPP Malagone is dispatched to the National Interconnected Grid through the Uberlândia SE Substation – 1 (CEMIG SE-1, which line extension has 34 km, in 138 KV) located in the Uberlândia city, Minas Gerais state, Brazil. The energy is also distributed by CEMIG.

The key parameters of the project are given in Table 2-1:

**Table 2-1:** Technical data of SHP Malagone

Parameter	Unit	Value
Installed power	MW	19
Reservoir	km <sup>2</sup>	1.72
Assured Generation	MWavg	10.11
Flow Rate River (average)	m <sup>3</sup> /s	25
<b>Turbines</b> (Francis)	Units	2 - Turbine 1: #19602 - Turbine 2: #19603
- Power	kW	9,800
- Flow rate	m <sup>3</sup> /s	26.36
- Spin	rpm	400
<b>Generators</b>	Units	2

Parameter	Unit	Value
		- Generator 1: # FCH227001612 - Generator 2: # FCH227001613
- Nominal Power	kVA	10,560
- Effective Power	MW	9.5
- Voltage	kV	6.9
- Power factor	-	0.9
- Frequency	Hz	60

## 2.2. Project Location

The details of the project location are given in Table 2-2:

**Table 2-2:** Project Location

No.	Project Location
Host Country	Brazil
Region:	State of Minas Gerais
Project location address:	Uberabinha River – Municipality of Uberlândia
Latitude:	18°40'50" S
Longitude:	48°29'57" W

## 2.3. Project Verification History

Essential events since the registration of the project are presented in the following Table 2-3.

**Table 2-3:** Status of previous Monitoring Periods

#	Item	Time	Status
1	1 <sup>st</sup> Monitoring period	2011-06-15 to 2012-03-31	Ongoing

An overview of all Post Registration Changes is given in the following table.

N/A

### 3. METHODOLOGY AND VERIFICATION SEQUENCE

#### 3.1. Verification Steps

The verification consisted of the following steps:

- Contract review
- Appointment of team members and technical reviewers
- Publication of the monitoring report
- A desk review of the Monitoring Report<sup>/MR/</sup> submitted by the client and additional supporting documents with the use of customized verification protocol<sup>/CPM/</sup> according to the Validation and Verification Standard<sup>/VVS/</sup>,
- Verification planning,
- On-Site assessment,
- Background investigation and follow-up interviews with personnel of the project developer and its contractors,
- Draft verification reporting
- Resolution of corrective actions (if any)
- Final verification reporting
- Technical review
- Final approval of the verification.

#### 3.2. Contract review

To assure that

- the project falls within the scopes for which accreditation is held,
- the necessary competences to carry out the verification can be provided,
- Impartiality issues are clear and in line with the CDM accreditation requirements

a contract review was carried out before the contract was signed.

#### 3.3. Appointment of team members and technical reviewers

On the basis of a competence analysis and individual availabilities a verification team, consisting of one team leader and 1 additional team members, was appointed.

The list of involved personnel, the tasks assigned and the qualification status are summarized in the Table 3-1 below.

**Table 3-1:** Involved Personnel

	Name	Company	Function <sup>1)</sup>	Qualification Status <sup>2)</sup>	Scheme competence <sup>3)</sup>	Technical competence <sup>4)</sup>	Verification competence <sup>5)</sup>	Host country Competence	On-site visit
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Ricardo Lopes	BRTÜV	TL <sup>A)</sup>	LA	<input checked="" type="checkbox"/>	1.2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Sergio Cruz	BRTÜV	TM <sup>A)</sup>	LA	<input checked="" type="checkbox"/>	1.2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Marcelo Sebben	BRTÜV	OT <sup>B)</sup>	T	<input type="checkbox"/>	-	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/> Mr. <input checked="" type="checkbox"/> Ms.	Sabine Meyer	TÜV NORD, Germany	TR <sup>B)</sup>	LA	<input checked="" type="checkbox"/>	1.2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	-
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Ingo Klein	TÜV NORD, Germany	TR/ FA <sup>B)</sup>	SA	<input checked="" type="checkbox"/>	1.2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	-

<sup>1)</sup> TL: Team Leader; TM: Team Member; TR: Technical review; OT: Observer-Team, OR: Observer-TR; FA: Final approval

<sup>2)</sup> GHG Auditor Status: A: Assessor; LA: Lead Assessor; SA: Senior Assessor; T: Trainee; TE: Technical Expert; <sup>3)</sup> GHG auditor status (at least Assessor)

<sup>4)</sup> As per S01-MU03 or S01-VA070-A2 (such as 1.1, 1.2, ...)

<sup>5)</sup> In case of verification projects

<sup>A)</sup> Team Member: GHG auditor (at least Assessor status), Technical Expert (incl. Host Country Expert or Verification Expert), not ETE

<sup>B)</sup> No team member

The team member contributed to the review of documents, the assessment of the project activity and to the preparation of this report under the leadership of the team leader.

Technical experts contributed to the assessment of special aspects of the project activity, e.g. technical or host country aspects.

In order to qualify further personnel the project team was accompanied by one trainee as indicated in the table above. They are usually not considered as team members.

Statements of competence for all above mentioned personnel are enclosed in annex 2 of this report.

### 3.4. Publication of the Monitoring Report

In accordance with the CDM M&P (§ 62) the draft monitoring report, as received from the project participants, has been made publicly available on the dedicated UNFCCC CDM website prior to the verification activity commenced. Comments received are taken into account in the course of the verification, if applicable.

### 3.5. Verification Planning

In order to ensure a complete, transparent and timely execution of the verification task the team leader has planned the complete sequence of events necessary to arrive at a substantiated final verification opinion.

Various tools have been established in order to ensure an effective verification planning.

#### Risk analysis and detailed audit testing planning

For the identification of potential reporting risks and the necessary detailed audit testing procedures for residual risk areas table A-1 is used. The structure and content of this table is given in Table 3-2 below.

**Table 3-2:** Table A-1; Identification of verification risk areas

<b>Table A-1: GHG calculation procedures and management control testing / Detailed audit testing of residual risk areas and random testing</b>				
<b>Identification of potential reporting risk</b>	<b>Identification, assessment and testing of management controls</b>	<b>Areas of residual risks</b>	<b>Additional verification testing performed</b>	<b>Conclusions and Areas Requiring Improvement (including Forward Action Requests)</b>
<i>The following potential risks were identified and divided and structured according to the possible areas of occurrence.</i>	<i>The potential risks of raw data generation have been identified in the course of the monitoring system implementation. The following measures were taken in order to minimize the corresponding risks.</i>  <i>The following measures are implemented:</i>	<i>Despite the measures implemented in order to reduce the occurrence probability the following residual risks remain and have to be addressed in the course of every verification.</i>	<i>The additional verification testing performed is described. Testing may include:</i> <ul style="list-style-type: none"> <li>- Sample cross checking of manual transfers of data</li> <li>- Recalculation</li> <li>- Spreadsheet 'walk throughs' to check links and equations</li> <li>- Inspection of calibration and maintenance records for key equipment</li> <li>- Check sampling analysis results</li> </ul>	<i>Having investigated the residual risks, the conclusions should be noted here. Errors and uncertainties are highlighted.</i>

**Table A-1: GHG calculation procedures and management control testing / Detailed audit testing of residual risk areas and random testing**

Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks	Additional verification testing performed	Conclusions and Areas Requiring Improvement (including Forward Action Requests)
			<i>Discussions with process engineers who have detailed knowledge of process uncertainty/error bands.</i>	

The completed table A-1 is enclosed in Annex 1 (table A-1) to this report.

#### Project specific periodic verification checklist

In order to ensure transparency and consideration of all relevant assessment criteria, a project specific verification protocol has been developed. The protocol shows, in a transparent manner, criteria and requirements, means and results of the verification. The verification protocol serves the following purposes:

- It organizes, details and clarifies the requirements a CDM project is expected to meet for verification
- It ensures a transparent verification process where the verifying DOE documents how a particular requirement has been proved and the result of the verification.

The basic structure of this project specific verification protocol for the periodic verification is described in Table 3-3.

**Table 3-3:** Table A-2; Structure of the project specific periodic verification checklist

**Table A-2: Periodic verification checklist**

Checklist Item	Reference	Verification Team Comments	Draft Conclusion	Final Conclusion
<i>The checklist items in Table A-2 are linked to the various requirements the monitoring of the project should meet. The checklist is organized in various sections as per the requirements of the topic and the individual project activity. It further includes guidance for the verification team.</i>	<i>Gives reference to the information source on which the assessment is based on.</i>	<i>The section is used to elaborate and discuss the checklist item in detail. It includes the assessment of the verification team and how the assessment was carried out. The reporting requirements of the VVS shall be covered in this section.</i>	<i>Assessment based on evidence provided if the criterion is fulfilled (OK), or a CAR, CL or FAR (see below) is raised. The assessment refers to the draft verification stage.</i>	<i>In case of a corrective action or a clarification the final assessment at the final verification stage is given.</i>

The periodic verification checklist (verification protocol) is the backbone of the complete verification starting from the desk review until final assessment. Detailed assessments and findings are discussed within this checklist and not necessarily repeated in the main text of this report.

The completed verification protocol is enclosed in Annex 1 (table A-2) to this report.

### 3.6. Desk review

During the desk review all documents initially provided by the client and publicly available documents relevant for the verification were reviewed. The main documents are listed below:

- the last revision of the PDD including the monitoring plan<sup>/PDD/</sup>,
- the last revision of the validation report<sup>/VAL/</sup>,
- documentation of previous verifications<sup>/VER/</sup>
- the monitoring report, including the claimed emission reductions for the project<sup>/MR/</sup>,
- the emission reduction calculation spreadsheet<sup>/XLS/</sup>.

Other supporting documents, such as publicly available information on the UNFCCC website and background information were also reviewed.

### 3.7. On-site assessment

As most essential part of the verification exercise it is indispensable to carry out an inspection on site in order to verify that the project is implemented in accordance with the applicable criteria. Furthermore the on-site assessment is necessary to check the monitoring data with respect to accuracy to ensure the calculation of emission reductions. The main tasks covered during the site visit include, but are not limited to:

- The on-site assessment included an investigation of whether all relevant equipment is installed and works as anticipated.
- The operating staff was interviewed and observed in order to check the risks of inappropriate operation and data collection procedures.
- Information processes for generating, aggregating and reporting the selected monitored parameters were reviewed.
- The duly calibration of all metering equipment was checked.
- The monitoring processes, routines and documentations were audited to check their proper application.
- The monitoring data were checked completely.
- The data aggregation trails were checked via spot sample down to the level of the meter recordings.

Before and during the on-site visit the verification team performed interviews with the project participants to confirm selected information and to resolve issues identified in the document review.

Representatives of Hidrelétrica Malagone S. A. and Carbotrader (project consultant) including the operational staff of the plant were interviewed. The main topics of the interviews are summarized in Table 3-4.

**Table 3-4:** Interviewed persons and interview topics

Interviewed Persons / Entities	Interview topics
1. Projects & Operations Personnel – Hidrelétrica Malagone S. A. and Energisa Soluções 2. Consultant - Carbotrader	<ul style="list-style-type: none"> <li>- General aspects of the project</li> <li>- Technical equipment and operation</li> <li>- Changes since validation / previous verification</li> <li>- Monitoring and measurement equipment</li> <li>- Remaining issues from validation/ previous verification</li> <li>- Calibration procedures</li> <li>- Quality management system</li> <li>- Involved personnel and responsibilities</li> <li>- Training and practice of the operational personnel</li> <li>- Implementation of the monitoring plan</li> <li>- Monitoring data management</li> <li>- Data uncertainty and residual risks</li> <li>- GHG emission reduction calculation</li> <li>- Procedural aspects of the verification</li> <li>- Maintenance</li> <li>- Environmental aspects</li> </ul>

The list of interviewees is included in chapter 7.4.



### 3.8. Draft verification reporting

On the basis of the desk review, the on-site visit, follow-up interviews and further background investigation the verification protocol is completed. This protocol is presented together with a general project and procedural description of the verification and a detailed list of the verification findings from the draft verification report. This report is sent to the client for resolution of raised CARs, CLs and FARs.

### 3.9. Resolution of CARs, CLs and FARs

Nonconformities raised during the verification can either be seen as a non-fulfillment of criteria ensuring the proper implementation of a project or where a risk to deliver high quality emission reductions is identified.

Corrective Action Requests (CARs) are issued, if:

- Non-conformities with the monitoring plan or methodology are found in monitoring and reporting, or if the evidence provided to prove conformity is insufficient;
- Mistakes have been made in applying assumptions, data or calculations of emission reductions which will impair the estimate of emission reductions;
- Issues identified in a FAR during validation or previous verifications requiring actions by the project participants to be verified during verification have not been resolved.

The verification team uses the term Clarification Request (CL), which is issued if:

- information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

Forward Action Requests (FAR) indicate essential risks for further periodic verifications. Forward Action Requests are issued, if:

- the monitoring and reporting require attention and / or adjustment for the next verification period.

For a detailed list of all CARs, CLs and FARs raised in the course of the verification pl. refer to chapter 4.

### 3.10. Final reporting

Upon successful closure of all raised CARs and CLs the final verification report including a positive verification opinion can be issued. In case not all essential issues could finally be resolved, a final report including a negative verification opinion is issued.

The final report summarizes the final assessments w.r.t. all applicable criteria.

### **3.11. Technical review**

Before submission of the final verification report a technical review of the whole verification procedure is carried out. The technical reviewer is a competent GHG auditor being appointed for the scope this project falls under. The technical reviewer is not considered to be part of the verification team and thus not involved in the decision making process up to the technical review.

As a result of the technical review process the verification opinion and the topic specific assessments as prepared by the verification team leader may be confirmed or revised. Furthermore reporting improvements might be achieved.

### **3.12. Final approval**

After successful technical review an overall (esp. procedural) assessment of the complete verification will be carried out by a senior assessor located in the accredited premises of TÜV NORD.

After this step the request for issuance can be started.

## 4. VERIFICATION FINDINGS

In the following paragraphs the findings from the desk review of the monitoring report<sup>/MR/</sup>, the calculation spreadsheet<sup>/XLS/</sup>, PDD<sup>/PDD/</sup>, the Validation Report<sup>/VAL/</sup> and other supporting documents, as well as from the on-site assessment and the interviews are summarized.

The summary of CAR, CL and FAR issued are shown in

Table 4-1:

**Table 4-1:** Summary of CAR, CL and FAR

Verification topic	No. of CAR	No. of CL	No. of FAR
A – Description of project activity	0	0	0
B – Implementation of project activity	1	1	0
C – Description of monitoring system	0	1	0
D – Data and parameters	0	0	0
E - Calculation of Emission Reductions	2	0	0
<b>SUM</b>	<b>3</b>	<b>2</b>	<b>0</b>

**Table 4-2:** MR versions used for assessments

Version	Assessment Round
MR v. 1 (Published)	Findings raised at Draft Report
MR v. 2	DOE Assessment # 1
MR v. 3 (Final)	DOE Assessment # 2

The following tables include all raised CARs, CLs and FARs and the assessments of the same by the verification team. For an in depth evaluation of all verification items it should be referred to the verification protocols (see Annex).

Finding	CL B1		
Classification	<input type="checkbox"/> CAR	<input checked="" type="checkbox"/> CL	<input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	In section B.1 of MR, it is missing the description of the installed technology, technical process, equipment and diagrams, as per the guidelines for completing the MR.  Associated checklist question(s): <b>B.1.</b>		
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	The information required was inserted in section B.1 of MR.		
<b>DOE Assessment #1</b> <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The technology included in the report comprehends hydro energy potential for electricity generation by gravitational energy from the river, which moves the turbines, triggering the generators enabling generation of electricity. Malagone has generation capacity of 19 MW.  This process is considered as run-of-river as it does not include significant water stocks.  A table containing technical characteristics of the SHP such as installed power, information of turbines and generators was also included.  The diagram shows the project boundary, main equipments, monitoring parameters and gases included.  <u><b>CL is closed.</b></u>		
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the first periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed		

Finding	CAR B2		
Classification	<input checked="" type="checkbox"/> CAR	<input type="checkbox"/> CL	<input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	In section B.1 of MR, clarify the reasons for the change in the reservoir dimension from the registered PDD and actual situation.  Associated checklist question(s): <b>B.2.3; D.1.</b>		
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	This information was explained in the note 2 in the MR.		
<b>DOE Assessment #1</b>	Interviews were performed along the site visit and it was verified		



Finding	CAR B2
<p><i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i></p>	<p>that a specialized company had been contracted to perform the study of the reservoir area for the feasibility study and preparation of the documents necessary for the request of environmental license and this data has been used in the registered PDD.</p> <p>When the installation was ready, another study has been done and an error about the dimension of the area of the reservoir has been detected. This has been immediately reported to the State Environmental Secretary and approved with the issuance of a Operational License Correction.</p> <p>In addition, the new study shows that the height of reservoir has remained the same during both measurements (for the first and for the second study), ensuring the area has not changed and that the previous value was a mistake of data interpretation by the specialized company hired to perform the first study.</p> <p>Therefore, as the value does not impact the project itself and has no impact in the project emissions, as the power density of the plant remains greater than 10W/m<sup>2</sup>, the verification team has accepted the PP's clarification.</p> <p><b><u>CAR is closed.</u></b></p>
<p><b>Conclusion</b> <i>Tick the appropriate checkbox</i></p>	<p><input type="checkbox"/> To be checked during the first periodic verification</p> <p><input type="checkbox"/> Additional action should be taken (finding remains open)</p> <p><input checked="" type="checkbox"/> The finding is closed</p>

Finding	CL C1
<b>Classification</b>	<input type="checkbox"/> CAR <input checked="" type="checkbox"/> CL <input type="checkbox"/> FAR
<p><b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i></p>	<p>In section C of MR, there is no diagram of the monitoring system and the information flow as required by guidelines of completing MR.</p> <p>Associated checklist question(s): <b>C.3; C.4.</b></p>
<p><b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i></p>	<p>It was inserted a diagram with the monitoring information in section C.</p>
<p><b>DOE Assessment #1</b> <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i></p>	<p>Information such as the flow chart of energy and generation data which describes the main equipments of every sector of SHP, including the dam, the substation and system of information collection has been included. A table with meters identification and its calibration data as required by guidelines has also been presented in the MR.</p> <p><b><u>CL is closed.</u></b></p>
<p><b>Conclusion</b> <i>Tick the appropriate checkbox</i></p>	<p><input type="checkbox"/> To be checked during the first periodic verification</p> <p><input type="checkbox"/> Additional action should be taken (finding remains open)</p>



Finding	CL C1
	<input checked="" type="checkbox"/> The finding is closed

Finding	CAR E1
<b>Classification</b>	<input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL <input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	<p>In the Excel ERs calculations:</p> <ol style="list-style-type: none"> <li>1. The calculation method of <math>EF_{grid,OM}</math> is not clear;</li> <li>2. The used EF values are outdated;</li> <li>3. The ER values are not presented by month.</li> </ol> <p>Associated checklist question(s): <b>D.2.2; D.2.3; D.2.4; E.1; E.2; E.3; E.4.</b></p>
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	<p>It was created the sheet CERs 1st MR_rev3.pdf that presents this calculation. In the Section E.1 of MR these values were inserted.</p> <ol style="list-style-type: none"> <li>1. The calculation of <math>EF_{grid,OM}</math> is done as stated in the "Tool to calculate the emission factor for an electricity system" - version 02 under "Dispatch data analysis OM".</li> <li>2. It was corrected with the 2011 and 2012 values.</li> <li>3. The ER values were available by month in the MR.</li> </ol>
<b>DOE Assessment #1</b> <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	<p>A new spreadsheet was provided to the verification team. Information was reviewed and cross-checked with values presented in the MR.</p> <ol style="list-style-type: none"> <li>1. <math>EF_{grid,OM}</math> calculation was clarified and calculated as follows: Total sum of the <math>EF_{grid,OM-DD,y}</math> multiplied by <math>EG_{PJ,y}</math>. (multiplying the <math>EF_{OM}</math> by the EG for each month and summing up the values for the whole monitoring period.) Then dividing the result by the total EG for the monitoring period.  However, the formula in section E.1 of the MR is not in accordance with the one in the tool EB 50 Annex 14 (equation 10) under "Dispatch". The formula in the tool clearly says that <math>EF_{grid,OM-DD,y}</math> needs to be calculated based on <math>EF_{EL,DD,h}</math> (hourly), hence <math>EF_{grid,OM-DD,y}</math> is calculated by using data <u>per hour</u>. OPEN</li> <li>2. The data used in the MR for <math>EF_{grid}</math> was corrected for the year 2011 and 2012 as provided by the Brazilian DNA <sup>/dna/</sup> and the ER calculation. CLOSED</li> <li>3. In the Excel spreadsheet the ER values are now presented by month and by the total of each year, for better</li> </ol>

	comprehension. CLOSED <b><u>CAR remains open due to item # 1.</u></b>
<b>Corrective Action #2</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	1. Regarding the $EF_{grid,OM-DD,y}$ calculation per hour as per EB 50 Annex 14 (equation 10), a new calculation is provided in worksheet CERs 1 <sup>st</sup> MR_rev3, tab "hourly". Attached the MR revised with the new values, version MR1_JUN1122_v3. The MR has also been updated.
<b>DOE Assessment #2</b> <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	1. The provided calculation has been checked. $EF_{grid,OM-DD,y}$ has been calculated as per formula in the tool to calculate the EF using data per hour. <b><u>CAR has been closed.</u></b>
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the first periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed

Finding	CAR E2		
<b>Classification</b>	<input checked="" type="checkbox"/> CAR	<input type="checkbox"/> CL	<input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The value presented as the estimated amount of GHG emission reductions for the monitoring period in Section E.5 and at the front page of MR is not in accordance with the one described in the registered PDD.  In addition, the remarks on the difference between achieved and estimated values of ERs as described in section E.6 are not correct. Revision is necessary.  Associated checklist question(s): <b>E.5.</b>		
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	The value was recalculated and the new value was inserted in the Section E.5 and at the front page. The revision in the comparison of ERs was done.		
<b>DOE Assessment #1</b> <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The calculation of estimated values in the PDD was done based on the 291 days of MP and being equal to 21,965 tCO <sub>2</sub> e. The ER obtained in the monitoring period equals to 16,239 tCO <sub>2</sub> e. No justification is necessary in Section E.6 of MR as the estimated value in registered PDD was higher than the actual values achieved. Reviews in MR were observed.  <b><u>CAR is closed.</u></b>		
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the first periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed		



## 5. SUMMARY OF VERIFICATION ASSESSMENTS

The summary of verification assessments will be provided as part of the final verification report.

The following paragraphs include the summary of the final verification assessments after all CARs and CRs are closed out. For details of the assessments pl. refer to the discussion of the verification findings in chapter 4 and the verification protocol (Annex 1).

### 5.1. Involved Parties and Project Participants

The following parties to the Kyoto Protocol and project participants are involved in this project activity.

**Table 5-1:** Project Parties and project participants

Party Involved	AUTHORIZED PARTICIPANT
Brazil (Host Country)	Hidrelétrica Malagone S.A. (Private Entity)
	Carbotrader Assessoria e Consultoria em Energia Ltda. (Private Entity)

### 5.2. Implementation of the project

During the verification a site visit was carried out. On the basis of this site visit and the reviewed project documentation it can be confirmed that w.r.t. the realized technology, the project equipments, as well as the monitoring and metering equipment, the project has been implemented and operated as described in the registered PDD.

The SHP Malagone is a dam located in Uberabinha River in the Uberlândia City, Minas Gerais, Brazil, classified as a Small Hydro Power Plant due to its installed capacity that is 19 MW.

Its construction started in 1<sup>st</sup> of April, 2008 with commercial operation starting in 1<sup>st</sup> of April, 2010.

It has a reservoir of 1.72 km<sup>2</sup> resulting in a virtually zero environmental impacts when compared with large hydroelectric plants.

Initially, it was described in the registered PDD that the project reservoir had 1.27 km<sup>2</sup>. However, in the first MR, the information was corrected to 1.72 km<sup>2</sup>. Interviews were performed along the site visit and it was verified that a specialized company had been contracted to perform the study of the reservoir area for the feasibility study



and preparation of the documents necessary for the request of environmental license and this data has been used in the registered PDD.

When the installation was ready, another study has been done and an error about the dimension of the area of the reservoir has been detected. This has been immediately reported to the State Environmental Secretary and approved with the issuance of a Operational License Correction.

In addition, the new study shows that the height of reservoir has remained the same during both measurements (for the first and for the second study), ensuring the area has not changed and that the previous value was a mistake of data interpretation by the specialized company hired to perform the first study.

Therefore, as the value does not impact the project itself and has no impact in the project emissions, as the power density of the plant remains greater than 10W/m<sup>2</sup>, the verification team has accepted the PP's clarification.

### **5.3. Project history**

The project has been registered on 2011-06-15 (reference number 4676); the starting date of this first crediting period was 2011-06-15 and this first monitoring period is from 2011-06-15 to 2012-03-31 (both days included).

During the validation the validating DOE might have raised issues that could not be closed or resolved during the validation stage. For this purpose FARs might have been raised. No such issues were identified for this project.

Furthermore as this is the 1<sup>st</sup> periodic verification no issues from former verifications are to be considered.

### **5.4. Post registration changes**

No post registration changes applicable for this monitoring period have been observed during the monitoring period.

### **5.5. Compliance with the monitoring plan**

The monitoring system and all applied procedures are completely in compliance to the registered monitoring plan.

No revision of the monitoring plan has been necessary.

The submitted monitoring report, which is the basis of the verification, was prepared by summarizing consolidated monthly data for each plant over the whole monitoring period in accordance with the monitoring plan of the registered PDD. The procedures are totally in compliance with the directives of the approved monitoring plan which could be confirmed by plant operators and CDM project manager during the site visit.

During the monitoring period, the achieved emission reductions are **16,239 tCO<sub>2</sub>e**. This could be verified by the verification team during the on site visit by checking the company records (SW Hemera) and cross checking with the CCEE reports.

## 5.6. Compliance with the monitoring methodology

The monitoring system is in compliance with the applied monitoring methodology (ACM0002 version 11).

## 5.7. Monitoring parameters

During the verification all relevant monitoring parameters (as listed in chapter B.7.1 of the PDD) have been verified with regard to the appropriateness of the applied measurement / determination method, the correctness of the values applied for ER calculation, the accuracy, and applied QA/QC measures. The results as well as the verification procedure are described parameter-wise in the project specific verification checklist.

After appropriate corrections were carried out by the project participant it can be confirmed that all monitoring parameters have been measured / determined without material misstatements and that they are in line with all applicable standards and relevant requirements.

The following parameters have been checked by the verification team:

1.  $EG_{\text{facility},y}$ : Quantity of net electricity generation supplied by the project plant/unit to the grid in year y.
2.  $EF_{\text{grid,CM},y}$ : Combined margin CO<sub>2</sub> emission factor for grid connected power generation in year y
3.  $EF_{\text{grid,OM-DD},y}$ : CO<sub>2</sub> operating margin emission factor of the grid in year y.
4.  $EF_{\text{grid,BM},y}$ : CO<sub>2</sub> Build Margin emission factor of the grid for the year y.

All records needed for monitoring are archived in line with the requirements of the registered monitoring plan. No significant lack of evidence and missing data were detected during the on-site verification.

## 5.8. Monitoring report

A draft monitoring report was submitted to the verification team by the project participants. The team has made this report publicly available prior to the start of the verification activities. No comments were received.

During the verification, mistakes and needs for clarification were identified. The PP has carried out the requested corrections so that it can be confirmed that the

Monitoring report is complete and transparent and in accordance with the registered PDD and other relevant requirements.

In the process of the verification, 03 CARs and 02 CLs were raised and successfully closed. No FAR has been raised in this monitoring period.

The findings are described in Section 4 of this Report.

## 5.9. ER Calculation

During the verification mistakes in the ER calculation were identified. Corresponding CARs were raised. A revised ER calculation was prepared by the PP and presented to the verification team. All raised issues were addressed appropriately so that all corresponding CARs could be closed out. Thus it is confirmed that the ER calculation is overall correct.

The emission reductions ( $ER_y$ ) were calculated by the product of Combined margin  $CO_2$  emission factor for grid connected power generation in year  $y$  ( $EF_{grid,CM,y}$ ) and quantity of net electricity generation supplied by the project plant/unit to the grid in year  $y$  ( $EG_{facility,y}$ ).

$$ER_y = EG_{facility,y} \times EF_{grid,CM,y}$$

As project emissions and project leakage are equal to zero, the emission reductions are equal to baseline emissions.

$$BE_y = EG_{facility,y} \times EF_{grid,CM,y}$$

$$BE_y = 80,472.18 \times 0.2018$$

$$BE = ER = 16,239 \text{ tCO}_{2e}$$

## 5.10. Quality Management

Quality Management procedures for measurements, collection and compilation of data, data storage and archiving, calibration, maintenance and training of personnel in the framework of this CDM project activity have been defined.

The verification team was able to check the consistency of the procedures by interviews and reports.

Procedures for internal QA/QC have been established and implemented as described in detail in the MR.

All calibration certificates have been presented to the verification team.



During the monitoring period, a calibration delay was observed in the electricity meter from 2011-06-15 (start date of the monitoring period) until 2011-07-20 inclusive. A correction factor of 2% was applied during this period as per Guidelines for assessing compliance with the calibration frequency requirements, EB 52, Annex 60. The guidelines requirements were fully met.

Also, procedures for data archive and protection are in place and implemented in the project activity.

The procedures defined can be assessed as appropriate for the purpose. No significant deviations thereof have been observed during the verification.

### **5.11. Comparison with ex-ante estimated emission reductions**

The MR includes a comparison of the calculated actual emission reductions with the ex-ante calculated values in the registered PDD.

This monitoring period covers a 291 days period (from 2011-06-15 to 2012-03-31 – both days included). According to the registered PDD, the emission reduction estimation for this monitoring period is 21,965 tCO<sub>2</sub>e . Thus, the ERs achieved by the project activity in this monitoring period are lower than the value estimated in the registered PDD and equal to 16,239 tCO<sub>2</sub>e.

### **5.12. Overall Aspects of the Verification**

All necessary and requested documentation was provided by the project participants so that a complete verification of all relevant issues could be carried out.

Access was granted to all installations of the plant which are relevant for the project performance and the monitoring activities.

No issues have been identified indicating that the implementation of the project activity and the steps to claim emission reductions are not compliant with the UNFCCC criteria and relevant guidance provided by the COP/CMP and the CDM EB (clarifications and/or guidance).

### **5.13. Hints for next periodic Verification**

No FARs were raised in this periodic Verification.

## 6. VERIFICATION AND CERTIFICATION STATEMENT

Hidrelétrica Malagone S. A. has commissioned the TÜV NORD JI/CDM Certification Program to carry out the 1st periodic verification of the project: “Malagone SHP CDM Project, Minas Gerais, Brazil (JUN1122)”, with regard to the relevant requirements for CDM project activities. The project reduces GHG emissions due to generating electricity from renewable hydroelectric source and replacing thermal generation from fossil fuels that would have been inputted in the system. This verification covers the period from 2011-06-15 to 2012-03-31 (including both days).

In the course of the verification, 3 Corrective Action Requests (CAR) and 2 Clarification Requests (CL) were raised and successfully closed. Furthermore no FARs were raised in this monitoring period. The verification is based on the draft monitoring report, revised monitoring report, the monitoring plan as set out in the registered PDD, the validation report, emission reduction calculation spreadsheet and supporting documents made available to the TÜV NORD JI/CDM CP by the project participant.

As a result of this verification, the verifier confirms that:

- all operations of the project are implemented and installed as planned and described in the validated project design document.
- the monitoring plan is in accordance with the applied approved CDM methodology, i.e., ACM0002 ver. 11
- the installed equipment essential for measuring parameters required for calculating emission reductions were checked appropriately. During the monitoring period a calibration delay was observed in the electricity meter from 2011-06-15 (start date of the monitoring period) until 2011-07-20. A correction factor of 2% was applied during this period as per Guidelines for assessing compliance with the calibration frequency requirements, EB 52, Annex 60.
- the monitoring system is in place and functional. The project has generated GHG emission reductions.

As the result of the 1<sup>st</sup> periodic verification, the verifier confirms that the GHG emission reductions are calculated without material misstatements in a conservative and appropriate manner. TÜV NORD JI/CDM CP herewith confirms that the project has achieved emission reductions in the above mentioned reporting period as follows:

Emission reductions: **16,239** t CO<sub>2</sub>e

São Paulo, 2013-01-07



Ricardo Lopes  
TÜV NORD JI/CDM CP  
Verification Team Leader

Essen, 2013-01-07



Ingo Klein  
TÜV NORD JI/CDM CP  
Final Approval

## 7. REFERENCES

**Table 7-1:** Documents provided by the project participant(s)

Reference	Document
<b>/CAL1/</b>	<p><u>Calibration Certificates of Meters:</u></p> <ul style="list-style-type: none"> <li>◦ Main: PT-0902A505-01 – Calibration Report # 0003/2009-11 – issued by IPEM/RJ on 2009-06-08 – valid for 02 years – Net Energy</li> <li>◦ Backup: PT-0902A177-01 – Calibration Report # 0003/2009-11 – issued by IPEM/RJ on 2009-06-08 – valid for 02 years – Net Energy</li> <li>◦ Main: PT-0902A505-01 – Calibration Report CC 0127-11 – issued by Metrium. Calibrated on 2011-07-20 – valid for 02 years – Net Energy</li> <li>◦ Backup: PT-0902A177-01 – Calibration Report CC 0128-11 – issued by Metrium. Calibrated on 2011-07-20 – valid for 02 years – Net Energy</li> </ul>
<b>/CON/</b>	<ul style="list-style-type: none"> <li>- Contract between Hidrelétrica Malagone S. A. and TÜV Nord – 12CDMBR030114 – 2012-03-16</li> </ul>
<b>/GEN/</b>	<p><u>Generated Energy:</u></p> <ul style="list-style-type: none"> <li>- Production Control (internal Excel file) – Hidrelétrica Malagone S. A.</li> <li>- Software Hemera Technology Platform– Energisa Soluções</li> <li>- Print screen of CCEE Reports – System SCDE – Energy Data Collection System;</li> </ul>
<b>/OPER/</b>	Operational Agreement # 02.111-OD/PO-008/2010 between Hidrelétrica Malagone S. A. and Energisa Soluções
<b>/LIC/</b>	<p><u>Operational License:</u></p> <ul style="list-style-type: none"> <li>- LO #028 – SHPP Hidrelétrica Malagone S.A. issued by SEMAD – Date: 2010-03-12 – valid until 2016-03-12.</li> </ul> <p><u>Operational License Correction:</u></p> <ul style="list-style-type: none"> <li>- LOC #066/2012 – SHPP Hidrelétrica Malagone S.A. issued by SEMAD – Date: 2010-04-13 – valid until 2016-04-13.</li> </ul> <p><u>Permit License of Functioning:</u></p>



Reference	Document
	<ul style="list-style-type: none"> <li>- License # 1636/2011 – Energisa Soluções – issued by Council of Finances – Uberlândia City Hall – Date: 2011-07-21 – valid until 2016-04-13.</li> </ul>
<b>/MAN/</b>	<p><u>Equipment, Operation and Management Manuals:</u></p> <ul style="list-style-type: none"> <li>- Procedure of Energy Commercialization – PdC Me.01, version 4 from 2010-02-23. Dispatch ANEEL #391 from 2010-02-22.</li> <li>- Operation manuals of the plants – Energisa Soluções (Operation Company);</li> <li>- Program of Prevention of Environmental Risks – Reviewed on June/2011 – issued by Energisa Soluções.</li> <li>- Technical Report – Issued by Energisa Soluções – Reviewed on June/2011;</li> <li>- Emergency Plan for Hidrelétrica Malagone S. A. – revision 01 – reviewed on 2011-02-17</li> <li>- Equipment manuals;</li> <li>- <u>Training Certificates:</u> <ul style="list-style-type: none"> <li>o Operator Qualification Certificate – NR 10 Basic</li> <li>o Operator Qualification Certificate – NR 10 Complementary</li> </ul> </li> <li>- <u>Programmed and non-Programmed stops:</u> <ul style="list-style-type: none"> <li>o Monthly Statistic Bulletin of Events – Issued by Energisa Soluções -</li> </ul> </li> </ul>
<b>/MR/</b>	<p>Monitoring Report “Malagone SHP CDM Project, Minas Gerais, Brazil (JUN 1122)” – 1<sup>st</sup> Monitoring Period : 15/06/2011 – 31/03/2012 (both days included – version 1 (2012-04-13)</p> <p>Monitoring Report “Malagone SHP CDM Project, Minas Gerais, Brazil (JUN 1122)” – 1<sup>st</sup> Monitoring Period : 15/06/2011 – 31/03/2012 (both days included – version 2 (2012-06-06)</p> <p>Monitoring Report “Malagone SHP CDM Project, Minas Gerais, Brazil (JUN 1122)” – 1<sup>st</sup> Monitoring Period : 15/06/2011 – 31/03/2012 (both days included – version 3 (2012-10-01)</p>
<b>/MRT/</b>	Monitoring Report Form (F-CDM-MR) version 02.0



Reference	Document
<b>/TD/</b>	Basic Project of the complexes
<b>/XLS/</b>	Excel spreadsheets calculations

**Table 7-2:** Background investigation and assessment documents

Reference	Document
<b>/ACM02/</b>	ACM0002 ver. 11, “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”
<b>/CPM/</b>	TÜV NORD JI / CDM CP Manual (incl. CP procedures and forms)
<b>/GLMP/</b>	Guidelines for completing the monitoring report form (EB 66 Annex 20)
<b>/IPCC/</b>	1. 1996 IPCC Guidelines for National Greenhouse Gas Inventories: work book 2. 2006 IPCC Guidelines for National Greenhouse Gas Inventories: work book
<b>/KP/</b>	Kyoto Protocol (1997)
<b>/MA/</b>	Decision 3/CMP. 1 (Marrakesh – Accords)
<b>/MRT/</b>	Monitoring Report Form (F-CDM-MR) Version 2.0
<b>/PDD/</b>	Project Design Document for CDM project: “ <i>Malagone SHP CDM Project, Minas Gerais, Brazil (JUN1122)</i> ” version 3.1, dated 2011-06-09
<b>/PS/</b>	Project Standard (EB 65 Annex 5)
<b>/TOOL/</b>	- “Tool for the demonstration and assessment of additionality” – Version 05.2; - “Tool to calculate the emission factor for an electricity system” – Version 2;
<b>/VAL/</b>	Validation Report for CDM project “ <i>Malagone SHP CDM Project, Minas Gerais, Brazil (JUN1122)</i> ” version 05.1, dated 2011-06-13
<b>/VER/</b>	Documents of previous verifications (Monitoring report, verification report, ER calculation sheet)



Reference	Document
<b>/VVS/</b>	UNFCCC Validation and Verification Standard (Version 2.0, EB 65)

Table 7-3: Websites used

Reference	Link	Organization
<b>/dna /</b>	<a href="http://www.mct.gov.br">http://www.mct.gov.br</a>	DNA of Brazil
<b>/ccee/</b>	<a href="http://www.ccee.org.br">www.ccee.org.br</a>	Chamber of Commercialization of Electric Energy
<b>/unfccc/</b>	<a href="http://cdm.unfccc.int">http://cdm.unfccc.int</a>	UNFCCC
<b>/ipcc/</b>	<a href="http://www.ipcc-nggip.iges.or.jp">www.ipcc-nggip.iges.or.jp</a>	IPCC publications

Table 7-4: List of interviewed persons

Reference	Mol <sup>1</sup>		Name	Organization / Function
<b>/IM01/</b>	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms	Dante Luiz do Nascimento	Hidrelétrica Malagone S. A. / Management Engineer
<b>/IM01/</b>	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms	Ricardo M. Andrade	Hidrelétrica Malagone S. A. / Person in charge of Maintenance works
<b>/IM02/</b>	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms	Thiago dos Santos Lima	Energisa Soluções / Operations Supervisor of Hidropower
<b>/IM02/</b>	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms	Ramon Silton Silva Oliveira	Energisa Soluções / Operations Technician of Hidropower
<b>/IM03/</b>	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms	Paulo Roberto Eleuterio	CEMIG / Team Supervisor
<b>/IM04/</b>	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms	Arthur Moraes	Carbotrader / Director

<sup>1)</sup> Means of Interview: (Telephone, E-Mail, Visit)

# ANNEX

- A1:** Verification Protocol
- A2:** Statements of Competence of  
involved Personnel

## ANNEX 1: VERIFICATION PROTOCOL

**Table A-1:** GHG calculation procedures and management control testing / detailed audit testing of residual risk areas and random testing

Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks	Additional verification testing	Conclusions and Areas Requiring Improvement (including <i>Forward Action Requests</i> )
<b>Raw data generation</b>				
<ul style="list-style-type: none"> <li>• Installation of measuring equipment</li> <li>• Dysfunction of installed equipment</li> <li>• Maloperation by operational personnel</li> <li>• Downtimes of equipment</li> <li>• Exchange of equipment</li> <li>• Change of measurement equipment characteristic</li> <li>• Insufficient accuracy</li> <li>• Change of technology</li> </ul>	<ul style="list-style-type: none"> <li>• Installation of modern and state of the art equipment</li> <li>• Process control automation</li> <li>• Internal data review</li> <li>• Regular visual inspections of installed equipment</li> <li>• Only skilled and trained personnel operates the relevant equipment</li> <li>• Daily raw data checks</li> <li>• Immediate exchange of dysfunctional equipment</li> <li>• Stand-by duty is</li> </ul>	<ul style="list-style-type: none"> <li>• Inadequate installation / operation of the monitoring equipment</li> <li>• Inadequate exchange of equipment</li> <li>• Change of personnel</li> <li>• Undetected measurement errors</li> <li>• Inappropriateness of Management system procedures w.r.t. monitoring plan requirements (e.g. substitute value strategies)</li> <li>• Non-application of management system procedures</li> <li>• Insufficient accuracy</li> <li>• Inappropriate QA/QC</li> </ul>	<ul style="list-style-type: none"> <li>• Site – visit</li> <li>• Check of equipment</li> <li>• Check of technical data sheets</li> <li>• Check of suppliers information / guarantees</li> <li>• Check of calibration records, if applicable</li> <li>• Check of maintenance records</li> <li>• Counter-check of raw data and commercial data</li> <li>• Check of CDM management system</li> <li>• Check of CDM related procedures</li> </ul>	<ul style="list-style-type: none"> <li>• <b>See Table A-2</b></li> </ul>

Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks	Additional verification testing	Conclusions and Areas Requiring Improvement (including <i>Forward Action Requests</i> )
<ul style="list-style-type: none"> <li>Accuracy of values supplied by Third Parties</li> </ul>	<ul style="list-style-type: none"> <li>organized</li> <li>Training</li> <li>Internal audit procedures</li> <li>Internal check of QA/QC measures of involved Third Parties</li> </ul>	<ul style="list-style-type: none"> <li>measures of Third Parties</li> </ul>	<ul style="list-style-type: none"> <li>Application of CDM management system procedures</li> <li>Check of trainings</li> <li>Check of responsibilities</li> <li>Check of QA/QC documentation / evidences of involved Third Parties</li> </ul>	
<b>Raw data collection and data aggregation</b>				
<ul style="list-style-type: none"> <li>Wrong data transfer from raw data to daily and monthly aggregated reporting forms</li> <li>IT Systems</li> <li>Spread sheet programming</li> <li>Manual data transmission</li> <li>Data protection</li> <li>Responsibilities</li> </ul>	<ul style="list-style-type: none"> <li>Cross-check of data</li> <li>Plausibility checks of various parameters.</li> <li>Appropriate archiving system</li> <li>Clear allocation of responsibilities</li> <li>Application of CDM Management system procedures</li> <li>Usage of standard software solutions</li> </ul>	<ul style="list-style-type: none"> <li>Unintended usage of old data that has been revised</li> <li>Incomplete documentation</li> <li>Ex-post corrections of records</li> <li>Ambiguous sources of information</li> <li>Non-application of management system procedures</li> <li>Manual data transfer mistakes</li> </ul>	<ul style="list-style-type: none"> <li>Check of data aggregation steps</li> <li>Counter-calculation</li> <li>Data integrity checks by means of graphical data analysis and calculation of specific performance figures</li> <li>Check of management system certification</li> <li>Check of data archiving system</li> </ul>	<ul style="list-style-type: none"> <li><b>See Table A-2</b></li> </ul>



Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks	Additional verification testing	Conclusions and Areas Requiring Improvement (including <i>Forward Action Requests</i> )
	(Spreadsheets) <ul style="list-style-type: none"> <li>Limited access to IT systems</li> <li>Data protection procedures</li> </ul>	<ul style="list-style-type: none"> <li>Unintended change of spread sheet programming or data base entries</li> <li>Problems caused by updating/upgrading or change of applied software</li> </ul>	<ul style="list-style-type: none"> <li>Check of application of Management system procedures</li> </ul>	
<b>Other calculation parameters</b>				
<ul style="list-style-type: none"> <li>Emission factors, oxidation factors, coefficients</li> </ul>	<ul style="list-style-type: none"> <li>The values and data sources applied are defined in the PDD and monitoring plan</li> </ul>	<ul style="list-style-type: none"> <li>Unintended or intended Modification of calculation parameters</li> <li>Wrong application of values</li> <li>Misinterpretations of the applied methodology and/ or the PDD</li> <li>Missing update of applicable regulatory framework (e.g. IPCC values)</li> </ul>	<ul style="list-style-type: none"> <li>Update-check of regulatory framework</li> <li>Countercheck of the applied MP in the MR against the methodology and the PDD</li> </ul>	<ul style="list-style-type: none"> <li><b>See Table A-2</b></li> </ul>
<b>Calculation Methods</b>				

Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks	Additional verification testing	Conclusions and Areas Requiring Improvement (including <i>Forward Action Requests</i> )
<ul style="list-style-type: none"> <li>Applied formulae</li> <li>Miscalculation</li> <li>Mistakes in spread-sheet calculation</li> </ul>	<ul style="list-style-type: none"> <li>Advanced calculation and reporting tools</li> <li>A CDM coordinator is in charge of the CDM related calculations</li> <li>Usage of tested / counterchecked Excel spreadsheets</li> <li>Involvement of external consultants</li> </ul>	<ul style="list-style-type: none"> <li>The danger of miscalculation can only be minimized.</li> </ul>	<ul style="list-style-type: none"> <li>Countercheck on the basis of own calculation.</li> <li>Spread sheet walk-through.</li> <li>Plausibility checks</li> <li>Check of plots</li> </ul>	<ul style="list-style-type: none"> <li><b>See Table A-2</b></li> </ul>
<b>Monitoring reporting</b>				
<ul style="list-style-type: none"> <li>Data transfer to the author of the monitoring report</li> <li>Data transfer to the monitoring report</li> <li>Unintended use of outdated versions</li> </ul>	<ul style="list-style-type: none"> <li>An experienced CDM consultant is responsible for monitoring reporting.</li> <li>CDM QMS procedures are defined</li> </ul>	<ul style="list-style-type: none"> <li>The danger of data transfer mistakes can only be minimized</li> <li>Inappropriate application of QMS procedures</li> </ul>	<ul style="list-style-type: none"> <li>Counter check with evidences provided.</li> <li>Audit of procedure application</li> </ul>	<ul style="list-style-type: none"> <li><b>See Table A-2</b></li> </ul>

**Table A-2:** (Project specific) Periodic Verification Checklist

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<b>A. Description of the project activity</b>				
<b>A.1. Purpose and general description of the project activity</b> <b>(EB 66 Annex 20, A.1)</b> <i>Check if section A.1 of the MR includes the following:</i> <ul style="list-style-type: none"> <li>- Purpose of the PA and the measures taken to reduce GHG emissions</li> <li>- Brief description of the installed technology and equipment</li> <li>- Relevant dates for the project activity (e.g. construction, commissioning, continued operation periods etc.)</li> <li>- Total emission reductions achieved in this monitoring period</li> </ul>	/MR/	<p>The verification team has checked section A.1 of the MR and confirms that the information provided is complete and correct with regards to the following:</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Purpose of the PA and the measures taken to reduce GHG emissions</li> <li><input checked="" type="checkbox"/> Brief description of the installed technology and equipments</li> <li><input checked="" type="checkbox"/> Relevant dates for the project activity (e.g. construction, commissioning, continued operation periods etc)</li> <li><input checked="" type="checkbox"/> Total emission reductions achieved in this monitoring period</li> </ul> <p>In this context the following findings have been identified: N/A</p>	OK	OK
<b>A.2. Location of project activity</b> <b>(EB 66 Annex 20, A.2)</b> <i>Check if section A.2 of the MR reflects correctly the following:</i> <ul style="list-style-type: none"> <li>- Host Party(ies)</li> <li>- Region / State / Province etc.</li> <li>- City / Town / Community etc.</li> </ul>	/MR/ /PDD/ /IM/	<p>The verification team has checked section A.2 of the MR and confirms by means of comparison with the information given in the PDD and information gathered during the site visit that the information provided is complete and correct with regards to the following:</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Host Party(ies)</li> <li><input checked="" type="checkbox"/> Region / State / Province</li> <li><input checked="" type="checkbox"/> City / Town / Community</li> </ul>	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
- <i>Physical / geographical location (e.g. Latitude and Longitude)</i>		<input checked="" type="checkbox"/> Physical / Geographical location In this context the following findings have been identified: N/A		
<b>A.3. Parties and Project Participants (EB 66 Annex 20, A.3)</b> <i>Check if section A.3 of the MR includes the following:</i> <ul style="list-style-type: none"> <li>- <i>All PPs as displayed on the UNFCCC website</i></li> <li>- <i>A correctly filled table as per the MR template</i></li> </ul>	/MR/ /unfccc/	The verification team has checked section A.3 of the MR as well as the UNFCCC website and confirms that: <input checked="" type="checkbox"/> all PPs as displayed on the project related UNFCCC website are correctly listed <input checked="" type="checkbox"/> the table as per the template MR has been correctly filled In this context the following findings have been identified: N/A	OK	OK
<b>A.4. Reference of applied methodology (EB 66 Annex 20, A.4)</b> <i>Check if section A.4 of the MR correctly describes / includes the following:</i> <ul style="list-style-type: none"> <li>- <i>Reference to the applicable version of the methodology</i></li> <li>- <i>Reference to the applicable version(s) of relevant methodological tools</i></li> <li>- <i>Relevant EB decisions, if applicable</i></li> </ul>	/MR/ /PDD/ /unfccc/	The verification team has checked section A.4 of the MR and confirms by means of comparison with the information given in the PDD and displayed on the UNFCCC website that the information provided is complete and correct with regards to the following: <input checked="" type="checkbox"/> Number, title and version of the applicable CDM Methodology <input checked="" type="checkbox"/> Name and version of applicable CDM methodological tools <input checked="" type="checkbox"/> Relevant EB decisions In this context the following findings have been identified:	OK	OK



Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		N/A		
<b>A.5. Crediting period of project activity (EB 66 Annex 20, A.5)</b>  <i>Check if section A.5 of the MR correctly includes the following:</i> <ul style="list-style-type: none"> <li>- <i>Start date of the crediting period. In this context please check, if applicable, whether post registration changes to the start date have been accepted by the EB.</i></li> <li>- <i>Length and type of the crediting period</i></li> </ul>	/MR/ /unfccc/	<p>The verification team has checked section A.5 of the MR and confirms by means of comparison with the information displayed on the UNFCCC website that the information provided is complete and correct with regards to the following:</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Start date of the crediting period.</li> <li><input checked="" type="checkbox"/> Type and length of the crediting period</li> </ul> <p>In this context the following findings have been identified: N/A</p>	OK	OK
<b>A.6. Publication of the Monitoring Report (EB 65 Annex 4, 207)</b>  <i>Check if the monitoring report has been made publicly available on the UNFCCC website before the verification commenced.</i> <i>Check if comments have been received and if yes, how they have been addressed.</i>	/unfccc/	<p>The verification team has ensured and confirms by means of checking the respective project information on the UNFCCC website that:</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> The draft monitoring report, as received from the project participants, has been made publicly available prior to the start of the verification activities.</li> <li><input checked="" type="checkbox"/> No comments have been received.</li> </ul> <p>In this context the following findings have been identified: N/A</p>	OK	OK
<b>A.7. Compliance with standardized format of the Monitoring Report</b>	/MRT/	<p>The verification team has checked all sections of the MR and confirms by means of comparison with the MR template that:</p>	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<b>(EB 65 Annex 4, 212 h)</b> <i>Check (only) if the latest applicable MR template has been used. For compliance assessment with the MR guideline pl. refer to the respective MR sections.</i>		<input checked="" type="checkbox"/> the standardized MR template has been used In this context the following findings have been identified: N/A		
<b>B. Implementation of project activity</b>				
<b>B.1. Description of implemented registered project activity</b> <b>(EB 66 Annex 20, B.1)</b> <i>Check if section B.1 of the MR correctly describes / includes the following:</i> <ul style="list-style-type: none"> <li>- <i>Implementation status of the PA</i></li> <li>- <i>Detailed description of installed technology(ies) / technical processes and equipment applied</i></li> <li>- <i>Diagrams (where appropriate)</i></li> </ul>	/MR/ /PDD/ /PS/	The verification team has checked section B.1 of the MR and confirms by means of comparison with the information given in the PDD, the project standard and information gathered during the site visit that: <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> the description of the implementation status of the PA is in line with the applicable provisions of the project standard</li> <li><input checked="" type="checkbox"/> an appropriate description of the installed technology(ies), technical process and equipment incl. diagrams, where applicable, has been included</li> </ul> In this context the following findings have been identified: <b>(CL B1)</b> In section B.1 of MR, it is missing the description of the installed technology, technical process, equipment and diagrams, as per the guidelines for completing the MR.	CL-B4	OK
<b>B.1.1. Initial project implementation</b> <b>(EB 65 Annex 4; § 225 a, 226)</b> <i>Assess whether the project has been implemented and operated as per the registered PDD and are all physical features of the project in place?</i>	/IM01/ /IM02/ /IM04/ /PDD/	<i>Description:</i> In the registered PDD, the technical features, equipment and monitoring procedures to be employed by the project activity are stated, and the verification team could verify that the project is indeed implemented with them. The SHPP Malagone is composed by two 9.5 MW	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><i>Further focus on the potential phase wise implementation and check the reporting on the corresponding status and starting dates accordingly.</i></p> <p><i>Also, discuss – if applicable – any approvals of the necessary request of notification or request for approval of changes from the project activity as described in the registered PDD (EB 48 Annex 66/67).</i></p>		<p>generators.</p> <p><i>Verifier's action:</i> Performed interviews, the PDD and the plates of the equipment were used to assess this issue.</p> <p><i>Conclusion:</i> The project has been implemented and operated as per registered PDD.</p>		
<p><b>B.1.2. Technical equipment changes</b> <b>-(EB 65 Annex 4; § 225 a, 226)</b></p> <p><i>Check if relevant technical equipment of the project activity has been exchanged or modified during the monitoring period. Further ensure that consistent notations of key equipment (meters etc.) in PDD, MR and calculation spreadsheet are applied</i></p> <p><i>Consider e.g. interviews with operational personnel, QMS records, maintenance records, instrument specifications.</i></p> <p><i>In case of changes, check whether the project is still in line with the registered PDD and assure that these changes have been considered in the monitoring report and the emission reduction calculation.</i></p> <p><i>In case of post registration changes pl. refer to chapter B.2.</i></p>	<p>/IM01/ /IM02/ /PDD/ /MR/</p>	<p><i>Description:</i> There was no exchange of equipments in SHPP Malagone during the MP.</p> <p><i>Verifier's action:</i> The verification team has checked the calibration control sheets, the OMNI software (for operations and integrated maintenance) and the calibration certificates. Also, interviews with the operational employees to counter check the information have been performed.</p> <p><i>Conclusion:</i> The equipments were observed and they are the same than the ones described in PDD and MR.</p>	OK	OK
<p><b>B.1.3. Operation of the project activity</b></p>	<p>/IM01/ /IM02/</p>	<p><i>Description:</i> The mode of operation for the project activity have not been changed or modified during this 1<sup>st</sup></p>	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><b>-(EB 65 Annex 4; § 225 a, 226)</b></p> <p><i>Check if relevant operation modes of the project activity have been exchanged or modified during the monitoring period.</i></p> <p><i>Consider e.g. interviews with operational personnel, operation log sheets, data management system records.</i></p> <p><i>In case of changes, check whether the project is still in line with the registered PDD and assure that these changes have been considered in the monitoring report and the emission reduction calculation.</i></p> <p><i>In case of post registration changes pl. refer to chapter B.2.</i></p>	<p>/IM04/ /PDD/ /MAN/ /GEN/ /OPER/</p>	<p>monitoring period. The company responsible for the operation of the project activity is Energisa Soluções.</p> <p><i>Verifier's action:</i> During the site visit, the verification team has interviewed the operation personnel from Energisa and Hidrelétrica Malagone S. A. and reviewed log sheets and data management records to confirm that there are no changes or modification undertaken during this monitoring period.</p> <p><i>Conclusion:</i> There are no changes for the mode of operation of the project activity during this monitoring period.</p>		
<p><b>B.1.4. Incidents</b> <b>(EB 65 Annex 4; § 225 a, 226)</b></p> <p><i>Identify if there have been any significant incidents, deviant operation modes and / or downtimes of the equipment?</i></p> <p><i>Consider e.g. interviews with operational personnel, operational log sheets, analysis of performance data.</i></p>	<p>/IM01/ /IM02/ /IM04/ /MR/ /MAN/</p>	<p><i>Description:</i> All events and incidents are accordingly described in a report called Monthly Statistic Bulletin of Events<sup>/MAN/</sup>. According to this report there was no event that needed special attention. Only programmed interruptions, regular cleaning interruptions and interruptions caused by hydrological problems have occurred, without significance and with no impact to the monitored generated energy. This information is obtained through report provided by Energisa Soluções.</p> <p><i>Verifier's action:</i> During the site visit, the verification team</p>	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		<p>has interviewed the operation personnel and reviewed log sheets and data management records to confirm the information.</p> <p><i>Conclusion:</i> There were no significant incidents, deviant operation modes and downtimes of the equipments during the MP.</p>		
<p><b>B.1.5. Legislation</b> Find out – esp. in the context of methodological requirements - whether relevant legislation with effect on the project activity in the host country has been changed.</p> <p>Assess, in case of changes, whether consequences for the PA with regard to relevant CDM requirements have been accounted for.</p> <p>In case of changes data sources shall be referenced.</p>	/IM01/ /IM02/ /IM03/ /MR/	<p><i>Description:</i> No relevant legislation from host country affecting the operations of the project activity has been changed.</p> <p><i>Verifier's action:</i> The verification team has reviewed the operational license and relevant legislation related to the project activity.</p> <p><i>Conclusion:</i> No changes have occurred.</p>	OK	OK
<p><b>B.1.6. Open issues from validation</b> <b>-(EB 65 Annex 4; § 213)</b></p> <p><i>Check (esp. in case of 1<sup>st</sup> periodic verification) whether there are any open issues indicated in the validation report (e.g. FAR)?</i></p>	/VAL/	<p><input checked="" type="checkbox"/> There were no open issues addressed in the validation report</p> <p><input type="checkbox"/> All open issues from the validation have been appropriately addressed.</p> <p><input type="checkbox"/> The following issues related to the validation have not yet been appropriately addressed:</p>	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.												
<b>B.1.7. Open issues from previous verification</b> <b>-(EB 65 Annex 4; §§ 213; 284 h)</b> <i>Check in case of further periodic verifications whether there are any open issues indicated in previous verification reports (FAR) and take into consideration the guidance as specified in VVS.</i>	/VER/	<input type="checkbox"/> There were no open issues addressed in the previous verification report <input type="checkbox"/> All open issues from the previous verification have been appropriately addressed. <input type="checkbox"/> The following issues related to the previous verification have not yet been appropriately addressed: Not applicable as this is the 1 <sup>st</sup> periodic verification.	N/A	N/A												
<b>B.2. Post registration changes</b>																
<b>B.2.1. Are post registration changes applicable to the proposed project activity?</b>		<input type="checkbox"/> No, by means of site visit, document check and interview it could be verified that the project is implemented and operated in line with the registered PDD and the applied methodology. <i>(Please proceed with section C)</i> <input checked="" type="checkbox"/> Yes, post registration changes have been identified and are assessed in detail in the subsequent steps. <i>(Please proceed with B.2.3.)</i>	OK	OK												
<b>B.2.2. Temporary deviations from the registered monitoring plan or applied methodology (TDfrMP; TDfMM)</b> <b>(EB 66 Annex 20, B.2.1; EB 65 Annex 4; §§ 251 - 256))</b> <i>Indicate whether any temporary deviations have been applied during this monitoring periods.</i> <i>In cases where approval has been sought from the</i>	/PS/ /unfccc/	<table border="1"> <tr> <td><input checked="" type="checkbox"/></td> <td colspan="2">No TDfrMP or TDfMM have been submitted to the UNFCCC prior to the current monitoring period</td> </tr> <tr> <td><input type="checkbox"/></td> <td colspan="2">The following TDfrMP or TDfMM have been approved or are under approval by the UNFCCC</td> </tr> <tr> <td>1</td> <td>Title</td> <td></td> </tr> <tr> <td></td> <td>Status</td> <td><input type="checkbox"/> under approval; <input type="checkbox"/> approved</td> </tr> </table>	<input checked="" type="checkbox"/>	No TDfrMP or TDfMM have been submitted to the UNFCCC prior to the current monitoring period		<input type="checkbox"/>	The following TDfrMP or TDfMM have been approved or are under approval by the UNFCCC		1	Title			Status	<input type="checkbox"/> under approval; <input type="checkbox"/> approved	N/A	N/A
<input checked="" type="checkbox"/>	No TDfrMP or TDfMM have been submitted to the UNFCCC prior to the current monitoring period															
<input type="checkbox"/>	The following TDfrMP or TDfMM have been approved or are under approval by the UNFCCC															
1	Title															
	Status	<input type="checkbox"/> under approval; <input type="checkbox"/> approved														



Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.													
<p><i>EB please provide reference. If applied, provide a description of the deviation(s). This should include the reasons for the deviation(s), how it deviates from the monitoring plan and/or applied methodology(ies), the duration for which the deviation(s) is(are) applicable and justification on the conservativeness of the approach. Indicate if the deviation will lead to a reduction in the accuracy and if so, which conservative assumptions and discount factors have been applied. For deviation(s) that require prior approval by the Board, include the date of approval and reference number.</i></p>		<table border="1"> <tr> <td rowspan="6">2</td><td>Appr.date</td><td></td></tr> <tr> <td>Ref. No.</td><td></td></tr> <tr> <td>Title</td><td></td></tr> <tr> <td>Status</td><td><input type="checkbox"/> under approval; <input type="checkbox"/> approved</td></tr> <tr> <td>Appr.date</td><td></td></tr> <tr> <td>Ref.No.</td><td></td></tr> </table>	2	Appr.date		Ref. No.		Title		Status	<input type="checkbox"/> under approval; <input type="checkbox"/> approved	Appr.date		Ref.No.			
		2		Appr.date													
				Ref. No.													
				Title													
				Status	<input type="checkbox"/> under approval; <input type="checkbox"/> approved												
				Appr.date													
			Ref.No.														
		<input type="checkbox"/>	During the verification of the current MP no need for a TDfrMP or TDfMM has been identified. The monitoring plan is in accordance with the approved methodology applied by the PA														
		<input type="checkbox"/>	An approval of the following TDfrMP or TDfMM is to be requested from the EB for the current MP as appendix 1 of the project standard does not apply.														
		1	Issue:														
		2	Issue:														
		<input type="checkbox"/>	The following TDfrMP or TDfMM for which appendix 1 of the PS is applicable have been applied:														
		1	Issue:														
		2	Issue:														
		<p><i>In cases of approved TDfrMP or TDfM the EB guidance has been applied as follows:</i></p>															





Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.											
		<p><i>Detailed description and justification each TDfrMP or TDfM for which appendix 1 is applicable:</i></p> <p>In this context the following findings have been identified: N/A</p>													
<p><b>B.2.3. Corrections</b> <b>(EB 66 Annex 20, B.2.2)</b></p> <p><i>Indicate whether any corrections to project information or parameters fixed at validation have been approved during this monitoring period or submitted with this monitoring report.</i></p> <p><i>In cases where the correction(s) and the revised PDD are approved prior to the submission of this monitoring report for request for issuance, provide the approval date and reference number. Otherwise, provide the version number and the completion date of the revised PDD.</i></p> <p><i>Please check and report that the corrected information is an accurate reflection of the actual project information and that the corrected parameters are in accordance with the applied methodology and the monitoring plan.</i></p>	/MR/ /PS/ /PDD/	<table border="1"><tr><td><input type="checkbox"/></td><td colspan="3">During the verification of the current MP no need for corrections has been identified.</td></tr><tr><td rowspan="2"><input checked="" type="checkbox"/></td><td colspan="3">The following corrections have been applied:</td></tr><tr><td>1</td><td>Issue:</td><td>The area of reservoir described in MR is different than the one in the registered PDD.</td></tr></table> <p><i>Detailed description and justification each correction:</i></p> <p>The area of reservoir observed in the MR is inconsistent with information provided in registered PDD. As per the new post-registration, it is a simple correction from the PDD and baseline. The additionality and applicability will not be influenced by the change of this parameter (EB 65</p>	<input type="checkbox"/>	During the verification of the current MP no need for corrections has been identified.			<input checked="" type="checkbox"/>	The following corrections have been applied:			1	Issue:	The area of reservoir described in MR is different than the one in the registered PDD.	CAR B2	OK
<input type="checkbox"/>	During the verification of the current MP no need for corrections has been identified.														
<input checked="" type="checkbox"/>	The following corrections have been applied:														
	1	Issue:	The area of reservoir described in MR is different than the one in the registered PDD.												



Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.																														
		Annex 5 Appendix 1 point I).  However, a CAR has been raised.  In this context the following findings have been identified:  <b>(CAR B2)</b> In section B.1 of MR, clarify the reasons for the change in the reservoir dimension from the registered PDD and actual situation.																																
<b>B.2.4. Permanent changes from the registered monitoring plan or applied methodology (PCfrMP; PCfMM)</b> <b>(EB 66 Annex 20, B.2.3)</b>  <i>Indicate whether any permanent changes from the registered monitoring plan or applied methodologies have been approved during this monitoring period or submitted with this monitoring report.</i>  <i>In cases where the change(s) and the revised PDD are approved prior to the submission of this monitoring report for request for issuance, provide the approval date and reference number. Otherwise, provide the version number and the completion date of the revised PDD.</i>		<table><tr><td><input checked="" type="checkbox"/></td><td colspan="3">No PCfrMP or PCfMM have been submitted to the UNFCCC prior to the current monitoring period</td></tr><tr><td rowspan="8"><input type="checkbox"/></td><td colspan="3">The following PCfrMP or PCfMM have been approved or are under approval by the UNFCCC</td></tr><tr><td rowspan="4">1</td><td>Title</td><td></td></tr><tr><td>Status</td><td><input type="checkbox"/> under approval; <input type="checkbox"/> approved</td></tr><tr><td>Appr.date</td><td></td></tr><tr><td>Ref. No.</td><td></td></tr><tr><td rowspan="4">2</td><td>Title</td><td></td></tr><tr><td>Status</td><td><input type="checkbox"/> under approval; <input type="checkbox"/> approved</td></tr><tr><td>Appr.date</td><td></td></tr><tr><td>Ref.No.</td><td></td></tr><tr><td><input checked="" type="checkbox"/></td><td colspan="3">During the verification of the current MP no need for a</td></tr></table>	<input checked="" type="checkbox"/>	No PCfrMP or PCfMM have been submitted to the UNFCCC prior to the current monitoring period			<input type="checkbox"/>	The following PCfrMP or PCfMM have been approved or are under approval by the UNFCCC			1	Title		Status	<input type="checkbox"/> under approval; <input type="checkbox"/> approved	Appr.date		Ref. No.		2	Title		Status	<input type="checkbox"/> under approval; <input type="checkbox"/> approved	Appr.date		Ref.No.		<input checked="" type="checkbox"/>	During the verification of the current MP no need for a			N/A	N/A
<input checked="" type="checkbox"/>	No PCfrMP or PCfMM have been submitted to the UNFCCC prior to the current monitoring period																																	
<input type="checkbox"/>	The following PCfrMP or PCfMM have been approved or are under approval by the UNFCCC																																	
	1	Title																																
		Status	<input type="checkbox"/> under approval; <input type="checkbox"/> approved																															
		Appr.date																																
		Ref. No.																																
	2	Title																																
		Status	<input type="checkbox"/> under approval; <input type="checkbox"/> approved																															
		Appr.date																																
Ref.No.																																		
<input checked="" type="checkbox"/>	During the verification of the current MP no need for a																																	



Checklist Item (incl. guidance for the verification team)	Refe- rence	Verification Team Comments (Means and results of assessment)			Draft Concl.	Final Concl.		
		<input type="checkbox"/>	PCfrMP or PCfMM has been identified. The monitoring plan is in accordance with the approved methodology applied by the PA					
		<input type="checkbox"/>	An approval of the following PCfrMP or PCfMM is to be requested from the EB for the current MP as appendix 1 of the project standard does not apply.					
			1	Issue:				
			2	Issue:				
		<input type="checkbox"/>	The following PCfrMP or PCfMM for which appendix 1 of the PS is applicable have been applied:					
			1	Issue:				
			2	Issue:				
		<i>In cases of approved PCfrMP or PCfMM the EB guidance has been applied as follows:</i>						
		<i>Detailed description and justification each TDfrMP or TDfM for which appendix 1 is applicable:</i>						
		In this context the following findings have been identified: N/A						

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.																																					
<div><b>B.2.5. Changes to the project design of the registered project activity (CoPD)</b> <b>(EB 66 Annex 20, B.2.4)</b></div> <div><i>Indicate whether any changes to the project design of the project activity have been approved during this monitoring period or submitted with this monitoring report.</i></div> <div><i>In cases where the change(s) and the revised PDD are approved prior to the submission of this monitoring report for request for issuance, provide the approval date and reference number. Otherwise, provide the version number and the completion date of the revised PDD.</i></div>		<table><tr><td><input checked="" type="checkbox"/></td><td colspan="3">No CoPD has been submitted to the UNFCCC prior to the current monitoring period</td></tr><tr><td rowspan="8"><input type="checkbox"/></td><td colspan="3">The following CoPD has been approved or are under approval by the UNFCCC</td></tr><tr><td rowspan="4">1</td><td>Title</td><td></td></tr><tr><td>Status</td><td><input type="checkbox"/> under approval; <input type="checkbox"/> approved</td></tr><tr><td>Appr.date</td><td></td></tr><tr><td>Ref. No.</td><td></td></tr><tr><td rowspan="4">2</td><td>Title</td><td></td></tr><tr><td>Status</td><td><input type="checkbox"/> under approval; <input type="checkbox"/> approved</td></tr><tr><td>Appr.date</td><td></td></tr><tr><td>Ref.No.</td><td></td></tr><tr><td><input checked="" type="checkbox"/></td><td colspan="3">During the verification of the current MP no need for a CoPD has been identified. The monitoring plan is in accordance with the approved methodology applied by the PA</td></tr><tr><td rowspan="2"><input type="checkbox"/></td><td colspan="3">An approval of the following CoPD is to be requested from the EB for the current MP as appendix 1 of the project standard does not apply.</td></tr><tr><td>1</td><td>Issue:</td><td></td></tr></table>	<input checked="" type="checkbox"/>	No CoPD has been submitted to the UNFCCC prior to the current monitoring period			<input type="checkbox"/>	The following CoPD has been approved or are under approval by the UNFCCC			1	Title		Status	<input type="checkbox"/> under approval; <input type="checkbox"/> approved	Appr.date		Ref. No.		2	Title		Status	<input type="checkbox"/> under approval; <input type="checkbox"/> approved	Appr.date		Ref.No.		<input checked="" type="checkbox"/>	During the verification of the current MP no need for a CoPD has been identified. The monitoring plan is in accordance with the approved methodology applied by the PA			<input type="checkbox"/>	An approval of the following CoPD is to be requested from the EB for the current MP as appendix 1 of the project standard does not apply.			1	Issue:		N/A	N/A
<input checked="" type="checkbox"/>	No CoPD has been submitted to the UNFCCC prior to the current monitoring period																																								
<input type="checkbox"/>	The following CoPD has been approved or are under approval by the UNFCCC																																								
	1	Title																																							
		Status	<input type="checkbox"/> under approval; <input type="checkbox"/> approved																																						
		Appr.date																																							
		Ref. No.																																							
	2	Title																																							
		Status	<input type="checkbox"/> under approval; <input type="checkbox"/> approved																																						
		Appr.date																																							
Ref.No.																																									
<input checked="" type="checkbox"/>	During the verification of the current MP no need for a CoPD has been identified. The monitoring plan is in accordance with the approved methodology applied by the PA																																								
<input type="checkbox"/>	An approval of the following CoPD is to be requested from the EB for the current MP as appendix 1 of the project standard does not apply.																																								
	1	Issue:																																							

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.														
		<table><tr><td></td><td>2</td><td>Issue:</td><td></td></tr><tr><td rowspan="3"><input type="checkbox"/></td><td colspan="3">The following CoPD for which appendix 1 of the PS is applicable have been applied:</td></tr><tr><td>1</td><td>Issue:</td><td></td></tr><tr><td>2</td><td>Issue:</td><td></td></tr></table> <p><i>In cases of approved CoPD the EB guidance has been applied as follows:</i></p> <p><i>Detailed description and justification each CoPD for which appendix 1 is applicable:</i></p> <p>In this context the following findings have been identified: N/A</p>		2	Issue:		<input type="checkbox"/>	The following CoPD for which appendix 1 of the PS is applicable have been applied:			1	Issue:		2	Issue:			
	2	Issue:																
<input type="checkbox"/>	The following CoPD for which appendix 1 of the PS is applicable have been applied:																	
	1	Issue:																
	2	Issue:																
C. Description of monitoring system																		
C.1. Monitoring Plan – PDD Compliance (EB 65 Annex 1, § 233-236)  Check if the monitoring plan is in accordance with the monitoring plan contained in the registered PDD (or	/MR/ /PDD/	By means of comparison of the MR with the registered PDD (or any revisions thereof) the verification team has checked whether the MP is in compliance with the registered PDD. The outcome is as follows:	OK	OK														

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.										
<p><i>any accepted revised MP).</i></p> <p><i>Please check esp. if</i></p> <ul style="list-style-type: none"><li>- <i>all parameters stated in the MP of the registered PDD have been monitored and updated as applicable</i></li><li>- <i>the monitoring equipment has been controlled and calibrated as per the MP</i></li><li>- <i>the monitoring results are consistently recorded as per the approved frequency</i></li><li>- <i>QA/QC procedures have been applied in accordance with the MP</i></li></ul>		<table><tr><td><input checked="" type="checkbox"/></td><td colspan="2">The MP is completely in accordance with the last registered/approved version of the PDD / MP.</td></tr></table> <p>In this context the following findings have been identified: N/A</p>	<input checked="" type="checkbox"/>	The MP is completely in accordance with the last registered/approved version of the PDD / MP.										
<input checked="" type="checkbox"/>	The MP is completely in accordance with the last registered/approved version of the PDD / MP.													
<p><b>C.2. Monitoring Plan – Meth Compliance (EB 65 Annex 4, § 229-232)</b></p> <p><i>Check if the monitoring plan is in accordance with the applied methodology.</i></p> <p><i>In case the methodology references applicable tools it has to be ensured that the MP is also compliant with those tools.</i></p> <p><i>Also please specify if monitoring aspects have been identified that are not specified in the methodology but may enhance the level of accuracy and completeness of the monitoring plan – this esp. applies for SSC PAs.</i></p>	<p>/MR/ /PDD/ /MR/</p>	<p>By means of comparison of the MR with the applied CDM methodology and related tools the verification team has checked whether the MP is in compliance with the MP related requirements of the applied methodology. The outcome is as follows:</p> <table><tr><td><input checked="" type="checkbox"/></td><td colspan="2">The MP is completely in accordance with the approved methodology applied by the CDM project (last registered/approved version of the PDD)</td></tr><tr><td rowspan="2"><input checked="" type="checkbox"/></td><td>1</td><td>Title (of the tool)</td><td>Tool to calculate emission factor for an electricity system</td></tr><tr><td></td><td>Version</td><td>2</td></tr></table>	<input checked="" type="checkbox"/>	The MP is completely in accordance with the approved methodology applied by the CDM project (last registered/approved version of the PDD)		<input checked="" type="checkbox"/>	1	Title (of the tool)	Tool to calculate emission factor for an electricity system		Version	2	OK	OK
<input checked="" type="checkbox"/>	The MP is completely in accordance with the approved methodology applied by the CDM project (last registered/approved version of the PDD)													
<input checked="" type="checkbox"/>	1	Title (of the tool)	Tool to calculate emission factor for an electricity system											
		Version	2											

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)				Draft Concl.	Final Concl.
				MP compliance	<input checked="" type="checkbox"/> full compliance <input type="checkbox"/> findings have been raised <input type="checkbox"/> N/A (for MP)		
			2	Title (of the tool)	Tool for demonstration and assessment of additionality		
				Version	05.2		
				MP compliance	<input checked="" type="checkbox"/> full compliance <input type="checkbox"/> findings have been raised <input type="checkbox"/> N/A (for MP)		
		In this context the following findings have been identified:  N/A  Regarding aspects that are not specified in the methodology the following issues have been identified which may enhance the level of accuracy and completeness of the MP:  N/A					
<b>C.3. Management System</b> <b>(EB 65 Annex 4, § 217 (iii))</b>  Check if the GHG data monitoring system can be assessed as appropriate.  In case reference is made to a (certified) company quality management system, check if all CDM related monitoring procedures have been fully integrated in		Description: The GHG data monitoring system does the measure and record the value of generated energy. There are two meters placed in SHPP Malagone: one main and other backup. This measurement panel is located in substation Uberlândia 1. The meters are sealed to guarantee its safety after calibration.  The monitoring and measurement system (SMF) send via				OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><i>the project participant's quality management system.</i></p> <p><i>In case of a stand-alone system, check how the GHG management system has been implemented and effectiveness is ensured.</i></p>		<p>satellite the information to CCEE and Malagone. This information comes from the same meter. The CCEE reads the data through a GPRS system, which is sent to Malagone through Hemera system (software).</p> <p>In the management system, information about data monitoring, quality control, data management, procedures and authority/responsibilities is included.</p> <p><i>Verifier's action:</i> The MR was reviewed against the interviews and the operation and management manuals.</p> <p><i>Conclusion:</i> The GHG monitoring system can be assessed as appropriate. All CDM monitoring procedures have been fully integrated. It could be observed that the system has been implemented on site and its effectiveness is ensured by management personnel.</p>		
<p><b>C.4. Metering diagram</b> <b>(EB 66 Annex 20, C; EB 65 Annex 5 §190)</b></p> <p><i>Check first if the MR includes a metering diagram showing all relevant monitoring points.</i></p> <p><i>Check further if this diagram reflects the actual situation and is in line with the registered PDD and with the requirements of the applied methodology.</i></p>	<p>/PS/ /PDD/ /MR/</p>	<p><i>Description:</i> A line diagram showing all relevant monitoring points is missing in the MR as required by guidelines for completing the monitoring report. CL has been raised.</p> <p><i>Verifier's action:</i> MR has been cross-checked against PDD.</p> <p><i>Conclusion:</i> <b>(CL C1)</b> In section C of MR, there is no diagram of the monitoring system and the information flow as required by</p>	CL C1	OK



Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		guidelines of completing MR.		
<b>C.5. Roles and Responsibilities</b> <b>(EB 66 Annex 20, C; EB 65 Annex 5 §190)</b> <i>Check if all roles and positions of each person in the GHG data management process are clearly defined and implemented as stated in the monitoring plan. Please consider the complete data trail from raw data generation to submission of the final data.</i> <i>Identify, if relevant personnel w.r.t. monitoring has been exchanged?</i> <i>If so, have appropriate training measures been carried out.</i> <i>In case of changes, assure that the implemented monitoring procedures have not been affected.</i>	/PS/ /PDD/ /MR/ /IM01/ /IM02/ /IM03/ /IM04/ /MAN/	<p><i>Description:</i> Authorities and responsibilities are well described in section C of the MR. Hidrelétrica Malagone S. A. is responsible for maintenance and calibration of monitoring equipments. Among other responsibilities, Malagone has authority for registration, monitoring, measurement and management of project activity. The baseline and ER calculations are the responsibility of Carbotrader Ltda which reports the results properly to entities related to CDM process.</p> <p><i>Verifier's action:</i> The MR was reviewed against the interviews and the operation and management manuals.</p> <p><i>Conclusion:</i> No issues have been found in this topic.</p>	OK	OK
<b>C.6. Emergency procedures for the monitoring system</b> <b>(EB 54 Annex 34, C; EB 65 Annex 5 §190)</b> <i>Check, as appropriate, whether relevant emergency procedures for the monitoring system have been included in the MR and assess whether these procedures have been implemented, when required</i>	/PS/ /PDD/ /MR/ /IM01/ /IM02/ /IM03/ /IM04/ /MAN/	<p><i>Description:</i> The complexes have implemented a digital system that reports immediately any problems (internal and external) in the operation and equipment. The staff is trained to deal with those problems and the procedures are established.</p> <p><i>Verifier's action:</i> The MR was reviewed against the interviews and the operation and management manuals.</p> <p><i>Conclusion:</i> No issues have been found in this topic.</p>	OK	OK



Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<b>C.7. Data archive and data protection (EB 65 Annex 5 §56 b)</b>  Check whether all records of monitoring parameters are archived according to the monitoring plan.  Assess further whether appropriate measures have been taken in order to avoid unintended or intended manipulation or loss of the measured data.	/MR/ /IM01/ /IM02/ /IM04/	<p><i>Description:</i> The data is measured hourly and recorded monthly. Spreadsheets are generated containing electricity dispatched to the grid. CCEE sends these data to Malagone for cross-checking with sales invoices. After, these data are sent to Carbotrader, ER calculations are performed. The gathered data are kept for at least 2 years after last crediting period.</p> <p><i>Verifier's action:</i> The MR was reviewed against the interviews and the operation and management manuals.</p> <p><i>Conclusion:</i> No issues have been found in this topic as all records of monitoring parameters are archived according to the monitoring plan.</p>	OK	OK
<b>D. Data and parameters</b>				
<b>D.1. Data and Parameters fixed ex ante</b>				

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><b>a) Compliance with registered PDD</b> <b>(EB66 Annex 20; D1)</b></p> <p><i>Check whether the value applied is in compliance with the registered PDD.</i></p>	<p>/MR/ /PDD/</p>	<p><i>Description:</i> The fixed parameters ex ante are <math>Cap_{PJ}</math> and <math>A_{PJ}</math>. The first parameter is in accordance with the PDD's monitoring plan. However, the parameter <math>A_{PJ}</math> in MR is different from the information provided in PDD (1.27km<sup>2</sup> in PDD vs. 1.72km<sup>2</sup> in MR). Thus, a CAR has been raised.</p> <p><i>Verifier's action:</i> PDD was cross-checked against MR.</p> <p><i>Conclusion:</i> <b>(CAR B2)</b> In section B.1 of MR, clarify the reasons for the change in the reservoir dimension from the registered PDD and actual situation.</p>	CAR B2	OK
<p><b>b) Compliance with the applied methodology</b> <b>(EB66 Annex 20; D1)</b></p> <p><i>Check whether the value applied is in compliance with the applied methodology or any other tool.</i></p>	<p>/ACM02 / /PDD/</p>	<p><i>Description:</i> The fixed parameters ex ante are <math>Cap_{PJ}</math> and <math>A_{PJ}</math> and they are in accordance with the ACM0002.</p> <p><i>Verifier's action:</i> The applied methodology was reviewed and cross-checked against PDD</p> <p><i>Conclusion:</i> The parameters fixed ex ante are in accordance with PDD</p>	OK	OK
<b>D.2. Data and Parameters monitored</b>				

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<b>D.2.1. EG<sub>facility,y</sub></b>		<b>Description:</b> <i>Quantity of net electricity generation supplied by the project plant/unit to the grid in year y</i>		
<b>a) Measurement / Determination method</b> <b>(EB 65 Annex 4, § 233, 236)</b> <i>Describe how the monitoring parameter was measured / determined.</i> <i>Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.</i> <i>Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</i>	/IM01/ /PDD/ /ACM02/	<b>Description:</b> According to the MP, the parameter is the total amount of net energy generated by SHP Malagone (generators 1 and 2) and delivered to the grid within the monitoring period. According to the PDD, the measurement is made hourly and recorded monthly. There was no exchange of relevant equipment, as verified during the site visit. <b>Verifier's action:</b> Interviews, equipment manuals and the company system have been checked to evaluate the electricity generation.	OK	OK
<b>b) Accuracy and QA/QC Procedure</b> <b>(EB 65 Annex 4, §§ 237-241)</b> <i>In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.</i> <i>Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line with</i>	/CAL/ /MR/	<b>Description:</b> These data will be used to calculate the emission reductions. The data will be recorded monthly (electronic) and will be archived during the credit period and two years after. The data from the energy meters will be cross checked with the CCEE databank in order to verify the coherency of the data. It was observed that from 2011-06-15 (start date of the monitoring period) until 2011-07-20 there was a calibration delay in the electricity meter. A correction factor of 2% <sup>/CAL/</sup> was applied from as per the Guidelines for assessing compliance with the calibration frequency requirements,	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<i>the latest EB guidance.</i>		<p>EB 52, Annex 60.</p> <p><i>Verifier's action:</i> The calibration certificates<sup>/CAL1/</sup> and equipment manuals<sup>/MAN/</sup> have been presented to the verification team. Calibrations have been carried out according to ONS requirements by Weights and Measures Institute (IPEM) using traceable standards.</p> <p><i>Conclusion:</i> All calibration and maintenance procedures have followed the manufacturer's recommendations and ONS requirements and the requisites of the MP in the registered PDD have been fulfilled.</p>		
<p><b>c) Correctness</b> <b>(EB 65 Annex 4, §§ 233, 236)</b></p> <p><i>Determine whether the value given in the monitoring report is correct or determined in a conservative manner.</i></p> <p><i>In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.</i></p> <p><i>In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i></p>	<p>/MR/ /ccee/ /GEN/</p>	<p><input checked="" type="checkbox"/> Correct <input type="checkbox"/> Not correct (initial assessment)</p> <p><i>Description:</i> The generated energy of SHP Malagone is consistent with the company's database and CCEE reports.</p> <p><i>Verifier's action:</i> All reports of energy generation have been presented to the verification team and they were cross checked with CCEE reports.</p> <p><i>Conclusion:</i> The values given in the MR are correct and determined in a conservative manner.</p>	OK	OK
<b>D.2.2. <math>EF_{grid,CM,y}</math></b>		<p><b>Description:</b> Combined margin CO<sub>2</sub> emission factor for grid connected power generation in year y</p>		

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><b>a) Measurement / Determination method</b> (EB 65 Annex 4, § 233, 236)</p> <p>Describe how the monitoring parameter was measured / determined.</p> <p>Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.</p> <p>Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</p>	<p>/IM04/ /PDD/ /MR/ /ACM02/ /dna/</p>	<p><i>Description:</i> According to the PDD, the combined margin is obtained through a weighted-average formula, considering the <math>EF_{grid,OM-DD,y}</math> and the <math>EF_{grid,BM,y}</math> and the weights <math>w_{OM}</math> and <math>w_{BM}</math> default 0.5 as defined in the “Tool to calculate the emission factor for an electricity system” version 2.</p> <p>The value is based on data provided by the Brazilian DNA.</p> <p><i>Verifier’s action:</i> Reviews were performed in DNA website, MR and PDD.</p> <p><i>Conclusion:</i> The determination method of this parameter is in line with the registered MP and with the applied methodology.</p>	OK	OK
<p><b>b) Accuracy and QA/QC Procedure</b> (EB 65 Annex 4, §§ 237-241)</p> <p>In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.</p> <p>Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance.</p>	<p>/MR/ /TOOL/ /dna/ /XLS/</p>	<p><i>Description:</i> These data was used for calculating the emission reductions. The data was obtained by <i>ex post</i> calculation, using <math>EF_{grid,OM-DD,y}</math> and <math>EF_{grid,BM,y}</math> parameters calculated based on the electricity production during the monitoring period. However, the input data considered for the calculation is outdated as data from 2010 was used. Thus, a CAR has been raised.</p> <p><i>Verifier’s action:</i> The excel calculations were cross-checked against formulae of “Tool to calculate the emission factor for an electricity system” version 2.</p> <p><i>Conclusion:</i></p>	CAR E1	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		CAR E1 has been raised. Please refer to section E.		
<b>c) Correctness</b> <b>(EB 65 Annex 4, §§ 233, 236)</b> <i>Determine whether the value given in the monitoring report is correct or determined in a conservative manner.</i> <i>In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.</i> <i>In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i>	/MR/ /dna/ /XLS/ /TOOL/	<input type="checkbox"/> Correct <input checked="" type="checkbox"/> Not correct (initial assessment) <i>Description:</i> The value presented as the combined margin of CO <sub>2</sub> emission factor of SHP Malagone is not in accordance with the required by “Tool to calculate the emission factor for an electricity system” as the data used is not the most recent. So a CAR has been raised.  <i>Verifier’s action:</i> Calculation spreadsheet was reviewed against the provided tool  <i>Conclusion:</i> Refer to CAR E1 in section E.	CAR E1	OK
<b>D.2.3. <math>EF_{grid,OM-DD,y}</math></b>		<b>Description:</b> CO <sub>2</sub> Operating Margin emission factor of grid, in year y		
<b>a) Measurement / Determination method</b> <b>(EB 65 Annex 4, § 233, 236)</b> <i>Describe how the monitoring parameter was measured / determined.</i> <i>Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.</i>	/IM04/ /PDD/ /MR/ /ACM02/ /dna/ /TOOL/ /XLS/	<i>Description:</i> According to the “Tool to calculate the emission factor for an electricity system” version 2, the Operating Margin is calculated <i>ex post</i> by using the data presented by Brazilian DNA and electricity production in the monitoring period.  <i>Verifier’s action:</i> Reviews were performed on DNA website, MR and PDD.	CAR E1	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.		Conclusion: As the applied value of EF is outdated and the calculation method is unclear. Hence, CAR E1 has been raised. Please refer to section E.		
<b>b) Accuracy and QA/QC Procedure</b> <b>(EB 65 Annex 4, §§ 237-241)</b> <i>In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.</i> <i>Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance.</i>	/MR/ /TOOL/ /dna/ /XLS/	Description: These data was used for calculating the $EF_{grid,CM,y}$ . The data was obtained by <i>ex post</i> calculation, based on data from 2010 presented by Brazilian DNA and electricity production within the monitoring period. However, the data considered for this calculation is outdated and the calculation method is unclear. Thus, a CAR has been raised.  Verifier's action: The excel calculations were cross-checked against formulae of "Tool to calculate the emission factor for an electricity system" version 2  Conclusion: Refer to CAR E1 in section E.	CAR E1	OK
<b>c) Correctness</b> <b>(EB 65 Annex 4, §§ 233, 236)</b> <i>Determine whether the value given in the monitoring report is correct or determined in a conservative manner.</i>  <i>In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should</i>	/MR/ /dna/ /XLS/ /TOOL/	<input type="checkbox"/> Correct <input checked="" type="checkbox"/> Not correct (initial assessment) Description: The value presented as the CO <sub>2</sub> Operating Margin emission factor of SHP Malagone is not in accordance with the requirement of the "Tool to calculate the emission factor for an electricity system" as the data used is from 2010 and not the most recent one. Further, the calculation method is unclear. So a CAR has been raised.	CAR E1	OK



Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p>be given.</p> <p>In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</p>		<p>Verifier's action: The calculation spreadsheet was reviewed against the provided tool.</p> <p>Conclusion: Refer to CAR E1 in section E.</p>		
<b>D.2.4. <math>EF_{grid,BM,y}</math></b>		<b>Description:</b> $CO_2$ Build Margin emission factor of the grid, in a year y		
<p><b>a) Measurement / Determination method</b> (EB 65 Annex 4, § 233, 236)</p> <p>Describe how the monitoring parameter was measured / determined.</p> <p>Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.</p> <p>Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</p>	/IM04/ /MR/ /dna/	<p>Description: According to the MR, the Build Margin is obtained directly from Brazilian DNA website as a default value for year y.</p> <p>Verifier's action: Reviews were performed on the DNA website and in the MR.</p> <p>Conclusion: The value is correct and in line with the registered MP and with the applied methodology.</p>	OK	OK
<p><b>b) Accuracy and QA/QC Procedure</b> (EB 65 Annex 4, §§ 237-241)</p> <p>In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance</p>	/dna/ /XLS/	<p>Description: These data from <math>EF_{grid,BM,y}</math> was used for calculating the <math>EF_{grid,CM,y}</math>. The data is obtained by default value presented by Brazilian DNA. However, the value used is not the most recent. The value for 2010 was used. Thus, a CAR has been raised.</p>	CAR E1	OK



Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><i>with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.</i></p> <p><i>Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance.</i></p>		<p><i>Verifier's action:</i> The excel spreadsheet was cross-checked against data of Brazilian DNA.</p> <p><i>Conclusion:</i> Refer to CAR E1 in section E.</p>		
<p><b>c) Correctness</b> <b>(EB 65 Annex 4, §§ 233, 236)</b></p> <p><i>Determine whether the value given in the monitoring report is correct or determined in a conservative manner.</i></p> <p><i>In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.</i></p> <p><i>In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i></p>	<p>/MR/ /dna/ /TOOL/</p>	<p><input type="checkbox"/> Correct      <input checked="" type="checkbox"/> Not correct (initial assessment)</p> <p><i>Description:</i> The value presented as the CO<sub>2</sub> Build Margin emission factor of SHP Malagone is not in accordance with the "Tool to calculate the emission factor for an electricity system" as it is not the most recent value obtained from Brazilian DNA. Thus, a CAR has been raised.</p> <p><i>Verifier's action:</i> Brazilian DNA website was checked.</p> <p><i>Conclusion:</i> Refer to CAR E1 in section E.</p>	CAR E1	OK
<b>E. Calculation of Emission reductions</b>				
<p><b>E.1. Traceability</b> <b>(EB 65 Annex 4, §§ 212, 214)</b></p> <p><i>Assess if the calculation is fully traceable. In case of complex calculations an Excel calculation spread-</i></p>	<p>/XLS/ /MR/</p>	<p><i>Description:</i> The calculation spreadsheet provided by PP is not clear enough for complete understanding and so it is not traceable. For this reason, a CAR has been raised</p>	CAR E1	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<i>sheet shall be used. All applied formulae must be visible.</i>		<p>Verifier's action: Values presented in MR were reviewed against calculation spreadsheets.</p> <p>Conclusion:</p> <p>CAR E1 has been raised.</p>		
<p><b>E.2. Parameter consistency</b> (EB 65 Annex 4, § 214)</p> <p><i>Assess whether all internal and external parameters and data used for calculation are applied consistently in the monitoring report and the calculation spreadsheet?</i></p> <p><i>Consider only the correct data exchange between the monitoring report and the calculation spreadsheet (if any). Further ensure the consistency of notations for all parameters in the PDD, MR, calculation spreadsheet.</i></p>	<p>/XLS/ /MR/ /PDD/ /dna/</p>	<p>Description: There are some inconsistencies for estimated amount of GHG emission reduction for calculations from PDD. The data used for the calculation of the emission factor was outdated and the calculation spreadsheets are not clear enough. So CAR E1 has been raised.</p> <p>Verifier's action: Values in calculation spreadsheet were cross-checked against data provided by Brazilian DNA and values in MR were cross-checked against PDD.</p> <p>Conclusion:</p> <p>CAR E1 has been raised.</p>	CAR E1	OK
<p><b>E.3. Correctness of calculation</b> (EB 65 Annex 1, §§ 235-236)</p> <p><i>Check if the applied formulae and methods for calculating baseline emissions, project emissions and leakage are in accordance with the monitoring plan and / or the approved methodology.</i></p>	<p>/XLS/ /MR/ /PDD/ /dna/</p>	<p>Description: The calculation of emission reductions were based on year 2010 and not in 2011 as the most recent available data. Furthermore, the provided calculations were not clear. So CAR E1 has been raised</p> <p>Verifier's action: Values in calculation spreadsheet were</p>	CAR E1	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><i>Assess whether the provided calculations are complete and reflect all requirements of the monitoring plan.</i></p> <p><i>Check especially that no standard or old values have been used for calculation where calculations based on up-to-date data is required.</i></p>		<p>cross-checked against data provided by Brazilian DNA and values in MR were cross-checked against PDD.</p> <p><i>Conclusion:</i> Refer to CAR E1.</p>		
<p><b>E.4. Emission reductions table (EB 66 Annex 20, E.4)</b></p> <p><i>Check if the MR includes a summary table of the emission reductions calculation specifying separately</i></p> <ul style="list-style-type: none"> <li>- Total baseline emissions</li> <li>- Total project emissions:</li> <li>- Total leakage</li> <li>- Total emission reductions.</li> </ul> <p><i>Assess whether the values are correct or need to be revised as a consequence of issues identified above.</i></p>	<p>/dna/ /MR/ /PDD/</p>	<p><input checked="" type="checkbox"/> The MR includes in section E.4 a summary table of the emission reductions calculation.</p> <p><input checked="" type="checkbox"/> The summary table specified the total baseline, project and leakage emissions as well as the total emission reductions separately.</p> <p><input type="checkbox"/> The values as specified in the ER summary table are correct; no issues have been identified during the verification which requires changes in the ER calculation.</p> <p><input checked="" type="checkbox"/> During the verification issues with impact on the ER calculation have been identified. Thus subject to the closure of above listed findings the summary table in E.4 needs to be revised.</p> <p>In this context the following additional findings have been identified:</p> <p>Refer to CAR E1 above.</p>	<p><del>CAR</del> E1</p>	<p>OK</p>
<p><b>E.5. Comparison with ex-ante determined emission reductions (EB 66 Annex 20, E.5; E.6)</b></p> <p><i>Check if the MR includes a comparison of actual</i></p>	<p>/XLS/ /MR/ /PDD/</p>	<p><i>Description:</i> The MR includes a comparison of actual values of the monitoring period with ex ante estimations in the registered PDD. However, a CAR has been raised, as the values are not correct.</p>	<p><del>CAR</del> E2</p>	<p>OK</p>



Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><i>values of the monitoring period with the estimations in the registered PDD.</i></p> <p><i>Check further whether in case of an increase an appropriate explanation is included in the MR.</i></p> <p><i>Assess in case of a significant increase whether this is due to technical or organizational changes within or outside the control of the PP which might require a notification / approval of changes (as per EB 48 Annex 66/67).</i></p>		<p><i>Verifier's action:</i> Calculation spreadsheet were reviewed against values presented in PDD and MR.</p> <p><i>Conclusion:</i></p> <p>CAR E2 has been raised.</p>		



## ANNEX 2: STATEMENTS OF COMPETENCE OF INVOLVED PERSONNEL

TUV NORD Certification																				
<p><b>Statement of Competence</b> Agreement and authorization according to the provisions of the TÜV NORD JI/CDM Certification Program</p> <p><b>Mr. Ricardo Lopes</b></p> <table border="1"> <thead> <tr> <th>SCHEME</th> <th>STATUS</th> <th>VALID UNTIL</th> </tr> </thead> <tbody> <tr> <td>CDM</td> <td>Lead Assessor (Validation, Verification)</td> <td>2013-11-06</td> </tr> <tr> <td>VCS</td> <td>Lead Assessor</td> <td>2013-11-06</td> </tr> </tbody> </table> <p>Authorization status for technical areas within sectoral scopes</p> <table border="1"> <thead> <tr> <th>CODE</th> <th>TECHNICAL AREA</th> </tr> </thead> <tbody> <tr> <td>1.2</td> <td>Renewable Energy</td> </tr> </tbody> </table> <p>077 - Rev. 2, Date: 2011-11-01</p>			SCHEME	STATUS	VALID UNTIL	CDM	Lead Assessor (Validation, Verification)	2013-11-06	VCS	Lead Assessor	2013-11-06	CODE	TECHNICAL AREA	1.2	Renewable Energy					
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