



# VERIFICATION AND CERTIFICATION REPORT

- 2ND PERIODIC –

HIDRELÉTRICA MALAGONE S. A.

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

UNFCCC REF. No. : 4676

Monitoring Period: 2012-04-01 to 2014-02-28  
(incl. both days)

**Report No: 10252 – 13/188**

**Date: 2014-05-06**

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<b>Project:</b>	<b>Title:</b>	<b>Registration date:</b>	<b>UNFCCC-No.:</b>	
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		<b>Verification No.:</b>	2 <sup>nd</sup> 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>Client:</b>			
	Hidrelétrica Malagone S. A.			
	<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>		
	Hidrelétrica Malagone S. A. Carbotrader Assessoria e Consultoria em Energia Ltda	-		
<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	1 / 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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	2014-04-01	2014-04-17	2014-04-16	2014-04-17
<b>Summary of Verification opinion</b>	<p>Hidrelétrica Malagone S. A. has commissioned the TÜV NORD JI/CDM Certification Program to carry out the 2nd 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>			

**2nd Periodic Verification and Certification Report: Malagone SHP CDM**

Project, Minas Gerais, Brazil (JUN1122)

TÜV NORD JI/CDM Certification Program

R-No: 10252 – 13/188



Emission reductions: [t CO <sub>2e</sub> ]	Total verified amount	As per draft MR:	As per PDD:
	55,732	55,732	52,761 *
		ER achieved up to 2012-12-31	ER achieved from 2013-01-01
		22,576	33,156
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	2014-05-06_FVR_Malagone.docx		70

\* Estimated at the registered PDD for the period of 699 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 Environment and Sustainable Development of the State of Minas Gerais</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>
<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 2nd 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 2nd 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 spreadsheet<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 key parameters of the project are given in Table 2-1:

**Table 2-1:** Technical data of the project activity

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 – Voith Siemens)	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> (GE Motors)	Units	2 - 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

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Longitude:	48°29'57" W
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### 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	Issued
2	2 <sup>nd</sup> Monitoring period	2012-04-01 to 2014-02-28	Issuance Requested

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

Not applicable.

### **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 member, 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.	Sergio Cruz	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.	Marcelo Sebben	BRTÜV	TM <sup>A)</sup>	A	<input checked="" type="checkbox"/>	1.2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Dr. Jochen Schubert	TÜV NORD, Germany	TR <sup>B)</sup> / 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

All team members 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.

Statements of competence for the above mentioned team members 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.  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>Discussions with process engineers who have detailed knowledge of process uncertainty/error bands.</i>	<i>Having investigated the residual risks, the conclusions should be noted here. Errors and uncertainties are highlighted.</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

<b>Table A-2: Periodic verification checklist</b>				
<b>Checklist Item</b>	<b>Reference</b>	<b>Verification Team Comments</b>	<b>Draft Conclusion</b>	<b>Final Conclusion</b>
<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 monitoring data were checked completely.
- An assessment of the implementation and operation of the registered project activity as per the registered PDD or any approved revised PDD;
- A review of information flows for generating, aggregating and reporting the monitoring parameters;
- The data aggregation trails were checked via spot sample down to the level of the meter recordings.
- Interviews with relevant personnel to determine whether the operational and data collection procedures are implemented in accordance with the monitoring plan in the PDD;
- A cross check between information provided in the monitoring report and data from other sources such as plant logbooks, inventories, purchase records or similar data sources;
- A check of the monitoring equipment including calibration performance and observations of monitoring practices against the requirements of the PDD and the selected methodology and corresponding tool(s), where applicable;
- A review of calculations and assumptions made in determining the GHG data and emission reductions;
- An identification of quality control and quality assurance procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters.

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., Energisa Soluções and Carbotrader Assessoria e Consultoria em Energia Ltda, 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
<ol style="list-style-type: none"> <li>1. Projects &amp; Operations Personnel</li> <li>2. Consultant</li> </ol>	<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 together with a general project and procedural description of the verification and a detailed list of the verification findings form 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-fulfilment 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	0	1	0
C – Description of monitoring system	0	0	0
D – Data and parameters	1	1	0
E - Calculation of Emission Reductions	0	0	0
<b>SUM</b>	<b>1</b>	<b>2</b>	<b>0</b>

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	B1		
<b>Classification</b>	<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>	The information about the occurrence or not of significant incidents, deviant operation modes and / or downtimes of the equipment is missing at Section B.1.  Associated checklist question(s): B.1.4		
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details. In case the MR is changed as part of the CA, the PP is requested to indicate the revised sections as well as the new version No.</i>	The information was added in the MR version 2.		
	<input checked="" type="checkbox"/> Changes in MR	Section(s): B.1	New version No.: 2
	<input type="checkbox"/> Changes in XLS	Worksheet(s):	New version No.:



Finding	B1
<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 statement has been included at Section B.1 of the MR which confirms that the incidents that occurred that caused downtimes of the equipment were normal maintenance incidents, not being considered significant as the interruptions did not last.</p> <p>This could be evidenced by the Monthly Statistical Bulletin of Events<sup>/MAN/</sup> presented to the verification team during the site visit.</p> <p><b><u>CL is closed</u></b></p>
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed

Finding	D2		
Classification	<input checked="" type="checkbox"/> CAR	<input type="checkbox"/> CL	<input type="checkbox"/> FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The validity of the calibrations is not correctly presented at Table 4. Therefore, the verified delays are not corrected presented.  In addition, it is necessary to revise the calculations of EG <sub>facility</sub> and respective ER calculations related to the period in which the calibrations were delayed.  Associated checklist question(s): B.1.4; D.2.1; E.2; E.3; E.4		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details. In case the MR is changed as part of the CA, the PP is requested to indicate the revised sections as well as the new version No.</i>	The table was revised in MR version 2.  The calculation has already considered the correct period and delayed calibration.		
	<input checked="" type="checkbox"/> Changes in MR	Section(s): B.1	New version No.: 2
	<input type="checkbox"/> Changes in XLS	Worksheet(s):	New version No.:
DOE Assessment #1 <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>	Table 4 has been transferred to Section B.1 and the validity of the calibrations has been corrected to exactly 2 years.  Indeed the calculations of EG <sub>facility</sub> and respective ER calculations related to the period in which the calibrations were delayed are correct as the error has already been considered for the period from 2013-07-20 to 2013-10-09 which is the whole period in which the meters were not calibrated.  <b><u>CAR is closed</u></b>  <u>Note:</u> Table 3 at the final version of the MR.		
Conclusion <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed		



Finding	D3								
<b>Classification</b>	<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>	<p>The values of <math>EG_{\text{facility},y}</math> for the years 2012, 2013 and 2014 at Section D.2 are not correctly presented.</p> <p>Associated checklist question(s): D.1</p>								
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details. In case the MR is changed as part of the CA, the PP is requested to indicate the revised sections as well as the new version No.</i>	<p>The values were corrected in the MR version 2.</p> <table border="1"> <tr> <td><input type="checkbox"/> Changes in MR</td> <td>Section(s): D.2</td> <td>New version No.: 2</td> </tr> <tr> <td><input type="checkbox"/> Changes in XLS</td> <td>Worksheet(s):</td> <td>New version No.:</td> </tr> </table>			<input type="checkbox"/> Changes in MR	Section(s): D.2	New version No.: 2	<input type="checkbox"/> Changes in XLS	Worksheet(s):	New version No.:
<input type="checkbox"/> Changes in MR	Section(s): D.2	New version No.: 2							
<input type="checkbox"/> Changes in XLS	Worksheet(s):	New version No.:							
<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>The values of <math>EG_{\text{facility},y}</math> for the years 2012, 2013 and 2014 are now in proper format and correctly presented.</p> <p><b><u>CL is closed</u></b></p>								
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<table border="1"> <tr> <td><input type="checkbox"/> To be checked during the next periodic verification</td> </tr> <tr> <td><input type="checkbox"/> Additional action should be taken (finding remains open)</td> </tr> <tr> <td><input checked="" type="checkbox"/> The finding is closed</td> </tr> </table>			<input type="checkbox"/> To be checked during the next periodic verification	<input type="checkbox"/> Additional action should be taken (finding remains open)	<input checked="" type="checkbox"/> The finding is closed			
<input type="checkbox"/> To be checked during the next 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 following paragraphs include the summary of the final verification assessments after all CARs and CLs 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

Characteristic	Party	Project Participant
Non-Annex 1	Brazil	Hidrelétrica Malagone S. A. Carbotrader Assessoria e Consultoria em Energia Ltda

### 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 equipment, 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 on 2008-04-01 with commercial operation starting on 2010-04-01.

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 an 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 2<sup>nd</sup> monitoring period is from 2012-04-01 to 2014-02-28 (both days included).

No issues from the 1<sup>st</sup> periodic verification have been raised.

### **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.

No significant incidents happened during the monitoring period that caused interruption of the project activity other than normal maintenance.

There was a delay in the calibration of the meters PT-0902A505-01 (main) and PT-0902A177-01 (back up) from 2013-07-20 to 2013-10-09. The calibration certificates were verified and both the accuracies and the errors were checked. As the results of the delayed calibrations present errors smaller than the maximum permissible errors, a permissible error of 0.2% was applied to the generated electricity during this period.

This is in accordance with the Guidelines for Assessing Compliance with the Calibration Frequency Requirements.

During the monitoring period, the achieved emission reductions are **55,732 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 in line with all applicable standards and relevant requirements.

The following parameters have been checked by the verification team:

1. Quantity of net electricity generation supplied by the project plant/unit to the grid in year  $y$  –  $EG_{facility,y}$  – for the years 2012, 2013 and 2014;
2. Combined margin CO<sub>2</sub> emission factor for grid connected power generation in year  $y$  calculated using the latest version of the “Tool to calculate the emission factor for an electricity system –  $EF_{grid,CM,y}$  – for the years 2012, 2013 and 2014;
3. CO<sub>2</sub> operating margin emission factor of the grid, in year  $y$  –  $EF_{grid,OM-DD,y}$  – for the year 2012;
4. CO<sub>2</sub> Build Margin emission factor of the grid, in year  $y$  –  $EF_{grid,BM,y}$  – for the year 2012;
5. Installed capacity of the hydro power plant after the implementation of the project activity –  $Cap_{PJ}$ ;
6. Area of the reservoir measured in the water surface, after the implementation of the project activity, when the reservoir is full –  $A_{PJ}$ .

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, 01 CAR 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. Sampling

### 5.9.1. Implementation of the sampling plan

No sampling was required to determine the monitored parameters.

### 5.9.2. Sampling approaches during verification

No sampling approaches were taken during the verification.

## 5.10. 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  $y$  calculated using the latest version of the “Tool to calculate the emission factor for an electricity system” ( $EF_{grid,CM,y}$ ) and quantity of net electricity generation supplied by the project plant/unit to the grid in in year  $y$  ( $EG_{PJ,y}$ ).

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

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

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



$$BE_{2012} = 57,389.08 * 0.3934$$

$$BE_{2012} = ER = 22,576 \text{ tCO}_2\text{e}$$

$$BE_{2013} = 85,597.89 * 0.3548$$

$$BE_{2013} = ER = 30,370 \text{ tCO}_2\text{e}$$

$$BE_{2014} = 10,894.03 * 0.2558$$

$$BE_{2014} = ER = 2,786 \text{ tCO}_2\text{e}$$

## 5.11. 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 procedures defined can be assessed as appropriate for the purpose.

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.

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.

## 5.12. Actual emission reductions during the first commitment period and the period from 1 January 2013 onwards

The MR includes actual ER values achieved up to 31 December 2012 and actual values achieved from 1 January 2013 onwards as follows:

**Table 5-2:** Emission reductions before and after the end of 2012

	until 2012-12-31 <sup>1)</sup>	from 2013-01-01 <sup>1)</sup>	Sum
Emission reductions [tCO <sub>2</sub> e]	22,576	33,156	55,732

<sup>1)</sup> Both days included

### **5.13. 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 699 days period (from 2012-04-01 to 2014-02-28 – both days included). According to the registered PDD, the emission reduction estimation for this monitoring period would be 52,761 tCO<sub>2</sub>e.

The calculated value was found to be proportionally higher than the ex-ante determined value. This can be justified by the increase of the emission factor in year 2012/2013 (16.1%) and the reduction of the expected generated electricity (9.3%).

### **5.14. 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).

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

Not applicable as no FAR was raised.



## 6. VERIFICATION AND CERTIFICATION STATEMENT

Hidrelétrica Malagone S. A. has commissioned the TÜV NORD JI/CDM Certification Program to carry out the 2nd 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 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 2012-04-01 to 2014-02-28 (including both days).

In the course of the verification 01 Corrective Action Request (CAR) and 02 Clarification Requests (CLs) were raised and successfully closed. No FAR was raised. 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 are calibrated appropriately.
- the monitoring system is in place and functional. The project has generated GHG emission reductions.

As the result of the 2<sup>nd</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: **55,732** t CO<sub>2e</sub>

São Paulo, 2014-05-06

A handwritten signature in blue ink, appearing to read 'Sergio Cruz', written over a light blue horizontal line.

Sergio Cruz

TÜV NORD JI/CDM Certification  
Program

Verification Team Leader

Essen, 2014-05-06

A handwritten signature in blue ink, appearing to read 'Jochen Schubert', written over a light blue horizontal line.

Dr. Jochen Schubert

TÜV NORD JI/CDM Certification  
Program

Final Approval

## 7. REFERENCES

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

Reference	Document
/CAL/	<p><u>Calibration Certificates of Meters:</u></p> <ul style="list-style-type: none"> <li>- Main: PT-0902A505-01 – Calibration Report CC-0127-11 – issued by Metrum Equipamentos de Medição e Testes Ltda. Calibrated on 2011-07-20 – valid until 2013-07-19</li> <li>- Backup: PT-0902A177-01 – Calibration Report CC-0128-11 – issued by Metrum Equipamentos de Medição e Testes Ltda. Calibrated on 2011-07-20 – valid until 2013-07-19</li> <li>- Main: PT-0902A505-01 – Calibration Report CC-0176-13 – issued by Metrum Equipamentos de Medição e Testes Ltda. Calibrated on 2013-10-09 – valid until 2015-10-08</li> <li>- Backup: PT-0902A177-01 – Calibration Report CC-0175-13 – issued by Metrum Equipamentos de Medição e Testes Ltda. Calibrated on 2013-10-09 – valid until 2015-10-08</li> </ul>
/CON/	Contract among Hidrelétrica Malagone S.A. and TÜV Nord – 13CDMBR100410 – 2013-10-31
/GEN/	<p><u>Generated Energy:</u></p> <ul style="list-style-type: none"> <li>- Software Hemera Technology Platform – Energisa Soluções</li> <li>- CCEE Reports – System SCDE – Energy Data Collection System</li> </ul>
/OPER/	Operational Agreement #02.111-OD/PO-008/2010 among Hidrelétrica Malagone S.A. and Energisa Soluções
/LIC/	<p><u>Licenses:</u></p> <ul style="list-style-type: none"> <li>- Operational License – LO #028 – SHPP Hidrelétrica Malagone S.A. issued by SEMAD – 2010-03-12 – valid until 2016-03-12</li> <li>- Operational License Correction – LOC #066/2012 – SHPP Hidrelétrica Malagone S.A. issued by SEMAD – 2010-04-13 – valid until 2016-04-13</li> </ul>



Reference	Document
	<ul style="list-style-type: none"> <li>- Municipal License # 1636/2011 – Energisa Soluções – issued by Uberlândia City Hall – 2011-07-21 – valid until 2016-04-13</li> </ul>
/MAN/	<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>- Manual of Operation and Maintenance Directives – Energisa Soluções</li> <li>- Program of Prevention of Environmental Risks – Energisa Soluções – May/2013</li> <li>- Technical Report – Installed capacity and Net Power – Hidrelétrica Malagone – January/2012</li> <li>- Emergency Plan for Hidrelétrica Malagone S. A. – rev. 01 – Energisa Soluções – 2011-02-17</li> <li>- Equipment manuals</li> </ul> <p><u>Training Certificates:</u></p> <ul style="list-style-type: none"> <li>- Operator Qualification Certificate – NR 10 Basic</li> <li>- Operator Qualification Certificate – NR 10 Complementary</li> <li>- Operator Qualification Certificate – NR 33</li> </ul> <p><u>Programmed and non-Programmed stops:</u></p> <ul style="list-style-type: none"> <li>- Monthly Statistical Bulletin of Events – Energisa Soluções</li> </ul>
/MR/	<p>Monitoring Report “Malagone SHP CDM Project, Minas Gerais, Brazil (JUN 1122)”</p> <ul style="list-style-type: none"> <li>- version 1 – 2014-03-25</li> <li>- version 2 – 2014-04-24</li> </ul>
/RES/	Topographic study – Vertente Engenharia – March 2014
/XLS/	Excel spreadsheets calculations

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

Reference	Document
/ACM02/	ACM0002 ver. 11 – “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”
/CPM/	TÜV NORD JI / CDM CP Manual (incl. CP procedures and forms)
/GLMP/	Guidelines: Completing the monitoring report form (EB 75, Annex 7)
/IPCC/	1. 1996 IPCC Guidelines for National Greenhouse Gas Inventories: work book 2. 2006 IPCC Guidelines for National Greenhouse Gas Inventories: work book
/KP/	Kyoto Protocol (1997)
/MA/	Decision 3/CMP. 1 (Marrakesh – Accords)
/MRT/	Monitoring Report Form (F-CDM-MR), Version 03.1
/PDD/	Project Design Document for CDM project: “ <i>Malagone SHP CDM Project, Minas Gerais, Brazil (JUN1122)</i> ” version 3.1 – 2011-06-09
/PS/	CDM Project Standard (Version 6.0)
/TOOL/	- “Tool for the demonstration and assessment of additionality” – Version 05.2; - “Tool to calculate the emission factor for an electricity system” – Version 2;
/VAL/	Validation Report for CDM project “ <i>Malagone SHP CDM Project, Minas Gerais, Brazil (JUN1122)</i> ” – RINA – version 05.1 – 2011-06-13
/VER/	Documents of previous verifications (Monitoring report, verification report, ER calculation sheet)
/VVS/	CDM Validation and Verification Standard (Version 06.0)

**Table 7-3:** Websites used

Reference	Link	Organization
/dna /	<a href="http://www.mct.gov.br">http://www.mct.gov.br</a>	DNA of Brazil

Reference	Link	Organization
/ccee/	www.ccee.org.br	Chamber of Commercialization of Electric Energy
/unfccc/	http://cdm.unfccc.int	UNFCCC
/ipcc/	www.ipcc-nggip.iges.or.jp	IPCC publications

Table 7-4: List of interviewed persons

Reference	Mol <sup>1</sup>		Name	Organization / Function
/IM01/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Ronaldo Oliveira Garcia	Hidrelétrica Malagone S.A. / Director Superintendent
/IM01/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Ricardo Andrade	Hidrelétrica Malagone S.A. / Manager
/IM02/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Thiago dos Santos Lima	Energisa Soluções / Supervisor
/IM02/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Marcos de Oliveira Lima	Energisa Soluções / Operations Technician
/IM03/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Victor Gomes Castro	CEMIG / Commercial Analyst
/IM03/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Francisco Sales Silva	CEMIG / Financial Technician
/IM03/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Luís André de Moraes	CEMIG / Electric System Supervisor
/IM03/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Sergio A. R. da Silva	CEMIG / Electric System Technician
/IM04/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Arthur Moraes	Carbotrader / Consultant

<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 75, Annex 7, A.1)</b> Check if section A.1 of the MR includes the following: <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/	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: <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 equipment</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> In this context the following findings have been identified: N/A	OK	OK
<b>A.2. Location of project activity</b> <b>(EB 75, Annex 7, A.2)</b> Check if section A.2 of the MR reflects correctly the following: <ul style="list-style-type: none"> <li>- Host Party(ies)</li> <li>- Region / State / Province etc.</li> </ul>	/MR/ /PDD/ /IM/	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: <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Host Party(ies)</li> <li><input checked="" type="checkbox"/> Region / State / Province</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.
<ul style="list-style-type: none"> <li>- City / Town / Community etc.</li> <li>- Physical / geographical location (e.g. Latitude and Longitude)</li> </ul>		<input checked="" type="checkbox"/> City / Town / Community <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</b> <b>(EB 75, Annex 7, A.3)</b> Check if section A.3 of the MR includes the following: <ul style="list-style-type: none"> <li>- All PPs as displayed on the UNFCCC website</li> <li>- A correctly filled table as per the MR template</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</b> <b>(EB 75, Annex 7, A.4)</b> Check if section A.4 of the MR correctly describes / includes the following: <ul style="list-style-type: none"> <li>- Reference to the applicable version of the methodology</li> <li>- Reference to the applicable version(s) of relevant methodological tools</li> <li>- Relevant EB decisions, if applicable</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</b> <b>(EB 75, Annex 7, 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 /	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: <input checked="" type="checkbox"/> Start date of the crediting period. <input checked="" type="checkbox"/> Type and length of the crediting period In this context the following findings have been identified: N/A	OK	OK
<b>A.6. Publication of the Monitoring Report</b> <b>(VVS, § 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 /	The verification team has ensured and confirms by means of checking the respective project information on the UNFCCC website that: <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. <input checked="" type="checkbox"/> No comments have been received. In this context the following findings have been identified: N/A	OK	OK
<b>A.7. Compliance with standardized format of the Monitoring Report</b> <b>(VVS, § 212 e)</b>	/ MRT /	The verification team has checked all sections of the MR and confirms by means of comparison with the MR template that: <input checked="" type="checkbox"/> the standardized MR template has been used	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<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>		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 75, Annex 7, 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>- Implementation status of the PA</li> <li>- Detailed description of installed technology(ies) / technical processes and equipment applied</li> <li>- Diagrams (where appropriate)</li> </ul>	/ MR/ / PDD/ / PS/ / IM/	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: <input checked="" type="checkbox"/> the description of the implementation status of the PA is in line with the applicable provisions of the project standard <input checked="" type="checkbox"/> an appropriate description of the installed technology(ies), technical process and equipment incl. diagrams, where applicable, has been included In this context the following findings have been identified: N/A	OK	OK
<b>B.1.1. Initial project implementation</b> <b>(VVS; § 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> <i>Further focus on the potential phase wise implementation and check the reporting on the corresponding status and starting dates accordingly.</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 turbo-generators of 9.5 MW of installed capacity. <i>Verifier's action:</i> Performed interviews, the PDD and the plates of the equipment were used to assess this issue. <i>Conclusion:</i> The project has been implemented and operated as	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>Check if the project is still in compliance with the applicability conditions of the methodology.</i></p> <p><i>Also, discuss – if applicable – the necessity of PRC notifications / approvals.</i></p>		per registered PDD.		
<p><b>B.1.2. Technical equipment changes</b> <b>(VVS; § 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 equipment in SHPP Malagone during the MP.</p> <p><i>Verifier's action:</i> The verification team has checked the calibration control sheets the calibration certificates. Also, interviews with the operational employees to cross check the information have been performed.</p> <p><i>Conclusion:</i> The equipment 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> <b>(VVS; § 225 a, 226)</b></p> <p><i>Check if relevant operation modes of the project activity have been exchanged or modified during the</i></p>	<p>/IM01/ /IM02/ /IM04/</p>	<p><i>Description:</i> The mode of operation for the project activity have not been changed or modified during this 2<sup>nd</sup> 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</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><i>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>/PDD/</p> <p>/MAN/</p> <p>/GEN/</p> <p>/OPER/</p>	<p>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 in the mode of operation of the project activity during this monitoring period.</p>		
<p><b>B.1.4. Incidents</b></p> <p><b>(VVS; § 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/</p> <p>/IM02/</p> <p>/IM04/</p> <p>/MR/</p> <p>/MAN/</p>	<p><i>Description:</i> All events and incidents are accordingly described in a report called Monthly Statistical 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>Nevertheless, this information is missing at the MR, so CL B1 was raised.</p> <p><i>Verifier's action:</i> During the site visit, the verification team 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 equipment during the MP.</p>	<p><del>CL B1</del></p> <p><del>CAR</del></p> <p><del>D2</del></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><b>(CL B1)</b> The information about the occurrence or not of significant incidents, deviant operation modes and / or downtimes of the equipment is missing at Section B.1.</p> <p><b>(CAR D2)</b> The validity of the calibrations is not correct presented at Table 4. Therefore, the verified delays are not corrected presented.</p> <p>In addition, it is necessary to revise the calculations of <math>EG_{\text{facility}}</math> and respective ER calculations related to the period in which the calibrations were delayed.</p>		
<p><b>B.1.5. Legislation</b></p> <p>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>	<p>/IM01/ /IM02/ /IM03/ /MR/</p>	<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>(VVS; § 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>  <i>(VVS; §§ 213; 284 h)</i>  <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/	<div><input checked="" type="checkbox"/> There were no open issues addressed in the previous verification report</div> <div><input type="checkbox"/> All open issues from the previous verification have been appropriately addressed.</div> <div><input type="checkbox"/> The following issues related to the previous verification have not yet been appropriately addressed:</div>	OK	OK
<b>B.2. Post registration changes</b>				
<b>B.2.1. Are post registration changes applicable to the proposed project activity?</b>	/IM01/ /IM02/ /IM03/ /MR/	<div><input checked="" 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. (Please proceed with section C)</div> <div><input type="checkbox"/> Yes, post registration changes have been identified and are assessed in detail in the subsequent steps. (Please proceed with B.2.2.)</div>	OK	OK
<b>B.2.2. Temporary deviations from the registered monitoring plan or applied methodology (TDfrMP; TDfMM)</b>  <i>(EB 75, Annex 7, B.2.1; VVS §§ 251 - 256)</i>  <i>Indicate whether any temporary deviations have been applied during this monitoring period.</i>  <i>In cases where approval has been sought from the</i>	/PS/ /unfccc/	<div><div><input type="checkbox"/></div><div><div></div><div>1</div><div>Title</div><div>Status</div><div>Appr.date</div></div><div><div>The following TDfrMP or TDfMM have been approved or are under approval by the UNFCCC</div><div></div><div><input type="checkbox"/> under approval; <input type="checkbox"/> approved</div><div></div></div></div>	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>EB please provide reference.</i></p> <p><i>If applied, provide a description of the deviation(s).</i></p> <p><i>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.</i></p> <p><i>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></td> <td></td> <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 TDfrMP or TDfMM has been identified. The monitoring plan is in accordance with the approved methodology applied by the PA</td> </tr> <tr> <td><input type="checkbox"/></td> <td colspan="3">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.</td> </tr> <tr> <td></td> <td>1</td> <td>Issue:</td> <td></td> </tr> <tr> <td></td> <td>2</td> <td>Issue:</td> <td></td> </tr> <tr> <td><input type="checkbox"/></td> <td colspan="3">The following TDfrMP or TDfMM for which appendix 1 of the PS is applicable have been applied:</td> </tr> <tr> <td></td> <td>1</td> <td>Issue:</td> <td></td> </tr> <tr> <td></td> <td>2</td> <td>Issue:</td> <td></td> </tr> </table> <p><i>In cases of approved TDfrMP or TDfMM the EB guidance has been applied as follows:</i></p> <p><i>Detailed description and justification each TDfrMP or TDfMM for which appendix 1 is applicable:</i></p> <p>In this context the following findings have been identified:</p> <p>N/A</p>			Ref. No.		<input checked="" 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:			
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	1	Issue:																																		
	2	Issue:																																		

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.							
<b>B.2.3. Corrections</b> <i>(EB 75, Annex 7, B.2.2; VVS; §§ 257 - 259)</i>  <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>  <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>  <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>	/PS/  /unfccc/	<table><tr><td rowspan="3"><input type="checkbox"/></td><td colspan="2">The following corrections have been applied:</td></tr><tr><td>1</td><td>Issue:</td></tr><tr><td>2</td><td>Issue:</td></tr></table> <i>Detailed description and justification each correction:</i>  In this context the following findings have been identified:  N/A	<input type="checkbox"/>	The following corrections have been applied:		1	Issue:	2	Issue:	OK	OK
<input type="checkbox"/>	The following corrections have been applied:										
	1	Issue:									
	2	Issue:									
<b>B.2.4. Permanent changes from the registered monitoring plan or applied methodology (PCfrMP; PCfMM)</b> <i>(EB 75, Annex 7, B.2.3; VVS; §§ 262 - 268)</i>  <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>	/PS/  /unfccc/	<table><tr><td rowspan="4"><input type="checkbox"/></td><td colspan="2">The following PCfrMP or PCfMM have been approved or are under approval by the UNFCCC</td></tr><tr><td rowspan="3">1</td><td>Title</td></tr><tr><td>Status</td></tr><tr><td>Appr.date</td></tr></table>	<input type="checkbox"/>	The following PCfrMP or PCfMM have been approved or are under approval by the UNFCCC		1	Title	Status	Appr.date	OK	OK
<input type="checkbox"/>	The following PCfrMP or PCfMM have been approved or are under approval by the UNFCCC										
	1	Title									
		Status									
		Appr.date									



Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.									
<p><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></p>		<table border="1"> <tr> <td></td> <td>Ref. No.</td> <td></td> </tr> </table>		Ref. No.									
			Ref. No.										
		<table border="1"> <tr> <td><input checked="" type="checkbox"/></td> <td colspan="2">During the verification of the current MP no need for a PCfrMP or PCfMM has been identified. The monitoring plan is in accordance with the approved methodology applied by the PA</td> </tr> </table>	<input checked="" type="checkbox"/>	During the verification of the current MP no need for a PCfrMP or PCfMM has been identified. The monitoring plan is in accordance with the approved methodology applied by the PA									
		<input checked="" type="checkbox"/>	During the verification of the current MP no need for a PCfrMP or PCfMM has been identified. The monitoring plan is in accordance with the approved methodology applied by the PA										
		<table border="1"> <tr> <td><input type="checkbox"/></td> <td colspan="2">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.</td> </tr> <tr> <td>1</td> <td>Issue:</td> <td></td> </tr> <tr> <td>2</td> <td>Issue:</td> <td></td> </tr> </table>	<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"/>	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:										
		<table border="1"> <tr> <td><input type="checkbox"/></td> <td colspan="2">The following PCfrMP or PCfMM 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>	<input type="checkbox"/>	The following PCfrMP or PCfMM for which appendix 1 of the PS is applicable have been applied:				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:												
<p><i>In cases of approved PCfrMP or PCfMM the EB guidance has been applied as follows:</i></p> <p><i>Detailed description and justification each TDfrMP or TDfMM for which appendix 1 is applicable:</i></p> <p>In this context the following findings have been identified:</p> <p>N/A</p>													

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)			Draft Concl.	Final Concl.	
<b>B.2.5. Changes to the project design of the registered project activity (CoPD)</b>  <i>(EB 75, Annex 7, B.2.4; VVS; §§ 269 - 282)</i>  <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>  <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>	/PS/  /unfccc/		<input type="checkbox"/> The following CoPD has been approved or are under approval by the UNFCCC		OK	OK	
			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			
				.			
			<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.				





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>1</td><td>Issue:</td><td></td></tr><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 of the CDM Project Standard is applicable:</i></p> <p>In this context the following findings have been identified:</p> <p>N/A</p>		1	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:			
	1	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																						
<b>C.1. Monitoring Plan – PDD Compliance</b> <b>(VVS, §§ 233-236)</b>  <i>Check if the monitoring plan is in accordance with the monitoring plan contained in the registered PDD (or any accepted revised MP).</i>  <i>Please check esp. if</i>	/MR/ /PDD/	<p>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:</p> <table><tr><td><input checked="" type="checkbox"/></td><td>The MP is completely in accordance with the last registered/approved version of the PDD / MP.</td></tr></table>	<input checked="" type="checkbox"/>	The MP is completely in accordance with the last registered/approved version of the PDD / MP.	OK	OK																
<input checked="" type="checkbox"/>	The MP is completely in accordance with the last registered/approved version of the PDD / MP.																					

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.															
<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>		<p>In this context the following findings have been identified:</p> <p>N/A</p>																	
<p><b>C.2. Monitoring Plan – Meth Compliance</b> <b>(VVS, §§ 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/ /ACM02/ /TOOL/</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="3">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><input checked="" type="checkbox"/></td><td colspan="3">The MP is completely in accordance with the applied tools which the methodology references. A breakdown of the referenced tools is as follows:</td></tr><tr><td rowspan="2">1</td><td>Title (of the tool)</td><td colspan="2">Tool to calculate emission factor for an electricity system</td></tr><tr><td>Version</td><td colspan="2">02</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"/>	The MP is completely in accordance with the applied tools which the methodology references. A breakdown of the referenced tools is as follows:			1	Title (of the tool)	Tool to calculate emission factor for an electricity system		Version	02		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"/>	The MP is completely in accordance with the applied tools which the methodology references. A breakdown of the referenced tools is as follows:																		
1	Title (of the tool)	Tool to calculate emission factor for an electricity system																	
	Version	02																	

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)				Draft Concl.	Final Concl.
			2	MP compliance	<input checked="" type="checkbox"/> full compliance <input type="checkbox"/> findings have been raised <input type="checkbox"/> N/A (for MP)		
				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:  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> <i>(VVS, § 217 (a) (iii))</i>  <i>Check if the GHG data monitoring system can be assessed as appropriate.</i>  <i>In case reference is made to a (certified) company</i>	/MR/  /IM01/  /IM02/	<i>Description:</i> The GHG data monitoring system does the measure and record the value of generated energy. There are two meters placed in in substation Uberlândia 1 where the energy is delivered. The meters are sealed to guarantee its safety after calibration.  The monitoring and measurement system (SMF) send via satellite the information to CCEE and Malagone. This				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>quality management system, check if all CDM related monitoring procedures have been fully integrated in 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>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 75, Annex 7, C; PS §196)</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 included at Section C of the MR as required by guidelines for completing the monitoring report.</p> <p><i>Verifier's action:</i> MR has been cross-checked against PDD.</p> <p><i>Conclusion:</i> A line diagram is included and reflects the actual situation and is in line with the registered PDD and with the requirements of the applied methodology.</p>	OK	OK
<p><b>C.5. Roles and Responsibilities</b> <b>(EB 75, Annex 7, C; PS §196)</b></p> <p><i>Check if all roles and positions of each person in the GHG data management process are clearly defined</i></p>	<p>/PS/ /PDD/ /MR/</p>	<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 equipment. Among other responsibilities, Malagone has authority for registration, monitoring, measurement and management of</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><i>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></p> <p><i>Identify, if relevant personnel w.r.t. monitoring has been exchanged?</i></p> <p><i>If so, have appropriate training measures been carried out.</i></p> <p><i>In case of changes, assure that the implemented monitoring procedures have not been affected.</i></p>	<p>/IM01/ /IM02/ /IM03/ /IM04/ /MAN/</p>	<p>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>		
<p><b>C.6. Emergency procedures for the monitoring system</b> <b>(EB 75 Annex 7, C; PS §196)</b></p> <p><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></p>	<p>/PS/ /PDD/ /MR/ /IM01/ /IM02/ /IM03/ /IM04/ /MAN/</p>	<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
<p><b>C.7. Data archive and data protection</b> <b>(PS §56 b)</b></p> <p>Check whether all records of monitoring parameters are archived according to the monitoring plan.</p> <p>Assess further whether appropriate measures have</p>	<p>/MR/ /IM01/ /IM02/ /IM04/</p>	<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>	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
been taken in order to avoid unintended or intended manipulation or loss of the measured data.		<i>Verifier's action:</i> The MR was reviewed against the interviews and the operation and management manuals.  <i>Conclusion:</i> No issues have been found in this topic as all records of monitoring parameters are archived according to the monitoring plan.		
<b>D. Data and parameters</b>				
<b>D.1. Data and Parameters fixed ex ante</b>				
<b>a) Compliance with registered PDD</b> <b>(EB 75 Annex 7; D1, VVS § 246 (d))</b>  <i>Check whether the value applied is in compliance with the registered PDD.</i>	/ MR/ / PDD/	<i>Description:</i> The fixed parameters ex-ante are $Cap_{BL}$ and $A_{BL}$ . They are in compliance with the registered PDD.  <i>Verifier's action:</i> PDD was cross-checked against MR.  <i>Conclusion:</i> The fixed parameters are in compliance with the registered PDD.	OK	OK
<b>b) Compliance with the applied methodology</b> <b>(EB 75 Annex 7; D1)</b>  <i>Check whether the value applied is in compliance with the applied methodology or any other tool.</i>	/ ACM02/ / PDD/	<i>Description:</i> The fixed parameters ex-ante are $Cap_{BL}$ and $A_{BL}$ and they are in accordance with the ACM0002.  <i>Verifier's action:</i> The applied methodology was reviewed and cross-checked against PDD.  <i>Conclusion:</i> The parameters fixed ex-ante are in accordance with PDD.	OK	OK
<b>D.2. Data and Parameters monitored</b>				
<b>D.2.1. <math>EG_{facility,y}</math></b>		<b>Description:</b> <i>Quantity of net electricity generation supplied by the project plant/unit to the grid in year y</i>		

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> <b>(VVS, §§ 233, 236)</b></p> <p><i>Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).</i></p> <p><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></p> <p><i>Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</i></p>	<p>/IM01/ /PDD/ /ACM02/</p>	<p><i>Description:</i> According to the MP, the parameter is the total amount of net energy generated by SHPP Malagone (generators 1 and 2) and delivered to the grid in the year 2012, 2013 and 2014 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.</p> <p><i>Verifier's action:</i> Interviews, equipment manuals and the company system have been checked to evaluate this issue.</p> <p><i>Conclusion:</i> The monitoring of this parameter is in line with the registered MP of the PDD and with the applied methodology.</p>	OK	OK
<p><b>b) Accuracy and QA/QC Procedure</b> <b>(VVS, §§ 237-243)</b></p> <p><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></p> <p><i>Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the</i></p>	<p>/CAL/ /MR/</p>	<p><i>Description:</i> 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.</p> <p>Calibrations have not been carried out according to ONS requirements and delays have been identified from 2013-07-20 to 2013-10-09. Thus CAR D2 was raised.</p> <p><i>Verifier's action:</i> The calibration certificates<sup>/CAL/</sup> and equipment manuals<sup>/MAN/</sup> have been presented to the verification team.</p>	CAR D2	OK



Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<i>monitoring equipment has been carried out in line with the latest EB guidance.</i>		<p><i>Conclusion:</i></p> <p><b>(CAR D2)</b> The validity of the calibrations is not correctly presented at Table 4. Therefore, the verified delays are not corrected presented.</p> <p>In addition, it is necessary to revise the calculations of <math>EG_{\text{facility}}</math> and respective ER calculations related to the period in which the calibrations were delayed.</p>		
<p><b>c) Correctness</b> <b>(VVS, §§ 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/ /CAL/</p>	<p><input type="checkbox"/> Correct      <input checked="" 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. Nevertheless, as the calculation of the error related to the calibration delays have to be revised, CAR D2 was raised</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> Refer to CAR D2 above.</p>	CAR D2	OK
<b>D.2.2. <math>EF_{\text{grid,CM,y}}</math></b>		<p><b>Description:</b> <i>Combined margin <math>CO_2</math> emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system"</i></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> <b>(VVS, §§ 233, 236)</b></p> <p><i>Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).</i></p> <p><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></p> <p><i>Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</i></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”.</p> <p>The values are from on data provided by the Brazilian DNA of 2012, as there is no data about <math>EF_{grid,BM,y}</math> from 2013 and 2014.</p> <p><i>Verifier’s action:</i> Reviews were performed in DNA website, MR and PDD.</p> <p><i>Conclusion:</i> <math>EF_{grid,BM,y}</math> has been corrected calculated with the available data from DNA’s website.</p>	OK	OK
<p><b>b) Accuracy and QA/QC Procedure</b> <b>(VVS, §§ 237-243)</b></p> <p><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></p> <p><i>Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the</i></p>	<p>/MR/ /TOOL/  /dna/  /XLS/</p>	<p><i>Description:</i> These data were used for calculating the emission reductions. The data were 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.</p> <p>The values are from on data provided by the Brazilian DNA of 2012, as there is no data about <math>EF_{grid,BM,y}</math> from 2013 and 2014.</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”.</p> <p><i>Conclusion:</i> The values are correctly calculated as per the “Tool</p>	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<i>monitoring equipment has been carried out in line with the latest EB guidance.</i>		to calculate the emission factor for an electricity system".		
<b>c) Correctness</b> <b>(VVS, §§ 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 checked="" type="checkbox"/> Correct <input 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 in accordance with required by "Tool to calculate the emission factor for an electricity system". <i>Verifier's action:</i> Calculation spreadsheet was reviewed against the provided tool. <i>Conclusion:</i> The values given in the MR are correct and determined in a conservative manner.	OK	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>(VVS, §§ 233, 236)</b> <i>Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).</i> <i>Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard</i>	/ PDD/ / MR/ / ACM02/ / dna/ / TOOL/ / XLS/	<i>Description:</i> According to the "Tool to calculate the emission factor for an electricity system", the <u>Dispatch data analysis Operating Margin emission factor</u> is calculated <i>ex post</i> by using the data presented by Brazilian DNA (data from 2012 and generated energy of the period). <i>Verifier's action:</i> Checking was performed at DNA website, MR and PDD. <i>Conclusion:</i> $EF_{grid,OM-DD,y}$ has been corrected calculated with the available data from DNA's website and generated energy for the	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>equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.</i></p> <p><i>Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</i></p>		period.		
<p><b>b) Accuracy and QA/QC Procedure (VVS, §§ 237-243)</b></p> <p><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></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>/MR/ /TOOL/ /dna/ /XLS/</p>	<p><i>Description:</i> Data calculated according to the “Tool to calculate the emission factor for an electricity system” and available data from DNA’s website.</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”.</p> <p><i>Conclusion:</i> The values are correctly calculated as per the “Tool to calculate the emission factor for an electricity system”.</p>	OK	OK
<p><b>c) Correctness (VVS, §§ 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</i></p>	<p>/MR/ /dna/ /XLS/ /TOOL/</p>	<p><input checked="" type="checkbox"/> Correct      <input type="checkbox"/> Not correct (initial assessment)</p> <p><i>Description:</i> The value presented as the operating margin of CO<sub>2</sub> emission factor of SHP Malagone is in accordance with required by “Tool to calculate the emission factor for an electricity system”.</p> <p><i>Verifier’s action:</i> Calculation spreadsheet was reviewed against</p>	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<i>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>		the provided tool.  <i>Conclusion:</i> The values given in the MR are correct and determined in a conservative manner.		
<b>D.2.4. <math>EF_{grid,BM,y}</math></b>		<b>Description:</b> <i>CO<sub>2</sub> Build Margin emission factor of the grid, in year y</i>		
<b>a) Measurement / Determination method (VVS, §§ 233, 236)</b>  <i>Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).</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>	/PDD/ /MR/ /ACM02/ /dna/ /TOOL/ /XLS/	<i>Description:</i> The data are given by the DNA's website. As no data from 2013 and 2014 are available, just data from 2012 have been used.  <i>Verifier's action:</i> Checking was performed at DNA website, MR and PDD.  <i>Conclusion:</i> $EF_{grid,BM,y}$ is in accordance with DNA's website.	OK	OK
<b>b) Accuracy and QA/QC Procedure (VVS, §§ 237-243)</b>	/MR/ /TOOL/	<i>Not applicable as the data is given by the DNA's website.</i>	N/A	N/A

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><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></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>/dna/ /XLS/</p>			
<p><b>c) Correctness</b> <b>(VVS, §§ 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/ /XLS/ /TOOL/</p>	<p><input checked="" type="checkbox"/> Correct      <input type="checkbox"/> Not correct (initial assessment)</p> <p><i>Description:</i> The value presented as the build margin of CO<sub>2</sub> emission factor of SHP Malagone is in accordance with the DNA's website.</p> <p><i>Verifier's action:</i> The website has been checked.</p> <p><i>Conclusion:</i> The values given in the MR are correct..</p>	OK	OK
<b>D.2.5. Cap<sub>PJ</sub></b>		<b>Description:</b> <i>Installed capacity of the hydro power plant after the implementation of the project activity</i>		

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> <b>(VVS, §§ 233, 236)</b></p> <p><i>Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).</i></p> <p><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></p> <p><i>Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</i></p>	<p>/IM01/ /PDD/ /ACM02/</p>	<p><i>Description:</i> The monitoring parameter is determined by the plates of equipment and necessary calculations.</p> <p><i>Verifier's action:</i> Interviews, equipment manual and equipment plates were cross-checked.</p> <p><i>Conclusion:</i> The monitoring of this parameter is in line with the registered MP of the PDD.</p>	OK	OK
<p><b>b) Accuracy and QA/QC Procedure</b> <b>(VVS, §§ 237-243)</b></p> <p><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></p> <p><i>Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the</i></p>	<p>/MR/ /IM01/</p>	<p><i>Not applied.</i></p>	N/A	N/A

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<i>monitoring equipment has been carried out in line with the latest EB guidance.</i>				
<b>c) Correctness</b> <b>(VVS, §§ 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 / / IM01 /	<input checked="" type="checkbox"/> Correct <input type="checkbox"/> Not correct <i>Description:</i> The given value in the monitoring report is consistent with the data found in the visit performed by verification team. <i>Verifier's action:</i> The equipment plates were cross-checked with equipment manual and interview of company employees. <i>Conclusion:</i> The given value in MR is correct.	OK	OK
<b>D.2.6. A<sub>PJ</sub></b>		<b>Description:</b> <i>Area of the reservoir measured in the water surface, after the implementation of the project activity, when the reservoir is full</i>		
<b>a) Measurement / Determination method</b> <b>(VVS, §§ 233, 236)</b> <i>Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).</i> <i>Check if relevant equipment has been exchanged</i>	/ PDD / / MR / / ACM02 / / RES /	<i>Description:</i> The monitoring parameter is measured by an annual topographical survey. <i>Verifier's action:</i> Interviews were performed and the survey has been presented. <i>Conclusion:</i> The monitoring of this parameter is in line with the registered MP of the PDD.	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>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></p> <p><i>Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</i></p>				
<p><b>b) Accuracy and QA/QC Procedure (VVS, §§ 237-243)</b></p> <p><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></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>/PDD/ /MR/ /ACM02/</p>	<p><i>Description:</i> A third party topographical survey has been performed.</p> <p><i>Verifier's action:</i> The survey has been presented.</p> <p><i>Conclusion:</i> The monitoring of this parameter is in line with the registered MP of the PDD.</p>	OK	OK
<p><b>c) Correctness (VVS, §§ 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>/PDD/ /MR/ /ACM02/</p>	<p><input checked="" type="checkbox"/> Correct      <input type="checkbox"/> Not correct</p> <p><i>Description:</i> The given value in the monitoring report is consistent with the topographical survey presented to the verification team.</p> <p><i>Verifier's action:</i> The survey has been presented.</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><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>		Conclusion: The given value in MR is correct.		
<b>D.3. Sampling</b>				
<p><b>a) Implementation of sampling plan (EB75 Annex 7; D3)</b></p> <p><i>Check whether the PP has applied a sampling approach to determine the monitored values (as per section D.2 above).</i></p> <p><i>If this is the case, please provide an assessment whether the PPs have correctly and sufficiently described the implemented sampling plan including</i></p> <ul style="list-style-type: none"> <li><i>a) Description of the implemented sampling design</i></li> <li><i>b) Collected data</i></li> <li><i>c) Analysis of collected data</i></li> <li><i>d) Demonstration on whether the required confidence/precision has been met.</i></li> </ul>	/IM01/	<input checked="" type="checkbox"/> No sampling approach has been used by the PP to determine the monitored parameters.	N/A	N/A

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<b>b) Sampling during verification</b> <i>In case the VT has applied a sampling approach in the course of the verification the approach shall be described for each parameter.</i>	/MR/	<input checked="" type="checkbox"/> No sampling approach has been used by the VT to verify the monitored parameters	N/A	N/A
<b>E. Calculation of Emission reductions</b>				
<b>E.1. Traceability</b> <b>(VVS, §§ 212, 214)</b> <i>Assess if the calculation is fully traceable. In case of complex calculations an Excel calculation spreadsheet shall be used. All applied formulae must be visible.</i>	/XLS/ /MR/	<i>Description:</i> The calculation spreadsheet provided by PP is clear and traceable. <i>Verifier's action:</i> Values presented in MR were reviewed against calculation spreadsheets. <i>Conclusion:</i> The calculation is fully traceable.	OK	OK
<b>E.2. Parameter consistency</b> <b>(VVS, § 214)</b> <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> <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 and calculation spreadsheet.</i>	/XLS/ /MR/ /dna/ /GEN/	<i>Description:</i> The parameters used for the calculations are consistent. Nevertheless, as there is a mistake about the period of delay in the calibration of the meters, this issue has to be closed in order to assess this point. <i>Verifier's action:</i> Values in calculation spreadsheet were cross-checked against data provided by Brazilian DNA and values from CCEE. <i>Conclusion:</i> <b>(CAR D2)</b> The validity of the calibrations is not correctly presented at Table 4. Therefore, the verified delays are not corrected presented.	CAR D2	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		In addition, it is necessary to revise the calculations of $EG_{\text{facility}}$ and respective ER calculations related to the period in which the calibrations were delayed.		
<b>E.3. Correctness of calculation</b> <b>(VVS, §§ 244-245)</b> <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> <i>Assess whether the provided calculations are complete and reflect all requirements of the monitoring plan.</i> <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>	/XLS/ /MR/ /dna/ /GEN/	<i>Description:</i> The calculation procedures are correct. Nevertheless, as there is a mistake about the period of delay in the calibration of the meters, this issue has to be closed in order to assess this point. <i>Verifier's action:</i> Values in calculation spreadsheet were cross-checked against data provided by Brazilian DNA and values in MR were cross-checked against PDD. <i>Conclusion:</i> Refer to CAR D2 above.	CAR D2	OK
<b>E.4. Emission reductions table</b> <b>(EB 75, Annex 7, E.4)</b> <i>Check if the MR includes a summary table of the emission reductions calculation specifying separately</i> <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>	/dna/ /MR/ /PDD/	<input checked="" type="checkbox"/> The MR includes in section E.4 a summary table of the emission reductions calculation. <input checked="" type="checkbox"/> The summary table specified the total baseline, project and leakage emissions as well as the total emission reductions separately. <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. <input checked="" type="checkbox"/> During the verification issues with impact on the ER calculation have been identified. Thus subject to the	CAR D2	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<i>Assess whether the values are correct or need to be revised as a consequence of issues identified above.</i>		closure of above listed findings the summary table in E.4 needs to be revised.  In this context the following additional findings have been identified:  Refer to CAR D2 above.		
<b>E.5. Comparison with ex-ante determined emission reductions</b> <b>(EB 75, Annex 7, E.5; E.6)</b> <i>Check if the MR includes a comparison of actual values of the monitoring period with the estimations in the registered PDD.</i> <i>Check further whether in case of an increase an appropriate explanation is included in the MR.</i> <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 and – if this is case – whether the PRC have been considered appropriately.</i>	/XLS/ /MR/ /PDD/ /GEN/ /dna/	<i>Description:</i> The MR includes a comparison of actual values of the monitoring period with ex ante estimations in the registered PDD.  There was a slight increase in the ERs for the period and it was justified by the increase in the EF <sub>CM</sub> and decrease of the energy generation which could be verified by the presented evidences.  <i>Verifier's action:</i> Calculation spreadsheet were reviewed against values presented in PDD, MR and DNA's website and generation reports.  <i>Conclusion:</i> There is a comparison and the slight increase at the ERs is consistently justified.	OK	OK
<b>E.6. ER during the 1<sup>st</sup> commitment period and the period from 1 January 2013 onwards</b> <b>(EB 75, Annex 7, E.7)</b> <i>Check if the MR includes in chapter E.7 a breakdown</i>	/MR/	<input checked="" type="checkbox"/> The MR in section E.7 includes a summary table of the ER breakdown  a) ER up to 2012-12-31 and b) ER from 2013-01-01 onwards  <input checked="" type="checkbox"/> The breakdown of the ERs during the first commitment	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>of the actual ER into</i></p> <p><i>a) ER up to 2012-12-31 and</i></p> <p><i>b) ER from 2013-01-01 onwards</i></p> <p><i>The ERs for each period should be determined as per the actual generation. In cases where this is not possible or a cap has been applied a proportional (time related) approach should be chosen.</i></p>		<p>period and from 2013-01-01 onwards is as follows:</p> <p><input type="checkbox"/> The ER have completely been generated during the first commitment period</p> <p><input type="checkbox"/> The ERs have completely been generated from 2013-01-01 onwards,</p> <p><input checked="" type="checkbox"/> The ERs have partly been generated during the first commitment period and partly from 2013-01-01 onwards.</p> <p><input checked="" type="checkbox"/> The breakdown of the ERs is correct, considering the applicable guidance.</p> <p>In this context the following additional findings have been identified:</p> <p>N/A</p>		



## ANNEX 2: STATEMENTS OF COMPETENCE OF INVOLVED PERSONNEL

**Statement of Competence**  
Appointment and authorization according to the procedures of the TÜV NORD JI/CDM Certification Program

**Mr. Sergio Cruz**

SCHEME	STATUS	VALID UNTIL
CDM	Lead Assessor (Validation, Verification)	2015-08-02
VCS / ISO 14064-2	Lead Assessor	2015-08-02

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA
1.2	Renewable Energies
13.1	Waste handling and disposal

185 – Rev. 2, Date: 2012-08-03

185\_S01-F003\_2012-08-03\_rev3.doc

**Statement of Competence**  
Appointment and authorization according to the procedures of the TÜV NORD JI/CDM Certification Program

**Mr. Marcelo Sebben**

SCHEME	STATUS	VALID UNTIL
CDM	Assessor (Validation, Verification)	2016-04-07
VCS / ISO 14064-2	Assessor	2016-04-07

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA
1.2	Renewable Energies

297 - Rev. 2, Date: 2013-04-08

297\_S01-VA060-F20\_2013-04-08\_rev2.doc

**Statement of Competence**  
Appointment and authorization according to the procedures of the TÜV NORD JI/CDM Certification Program

**Mr. Dr. Jochen Schubert**

SCHEME	STATUS	VALID UNTIL
CDM	Senior Assessor (Validation, Verification) Technical Reviewer	2014-05-11
VCS	Senior Assessor (Validation, Verification) Technical Reviewer	2014-05-11

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA	TR INCLUDE SUB-AREAS
1.2	Renewable Energies	1.2.1 Hydro 1.2.2 Wind 1.2.3 Geothermal 1.2.4 Solar 1.2.5 Total
13.1	Waste handling and disposal	13.1.1 Waste management 13.1.2 Waste water management

056 – Rev. 2, Date: 2011-07-29

056\_S01-F003\_2011-07-29\_rev2