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# Verification Report

Third Periodic Verification of the Registered CDM Project

“TROJES HYDROPOWER PROJECT”

UNFCCC 0649-CDMP

Monitoring period 3: 01-10-2007 to 31-03-2009

Report No. 1333946

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<b>Executing Operational Unit:</b>				
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<b>Registration number / Project Title</b>			Project 0649: “Trojes Hydropower Project”	
<b>Monitoring period:</b>			01-10-2007 to 31-03-2009	
<b>First Monitoring Report (version/date)</b>			Version 01 / 29-04-2009	
<b>Final Monitoring Report (version/date)</b>			Version 07 / 20-01-2011	
<b>Summary:</b>				
<p>TÜV SÜD Industrie Service GmbH has performed the third periodic verification of the registered CDM project: “Trojes Hydropower Project”. The project consists of a hydroelectric power plant with an authorized capacity of 8 MW at the existing dam of Trojes on the Barreras river in the state of Michoacan. The technology consists in the use of a generator and hydraulic turbine.</p> <p>The management of Hidroelectricidad del Pacífico S. de R.L. de C.V. is responsible for the preparation of the GHG emissions data and the reported GHG emission reductions.</p> <p>A document review, followed by a site visit was conducted to verify the information submitted by the project participant regarding the present verification period. Based on the assessment carried out, the verifier confirms:</p> <ul style="list-style-type: none"><li>• that the project has been implemented and operated in accordance with the description given in the registered PDD (version 03, 19-04-2006, registration date 04-11-2006).</li><li>• that the project is completely implemented as described in registered PDD.</li><li>• that the monitoring plan complies with the applied methodology (grid connected renewable electricity generation, AMS-I.D version 08) and the monitoring has been carried out as exactly following the monitoring plan.</li></ul> <p>Installed equipments essential for generating emission reductions run reliably and the meters are calibrated appropriately. The project is generating emission reductions as a CDM project.</p> <p>The verifier can confirm that the GHG emission reductions are calculated without material misstatements. Our opinion refers to the project's GHG emissions and resulting GHG emission reductions reported, both determined due to the valid and registered project's baseline, its monitoring plan and its associated documents.</p> <p>Based on the information we have seen and evaluated we confirm that the implementation of the project resulted in 33,614 tCO<sub>2</sub>e of emission reductions during the verification period 01-10-2007 to 31-03-2009.</p>				

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\* Please note that the project title (Trojes Hydroelectric Project) in the PDD and LoAs is slightly different to the name, which is mentioned on the UNFCCC webpage and in our report. However, the project activity can still be identified clearly. In order to avoid any misunderstandings the name “Trojes Hydropower Project” will be used throughout this report.



Industrie Service

<b>Assessment Team Leader:</b> Javier Castro <b>Assessment Team Members:</b> Arturo Lemus* Guadalupe Avendaño** Bhai Raja Maharjan Katrin Hartmann	<b>Technical Review:</b> Caiyang, Wu <b>Certification Body responsible:</b> Thomas Kleiser
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\* Currently not appointed (see section 2.2)



## Abbreviations

<b>AM</b>	Approved Methodology
<b>BM</b>	Build Margin
<b>CAR</b>	Corrective Action Request
<b>CDM</b>	Clean Development Mechanism
<b>CDM-EB</b>	CDM Executive Board
<b>CER</b>	Certified Emission Reduction
<b>CM</b>	Combined Margin
<b>CMP</b>	Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol
<b>CFE</b>	Energy Federal Commission
<b>CNA</b>	Federal Water Commission
<b>CO<sub>2e</sub></b>	Carbon dioxide equivalent
<b>CR</b>	Clarification Request
<b>DNA</b>	Designated National Authority
<b>DOE</b>	Designated Operational Entity
<b>EF</b>	Emission Factor
<b>EIA / EA</b>	Environmental Impact Assessment / Environmental Assessment
<b>ER</b>	Emission Reduction
<b>FAR</b>	Forward Action Request
<b>GHG</b>	Greenhouse Gas(es)
<b>GWP</b>	Global Warming Potential
<b>IPCC</b>	Intergovernmental Panel on Climate Change
<b>IRL</b>	Information Reference List
<b>KP</b>	Kyoto Protocol
<b>MP</b>	Monitoring Plan
<b>MR</b>	Monitoring Report
<b>OM</b>	Operational Margin
<b>PDD</b>	Project Design Document
<b>PP</b>	Project Participant
<b>TÜV SÜD</b>	TÜV SÜD Industrie Service GmbH
<b>UNFCCC</b>	United Nations Framework Convention on Climate Change
<b>VVM</b>	Validation and Verification Manual



## Main Documents (referred to in this report)

Methodology (name / version)	Grid connected renewable electricity generation, AMS-I.D version 08	
Sectoral Scope	1	
Technical Area	1.2	
Registered PDD:	Version 03, date 19-04-2006	
Revised Monitoring Plan:	N/A	
	Version	Date
Published Monitoring Report	01	29-04-2009
Revised Monitoring Report	07	20-01-2011
Project documentation link:	<a href="http://cdm.unfccc.int/Projects/DB/DNV-CUK1158843806.46/view">http://cdm.unfccc.int/Projects/DB/DNV-CUK1158843806.46/view</a>	

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Annex 1: Verification Protocol

Annex 2: Information Reference List

Annex 3: Appointment Certificates

## **1 INTRODUCTION**

### **1.1 Objective**

Hidroelectricidad del Pacífico S. de R.L. de C.V. has commissioned an independent verification by TÜV SÜD Industrie Service GmbH (TÜV SÜD) of its registered CDM project: “Trojes Hydropower Project”.

The objective of the verification work is to comply with the requirements of paragraph 62 of the CDM Modalities and Procedures. According to this assessment TÜV SÜD shall:

- ensure that the project activity has been implemented and operated as per the registered PDD “Trojes Hydroelectric Project” Version 03.-19-04-2006, and that all physical features (technology, project equipment, monitoring and metering equipment) of the project are in place (the UNFCCC has identified the project as 0649: Trojes Hydropower Project),
- ensure that the published MR and other supporting documents provided are complete and verifiable and in accordance with applicable CDM requirements,
- ensure that actual monitoring systems and procedures comply with the monitoring systems and procedures described in the monitoring plan and the approved methodology,
- evaluate the data recorded and stored as per the “Grid connected renewable electricity generation”, AMS-I.D version 08.

### **1.2 Scope**

The verification scope is defined as an independent and objective review and ex-post determination of the monitored reductions in GHG emissions by the Designated Operational Entity. The verification is based on the submitted monitoring report, the validated project design documents including its monitoring plan and validation report, previous verification reports, the applied monitoring methodology, relevant decisions, clarifications and guidance from the CMP and the EB and any other information and references relevant to the project activity’s resulting emission reductions. These documents are reviewed against the requirements of the Kyoto Protocol, the CDM Modalities and Procedures and related rules and guidance.

TÜV SÜD has, based on the requirements in the VVM applied a rule-based approach. The principles of accuracy, completeness, relevance, reliability and credibility were combined with a conservative approach to establish a traceable and transparent verification opinion.

The verification considers both quantitative and qualitative information on emission reductions.

The verification is not meant to provide any consultancy towards the client. However, stated requests for clarifications, corrective and/or forward actions may provide input for improvement of the monitoring activities.

### **1.3 GHG Project Description**

Project activity:	“Trojes Hydropower Project”
UNFCCC registration number:	0649
Project Participants:	Impulsora Nacional de Electricidad S. de R.L. de C.V and Hidroelectricidad del Pacífico S. de R.L. de C.V.
Location of the project:	GSP coordinates: 18° 57’55” North Latitude 103° 23’48.0” West Longitude Barreras river, near the city of Colima, in the State of Michoacan.



Date of registration: 04-11-2006

Starting date of the crediting period: 01-04-2003

The “Trojes Hydropower Project” consists of a hydroelectric power plant with an authorized capacity of 8 MW at the existing dam of Trojes on the Barreras River in the state of Michoacán. The objective of the project is reducing GHG emission through renewable energy displacement to the grid. Trojes project will use the existing Trojes dam to generate electricity by impounding water mainly utilized for downstream irrigation. The technology consists in the use of generators and hydraulic turbines. This way, the reduction is the result of the displacement of generation from fossil fuel-fired plants that would have otherwise delivered electricity to the CFE interconnected to the grid.

## **2 METHODOLOGY**

### **2.1 Verification Process**

The verification process is based on the approach depicted in the Validation and Verification Manual.

Standard auditing techniques have been adopted. The verification team performs first a desk review, followed by an on-site visit which results in a protocol including all the findings. The next step is to close out the findings through direct communication with the PPs and finally prepare the verification report. This verification report and other supporting documents then undergo an internal quality control by the CB “climate and energy” before submission to the CDM-EB.

### **2.2 Verification Team**

The appointment of the team takes into account the coverage of the technical area(s), sectoral scope(s) and relevant host country experience for verifying the ER achieved by the project activity in the relevant monitoring period for this verification.

The CB TÜV SÜD operates the following qualification levels for team members that are assigned by formal appointment rules:

- Assessment Team Leader (ATL);
- Verifier (V);
- Verifier Trainee (T);
- Technical Expert (TE).

The verification team consisted of the following members:

Name	Qualification	Coverage of sectoral scope	Coverage of technical area	Host country experience
<b>Javier Castro</b>	<b>ATL</b>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Arturo Lemus		-	-	<input checked="" type="checkbox"/>
Guadalupe Avendaño		-	-	<input checked="" type="checkbox"/>
Bhai Raja Maharjan	V	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Katrin Hartmann	V	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

Technical reviewer:

- Caiyang, Wu.

## **2.3 Review of Documents**

The Monitoring Report, version 01 was submitted by the PP which was made publicly available at the UNFCCC website on 15-05-2009 before the verification activities started. The published MR was assessed based on all the relevant documents as listed in annex 2. The aim of the assessment in the desk review was to verify the completeness of the data and the information presented in the MR. The compliance check of the MR with respect to the monitoring plan depicted in the registered PDD and the applied methodology was carried out. Particular attention to the frequency of measurements, the quality of the metering equipment including calibration requirements, and the quality assurance and quality control procedures was paid. The evaluation of data management and the quality assurance and quality control system in the context of their influence on the generation and reporting of emission reductions was also carried out. A complete list of all documents reviewed is available in Annex 2: Information Reference List of this report.

## **2.4 On-site Assessment and follow-up Interviews**

During 03-06-2009 to 04-06-2009, TÜV SÜD performed a physical site inspection and on-site interviews with project stakeholders to:

- confirm the implementation and operation of the project,
- review the data flow for generating, aggregating and reporting the monitoring parameters,
- confirm the correct implementation of procedures for operations and data collection,
- cross-check the information provided in the MR documentation with other sources (raw data),
- check the monitoring equipments against the requirements of the PDD and the approved methodology, including calibrations, maintenance, etc.,
- review the calculations and assumptions used to obtain the GHG data and ER,
- identify if the quality control and quality assurance procedures are in place to prevent or correct errors or omissions in the reported parameters.

A list of the people interviewed during this verification activity is included in Annex 2.

## **2.5 Quality of Evidence to Determine Emission Reductions**

Among many others the following relevant and reliable evidences have been used by the audit team during the verification process:

- External Data, such as invoices from CFE (Energy Federal Commission) (IRL 9),
- Internal Data, such as registers, recording files, electronic records (IRL 11, 12 and 17),
- Quality assurance documents, such as calibrations and manufacture's specifications (IRL 16, 13), and
- Excel sheet calculations, showing Baseline Emissions, Project Emissions (mentioned as calculation of the net electricity supplied to the grid, after electricity consumption) and Emission Reductions (IRL 8).



Sufficient evidence covering the full verification period in the required frequency is available to validate the figures stated in the final MR. The source of the evidences will be discussed in chapter 3 of this report. Specific cross-checks have been done in cases that further sources were available, such as invoicing. All figures in the monitoring report were checked by the audit team against the raw data. The data collection system meets the requirements of the monitoring plan as per the methodology.

## **2.6 Resolution of Clarification and Corrective and Forward Action Requests**

The objective of this phase of the verification process was to resolve any outstanding issues which needed to be clarified for TÜV SÜD's positive conclusion on the GHG emission reduction calculation. The findings raised as Forward Action Requests (FARs) indicated in previous verification report were clarified during communications between the PP and TÜV SÜD.

To guarantee the transparency of the verification process, the concerns raised, based on the desk review and subsequent on-site audit assessment and follow up interviews, together with the responses given are documented in Annex 1 (verification protocol).

A Corrective Action Request is raised where TÜV SÜD identifies:

- non-conformities in monitoring and reporting with the monitoring plan or methodology;
- that the evidence provided is not sufficient to prove conformity;
- mistakes in assumptions, data or calculations that impair the ER;
- FARs stated during last verification that are not solved until the on-site visit.

A Clarification Request is raised where TÜV SÜD does not have enough information or the information is not clear in order to confirm a statement or data.

A Forward Action Request is raised where TÜV SÜD identifies that monitoring and/or reporting required special attention or adjustments for the next verification period.

Information or clarifications provided as response to a CAR, CR or FAR could also lead to a new request.

## **2.7 Internal Quality Control**

As an ultimate step of verification the final documentation including the verification report and the protocol have to undergo an internal quality control by the Certification Body (CB) “climate and energy”, i.e. each report has to be finally approved either by the Head of the CB or the Deputy. In case one of these two persons is part of the assessment team the approval can only be given by the other one. If the documents have been satisfactorily approved, the Request for Issuance is submitted to the CDM-EB along with the relevant documents.

### **3 VERIFICATION RESULTS**

In the following sections the results of the verification are stated. The verification results relate to the project performance as documented and described in the final Monitoring Report (20-01-2011, version 07). The verification findings for each verification subject are presented below:

#### **3.1 FARs from Validation / Previous Verification**

The verification team confirms that all FARs presented in the validation report and/or verification reports have been correctly addressed by the PPs.

FAR 1 (as per DNV Final Verification Report) regarding the improvement of the personnel involved in data management and reporting of the structure of the project by refreshing the implications and the importance of a CDM Project, this situation has been corrected and confirmed by the audit team through assessing the training programs and certificates (IRL 15) and interviews with the personnel, thus has been considered closed.

FAR 2 (as per DNV Final Verification Report), in order to verify the analysis of the result of the evaluations of personnel competences and improvement of the current training program, the PP showed several attendance lists as evidence. According to these attendance lists the respective personnel have been interviewed and it could be confirmed by the audit team during the on-site visit that the personnel competences and the training program has been improved..

FAR 3 (as per DNV Final Verification Report), in order to improve the control over the generated formal procedures, Data Flow Charts and Information Control, internal procedures together with a manual were verified by the DOE, hence this FAR is considered closed.

#### **3.2 Project Implementation in accordance with the registered Project Design Document**

The project is fully implemented according to the description presented in the PDD. The verifier confirms, through the visual inspection that all physical features of the proposed CDM project activity including data collecting systems and storage have been implemented in accordance with the registered PDD. The project activity is completely operational and the same has been confirmed on-site.

According to the PDD the electricity generation is multiplied by the Emission Factor, established ex-ante with the value: 0.531 tCO<sub>2</sub>e/MWh (according to the PDD and the Validation Report No. 2004-0050, section 3.5). For the years 2007 and 2008, the total amount of ER in the MR exceeds the yearly estimated in the PDD. A CR was raised to clarify and correct the situation, at which the PP response is: “The available water for electricity generation is determined by the CNA (National Water Commission) according to the annual irrigation program. Normally, from July to December, the water extraction program for irrigation is zero; therefore the available water for the plant depends directly on the rainy season. For this monitoring period, the rainy season was regular, allowing Hidroelectricidad del Pacífico S. de R.L. de C.V. (HPA) to request to the CNA water exceeding volumes during some specific months. The CERs estimation was made considering conservative volumes of available water in the dam, so during the crediting period of the project may be variations due to the regularity of the rainy season and the CNA irrigation program, that HPA cannot control nor forecast in a completely accurate manner. For



more information, please refer to the document “RESUMEN DE OPERACIÓN DE LA C H TROJES 01 10 2007 A 31 03 2009.pdf”

There is also an explanation in the PDD, section A.4.3.1. Estimated amount of emission reductions over the chosen crediting period, where it says that: In each crediting period, the amount of ERs generated by the project will vary directly with the metered net generation output from Trojes”. The calculations in the PDD are conservative and suppose the worst of the scenarios, in the real practice CNA allowed the use of more water if the rainy conditions permit it. According to IRL 23 the DOE could verify that for this monitoring period the conditions of the project were favorable, i.e. in this chart it can be seen that already in the middle of August and beginning of September of 2007 and 2008 the dam filled up in an accelerated way, which is earlier compared to previous years, which therefore leads to a higher availability. The DOE verified this information since the yearly ER overestimation, i.e. 2008, is not considerable (slightly over 5% more than estimation in the PDD) and does not affect the project additionality. Furthermore, the mentioned document assess the energy generation based on the amount of received water from the dam (IRL #10).

No data and/or variables presented in the MR differ significantly (5%) from the stated ones in the registered PDD, which would cause a significantly increment of the ER in this period or in future periods in relation to the estimates in the registered PDD.

### **3.3 Compliance of the Monitoring Plan with the Monitoring Methodology**

The monitoring plan is in accordance with the approved methodology, AMS-I.D, Version 08, applied by the proposed CDM project activity. Neither a revision nor a deviation to the monitoring plan has been requested to the CDM Executive Board.

### **3.4 Compliance of the Monitoring with the Monitoring Plan**

The monitoring has been carried out in accordance with the monitoring plan contained in the registered PDD. The only parameter EG was monitored and determined as per the Monitoring Plan.

The verification of this parameter required by the monitoring plan is provided as follows:

Data / Parameter:	EG
Data unit:	MWh
Description:	Electricity Generated by the Project Delivered to Grid
Source of data used:	Raw data is obtained from the main meter by CFE, which is resumed in invoices. The energy generation is compiled electronically through the SCADA system. The responsibility for data collection and recording is with the superintendent in charge of the facilities. There is a daily report of the readings of the measuring instrument and this is internally verified on a weekly and monthly basis as well as in annual reports. These data are ultimately confirmed in the Mexico City offices and audited on a monthly basis and also cross checked with CFE reports. The access to the resumes is conditioned to passwords, which are only known by the Supervisor of the Plant, the operational Manager and the National Manager, both from ENEL. The net electricity generation by the Trojes project is the result of the Electricity generated minus the electricity consumed from the National Grid.
Means of verification/Comments:	The effectiveness of the generating set and the accuracy of the electricity generated and measured by the CFE were also assessed.



	<p>Additionally during the same site visit, the daily, weekly and monthly reports and records of the electricity generation were cross-checked. Verifying the effectiveness of the data quality assurance and control performed by the owners and operators (MYOCEN). The electricity production is confirmed by comparing the value with the invoices and with the values obtained from the physical electricity meters.</p> <p>From the beginning of the project until 05/11/2007 the principal meter was N/S AR-0012A368-02, and then it was replaced because the equipment presented a % error higher than manufacture's specifications. From that date on, the backup meter was placed as principal with S/N PR-0506A068-02.</p> <p>For the meter with S/N AR-0012A368-02: One calibration was made on 03/03/2006 and the next one on 05/11/2007 the time between calibrations is longer than 1 year, also the last calibration shows a 0.3525 % error which is bigger than the manufacture's specifications, thus during the months of October and November 2007, a percentage error of 0.5% was deducted from the energy generation to compensate the founded error of 0.3525% in the calibration report. Taking into account that the back-up meter (now principal) was correctly calibrated and presented an error lower than specifications, the deduction is considered to be conservative and acceptable.</p> <p>Besides of this, at the moment when the calibration was performed and the meters were changed the plant was not in operation.</p> <p>For the meter with S/N PR-0506A068-02 (placed first as back up and nowadays designed as main meter): One calibration was made on 05/11/2007 and the next one on 05/12/2008 the time between calibrations is longer than 1 year, thus the manufacturer's percentage of error (0.2%) was deducted from energy generation of November and December 2008 to compensate the calibration delay. A current calibration report shows that the maximum error of the meter is lower than the manufacturer's specification, thus the deducted energy is conservative. The metering equipment are calibrated and checked annually for accuracy.</p> <p>The calculation data from the excel spreadsheet (from the designated main meter) was corroborated by the audit team (IRL #8). Also calibrations are available for the DOE (IRL #16)</p>
Cross-check	<p>Invoices issued by the electricity generator and approved by buyer (CFE). The Trojes Manager compares the delivered energy certification data determined by CFE (CFE is not interested in overestimate the energy delivery data in order to pay only the energy received) with the Trojes power electricity meter reference and after verification, the data is approved in order to issue the fee billing and the emissions reduction calculations. The consolidated electricity generation measured by the main meter is the delivered one, (The energy reported in the invoice reflects a compensation of energy generated and energy consumed. The energy, which is metered by CFE is the actual energy generated, which will be invoiced. If energy is produced, which cannot be allocated at the moment, CFE will store this energy as surplus energy inventory.) IRL #8 and #9, respectively.</p>

### **3.5 Assessment of Data and Calculation of Greenhouse Gas Emission Reductions**

All data was available and all the parameters have been monitored in accordance with the registered monitoring plan.

The reported data has been cross check against other sources when available as explained above in chapter 3.4.

The verifier confirms that the methods and formulae used to obtain the baseline and project emissions are appropriate. The same have been done in accordance with the methods and formulae described in the registered monitoring plan and applicable methodology.

The verifier confirms that the emission factor was fixed ex-ante as per the registered PDD.

The registered PDD and validation report, refer to a “power” of 8 MW for the Project. The 8 MW value was obtained while the project was under construction, in line with the generation permit granted by the Energy Federal Commission (CFE) IRL 17 and 20. According to this permit, the installed capacity is defined as 8 MW, which is the maximum amount allowed to be delivered to the national grid. This permit has been assessed by the DOE during on-site visit.

The Trojes Hydropower Project is therefore characterized by an authorized capacity of 8 MW, and a nominal capacity of 8.3 MW, which is 0.3 MW above of the capacity mentioned in the permit.

Although the assessment team could notify a slightly difference in the installed capacity (8 MW versus 8.3 MW), it is important to note that the amount of CERs calculated during the monitoring period is not affected, because the CERs are calculated according to the approved baseline and monitoring methodology AMS-I.D version 08, using the amount of electricity supplied by the project to the national grid, and measured by the Energy Federal Commission (CFE).

The operation of the project during the monitoring period has been done in full compliance with the permits and licenses granted to the project. The DOE has verified that the project was implemented and operated in accordance with the descriptions in the registered PDD, by verifying the generation permit of the Energy Federal Commission (CFE) and the available capacity observed in the monitoring period.

According to the information reviewed, it can be concluded that the nominal installed capacity (as per the name plate) is 03 MW above of the one mentioned in the permit issued in 1999; the authority is aware of the situation. While this consolidated electricity generation measured by the main meter is exported to the grid, the only action undertaken by the authority is that the accounting of this energy, if over 8 MW, is only shifted to the next year. The energy reported in the invoice reflects a compensation of energy generated and energy consumed. The energy, which is metered by CFE is the actual energy generated, which will be invoiced. If energy is produced, which cannot be allocated at the moment, CFE will store this energy as surplus energy inventory. Therefore, it can be concluded that, independently of paying the energy, the ER achieved by the project activity were properly considered and the audit team considers the requirements as fulfilled according to VVM 01.2, § 189.

The assessment team further confirms that none of the data affects the additionality, scale or applicability of the project; hence no notification as defined in EB 48, Annex 67 has been submitted to the EB.



## 4 SUMMARY OF FINDINGS

The verifier can confirm that the published MR and related documents are complete and verifiable in accordance with the CDM requirements. All the findings raised by the verification team, the responses by the PPs and the conclusion from the team are presented in Annex 1, the means of verification and resulting changes in the MR or related documents are stated as follows:

### **CAR 1, means of verification**

This CAR was issued to the PP requesting to include in the MR a list of the equipment used in the site.

In response, the PP has submitted revised MR with the equipment specifications, also the PP sent the specification's sheet from the Manufacturer (IRL #14)

The audit team made a cross check between the equipment specification sheet, the MR and the physical equipment seen on-site. Hence, this issue is closed.

### **CAR 1, changes in the MR or related documents**

The monitoring Report has been updated accordingly.

### **CAR 2, means of verification**

This correction was requested because the PPs details were not consistent between PDD and MR, and also it was not clear the entity responsible of the project activity.

The PP includes both participants in the MR, includes more information regarding the PP and responsible and submit to the DOE the MOC updated.

The DOE compared PPs in the monitoring report with those stated in the PDD (IRL #2 and #4) and the LoA ; also the revised documents (IRL #11 and 19) includes a flow chart and information of the responsibilities. Hence, this issue is closed.

### **CAR 2, changes in the MR or related documents**

The monitoring Report has been updated accordingly.

### **CAR 3, means of verification**

This CAR was raised because the Data Collection Manual was not complete, frequencies and way of collection were missing.

The PP submitted to the DOE the complete document.

The information in the submitted Data collection manual (IRL #12) was compared to the common practice during the on-site visit, the frequency of collection of data is hourly and the mean of collection is the SCADA System. Hence the issue is closed.

### **CAR 3, changes in the MR or related documents**

The data collection manual has been modified accordingly, processing of the data.

### **CAR 4, means of verification**

This CAR was issued since calculations in the excel file had the automatic rounding function of Excel.

The PP rounded the final ER down to achieve conservativeness in the calculations.

The last version of the submitted calculation tool was revised by the DOE (IRL #8) which corroborate that the final ER are rounded down. Hence the issue is closed.

### **CAR 4, changes in the MR or related documents**

The Calculation Tool was changed accordingly, hence the MR also addresses changes.

### **CAR 5, means of verification**

The CAR was issued since the information of July 2008 corresponds to August 2008, the used formula was wrong.



The PP corrects the formula in the calculation tool.

The DOE corroborates that the last version of the submitted calculation tool addresses the requested correction (IRL #8). Hence the issue is closed.

**CAR 5, changes in the MR or related documents**

The Calculation Tool was changed accordingly, hence the MR also addresses changes.

**CAR 6, means of verification**

During the on-site visit, the Supervisor of the Plant mentioned that the former Principal meter was out of specification (this was a RfR during the second verification period), then it was replaced with the back-up meter which do complain with manufacturer's specifications. In this CAR the DOE asked the PP to include this eventuality as part of the MR.

The PP includes a brief description of the event with specific dates and S/N of each meter.

The DOE corroborate the information with the calibration reports (IRL #16) which indicate the interchange between the principal and back-up meters, and also the accuracy level of each meter. Hence the issue is closed

**CAR 6, changes in the MR or related documents**

The MR has been changed accordingly.

**CAR 7 means of verification**

This CAR requests the PP to address a more conservative approach in the Energy Generation, since calibrations made during the Monitoring Period show some deviations from the manufacturer's specifications and in the frequency of calibration.

The PP made the following actions to achieve more conservativeness:

- a) For the meter with S/N PR-0506A068-02 (placed first as back up and nowadays designed as main meter): manufacturer's percentage of error (0.2%) was deducted from energy generation of November and December 2008 to compensate the calibration delay.
- b) For the meter with S/N AR-0012A368-02 (former principal): during the months of October and November 2007, a percentage error of 0.5% was deducted from the energy generation to compensate the founded error of 0.3525% in the calibration report.

The DOE validate the approaches as following:

- a) A current calibration report (made on December 2008) shows that the maximum error of the meter is lower than the manufacturer's specification, thus the deducted energy is conservative.
- b) Taking into account that the back-up meter (now principal) was correctly calibrated and presented an error lower than specifications, the deduction is considered to be conservative and acceptable.

All the calibration reports (IRL #16) corresponding to the period were delivered to the DOE. Due to the above reasons the issue is closed.

**CAR 7, changes in the MR or related documents**

The Calculation Tool was changed accordingly, hence the MR also addresses changes.

**CAR 8 means of verification**

According to technical specifications of the generators the installed capacity is higher than the 8MW stated in the PDD. The PP has explained that the project has been done in full compliance with the permits and licenses granted to the project. The DOE has verified that the project was implemented and operated in accordance with the descriptions in the registered PDD, by verifying the generation permit of Comisión Reguladora de Energía and the available capacity observed in the monitoring period. Hence, this issue is closed.

**CAR 8, changes in the MR or related documents**

The Calculation Tool was changed accordingly, hence the MR also addresses changes.



**CAR 9 means of verification**

This CAR was requested because it was not clear the raw data source used to calculate the ER. The project participant explains that Emission Reductions were calculated through the energy generation, which is received by the grid (one part is consumed and the other part is placed in the energy bank). Other minors corrections were addressed in as requested.

**CAR 9, changes in the MR or related documents**

This explanation and minor corrections were clearly addressed and explained in the M.R.

**CR 1, means of verification**

Since the GPS coordinates were not indicated in the PDD and MR, the DOE asked the PP to indicate the same in the MR.

The PP measured the GPS coordinates in the power house and indicated them in the MR. The audit team has checked the submitted revised MR and the measured coordinates are accurate. Hence, this issue is closed.

**CR 1, changes in the MR or related documents**

The GPS coordinates were included in the last version of the MR.

**CR 2 means of verification**

The audit team raised this CR since the total amount of ER in the MR exceeds the yearly estimated in the PDD for the year 2008.

The PP delivered a document called "RESUMEN DE OPERACIÓN DE LA C H TROJES 01 10 2007 A 31 03 2009" (IRL #10), in which a generation resume based on the amount of water permitted by CNA is assessed.

The DOE validated the ER since this overestimation is not considerable (slightly over 5% more in the year 2008 than estimation in the PDD), and the mentioned document assesses the energy generation based on the amount of received water from the dam which is only controlled by CNA. Hence, this issue is closed.

**CR 2, changes in the MR or related documents**

No changes were addressed since related document is prepared by MYOCEN yearly

**CR 3 means of verification**

This CR was issued since it is not clear in the PDD if the Emission Factor from the grid was fixed ex-ante, or if it will be calculated ex-post yearly.

The PP includes in the MR the clarification that the Emission Factor from the grid was fixed ex-ante according to the "Tool to calculate the emission factor for an electricity system".

The DOE accepted this clarification based on this tool and on the Validation Report No. 2004-0050; the clarification was included in the MR. Hence, this issue is closed.

**CR 3, changes in the MR or related documents**

The MR has been changed accordingly.

**CR 4 means of verification**

This issue was requested since it was not clear what would happen if a trouble in the Data collection is presented.

The PP answered that the SCADA System used to collect information consisting on a main and back up storage. Whenever the main fails, the back-up has all relevant information from past events and data.

Relevant information regarding SCADA systems was consulted (IRL #19), in which it is corroborated that the SCADA System does make an internal backup at the time the system is collecting the data. Hence, this issue is closed.



<b>CR 4, changes in the MR or related documents</b>
None
<b>CR 5 means of verification</b>
<p>This CR was raised because at the moment of the visit the maintenance schedule was not updated and was incomplete.</p> <p>The PP delivered to the DOE updated documents addressing the programmed and realized maintenance actions for every year.</p> <p>The DOE verified that the maintenance reports (IRL #18) delivered are complete. Hence, this issue is closed.</p>
<b>CR 5, changes in the MR or related documents</b>
The maintenance reports changed accordingly.
<b>CR 6 means of verification</b>
<p>A clarification was raised to the PP, about how the project has been implemented in accordance with the registered PDD. The PP has answered that the operation of the project during the monitoring period has been done in full compliance with the permits and licenses granted to the project.</p> <p>The DOE has verified that the project was implemented and operated in accordance with the descriptions in the registered PDD, by verifying the generation permit of Comisión Reguladora de Energía IRL 17 and 20 and the available capacity observed in the monitoring period. Hence, this issue is closed.</p>
<b>CR 6, changes in the MR or related documents</b>
The MR has been amended accordingly.
<b>FAR 1, means of verification</b>
<p>To corroborate that the plant is correctly operating is a requirement of the verification process to carry out the visit when the Plant is ongoing. This FAR was issued since during the on-site visit the audit team needed to stay several hours in the site because the Plant was operating only certain hours during the day. This is common practice because water for the hydroelectric is not available all hours a day, nevertheless with this FAR it is expected that for the next visit the PP is prepared to comply with this requirement.</p> <p>The PP responded that for the next visit the auditory will be arranged according to the Operating program of the plant.</p> <p>This is will be corroborated during the next verification</p>
<b>FAR 1, changes in the MR or related documents</b>
None
<b>FAR 2, means of verification</b>
<p>This FAR was issued because internal meter with S/N 001067302 is operating since the beginning of the project (01/04/2003) and is used to compare information from CFE and the same has never been calibrated. Even when the meter is for internal control it needs to comply with the specified accuracy.</p> <p>The PP answered that this meter is not used in the CERs calculation, nevertheless a calibration will be scheduled before the next verification.</p> <p>This is will be corroborated during the next verification</p>
<b>FAR 2, changes in the MR or related documents</b>
None



## 5 VERIFICATION STATEMENT

TÜV SÜD Industrie Service GmbH has performed the third periodic verification of the CDM project: "Trojes Hydropower Project". The verification is based on the currently valid documentation of the UN Framework Convention on Climate Change (UNFCCC).

The management of Hidroelectricidad del Pacífico S. de R.L. de C.V. and MYOCEN team supports Enel Mexico to collect the needed information to complete the monitoring report as well as the responsibility for the preparation of the GHG emissions data and the reported GHG emission reductions on the basis set out within the project's Monitoring Plan indicated in the registered PDD version 03, dated 19-04-2006 and the applied methodology AMS-I.D, Version 08.

The verifier can confirm that:

- the development and maintenance of records and reporting procedures are in accordance with the registered monitoring plan;
- the project is operated as planned and described in the validated and registered project design document;
- that the installed equipment being essential for generating emission reduction runs reliably and is calibrated appropriately; However, during 2007 and 2008 the calibration has been delayed, thus the PP has applied conservative approach discounting the maximum permissible error of the emission reductions.
- that the monitoring system is in place and generates GHG emission reductions data;
- that the GHG emission reductions are calculated without material misstatements;
- that the monitoring plan in Monitoring Report is as per the registered PDD;
- that the monitoring plan in registered PDD is as per the applied methodology.

Our opinion refers to the project's GHG emissions and resulting GHG emission reductions reported both determined due to the valid and registered project's baseline, its monitoring plan and its associated documents.

Based on the information we have seen and evaluated, we confirm the following statement:

Reporting period: From 01-10-2007 to 31-03-2009

Verified emissions in the above reporting period:

Emission reductions: 33 614 t CO<sub>2e</sub>  
Project emissions: 0 tCO<sub>2e</sub>  
Leakage emissions: 0 tCO<sub>2e</sub>  
Emission reductions: 33 614 t CO<sub>2e</sub>

Munich, 14.04.2011

A handwritten signature in blue ink, reading "Thomas Kleiser".

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Thomas Kleiser  
Certification body "climate and energy"  
TÜV SÜD Industrie Service GmbH

Munich, 14.04.2011

A handwritten signature in black ink, reading "Javier Castro".

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Javier Castro  
Assessment Team Leader



## **Annex 1:**

### **Verification Protocol**

# Verification Protocol

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## 1 Project Activity Implementation

### 1.1 Technology

PDD	Verified Situation	Conclusion
Location (s)		
<p>Description / Address:</p> <p>The Trojes project has an existing dam at the site. The power plant has a nominal capacity of 8 MW, using the existing pattern of irrigation flow releases to generate electricity.</p> <p>Plant characteristics:</p> <p>Power (MW) 8.0 Design head (m) 61.8 Design rate of flow (m<sup>3</sup>/s) 15.0 Project efficiency (%) 88.0 Transmission line (Km) 2.5</p> <p>Address:</p> <p>The project is located in the River Barreras in the Municipality of Pihuamo in the State of Jalisco, West Central Mexico,</p>	<p>During the on-site visit, it has been confirmed that the project site is in compliance with the description of the registered PDD. The description of the on-site situation can be confirmed by the grid connection agreement between CFE and Hidroelectricidad del Pacífico S.de R.L. de C.V.. Trojes hydropower project consist of 1 set of 8MW units, resulting in a total installed capacity of 8MW and nominal capacity of 8.3 MW,</p>	<input checked="" type="checkbox"/>
<p>GSP coordinates:</p> <p>18° 57'55" North Latitude 103° 23'48.0" West Longitude</p>	<p>There is any indication of the GPS coordinates in the PDD.</p> <p><b><u>Clarification Request No. 1.</u></b></p> <p>The GPS coordinates should be measured and submitted to the assessment team.</p>	CR

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PDD	Verified Situation	Conclusion
<b>Technical Equipment – Main Components</b>		
<p><i>Component 1: Turbine</i></p> <p>The plant consists of a horizontal turbine connected to a generator (please see characteristics at the right). The turbines and generators for the project were made by Alstom Power who signed an Engineering/Procurement/Construction (EPC) contract with the project sponsors.</p>	<p>The following features were revised on site: Manufacturer: ALSTOM Hydro-Barcelona Year: 2002 P= 10,5767W Q = 17.37 m<sup>3</sup>/s n= 400 rpm</p> <p><b><u>Corrective Action Request No.1.</u></b></p> <p>The list of equipment used in the project activity should be included in the monitoring report.</p>	CAR
<p><i>Component 2: Generator</i></p> <p>The generator is connected directly to the turbine (please see characteristics at the right). The turbines and generators for the project were made by Alstom Power who signed an Engineering/Procurement/Construction (EPC) contract with the project sponsors.</p>	<p>The following features were revised on site: Manufacturer: ALSTOM Year: 2002 No.: G0N019      cosφ 0.95 nominal P= 8,760 kVA V = 8,600 V I= 505 A f.= 60 Hz 3 phases v= 400 rpm</p>	<input checked="" type="checkbox"/>
<b>Operation Status during verification</b>		

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PDD	Verified Situation	Conclusion
<p>Approvals / Licenses</p> <p>Letter of Approval from DNA</p> <p>Grid-Connection agreement</p> <p>Power purchasing contract</p>	<p>During the on-site visit the Interconnection Contract between Hidroelectricidad del Pacífico S. de R.L. de C.V (project participant) and Electricity Federal Commission: CFE (unique electricity provider in Mexico) was provided to the DOE. In this contract the relevant conditions of energy provision are stated, the verifier revised the information and it is consistent with the rest of the documentation. (IRL #17 )</p> <p>The approval of project from DNA have been verified during validation. The grid-connection agreement and power purchasing contract have been verified during the on-site visit and it is called "Contrato de Interconexión"</p>	<input checked="" type="checkbox"/>
<p>Actual Operation Status</p> <p>N/A</p>	<p>Under construction <input type="checkbox"/></p> <p>In operation <input checked="" type="checkbox"/></p> <p>Out of operation <input type="checkbox"/></p> <p>Reason (when out of operation):N/A</p>	<input checked="" type="checkbox"/>
<p>Remarks to Special Operational Status</p> <p>During the Verification Period</p>	<p>During the verification period operation was normal, based on the amount of water permitted by CNA (Federal Water Commission). Nevertheless please see observation below.</p> <p><b><u>Forward Action Request No. 1</u></b></p> <p>As per Paragraph 62 b) of Annex of Decision 3/CMP1 (CDM M&amp;P); <a href="http://cdm.unfccc.int/Reference/COPMOP/08a01.pdf#page=6">http://cdm.unfccc.int/Reference/COPMOP/08a01.pdf#page=6</a> ); "Conduct on-site inspections, as appropriate, that may comprise, inter alia, a review of performance records, interviews with project participants and local stakeholders, collection of measurements, observation of established practices and testing of the accuracy of monitoring equipment"</p> <p>In order to perform a correct verification audit and comply with this requirement is necessary to visit the project installations when the activity is performed / ongoing. Please be aware of this requirement in order to coordinate the visit in a way that could</p>	<p>FAR</p>

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PDD	Verified Situation	Conclusion
	allow visiting the installations when they are running.	

### 1.2 Organization

PDD	Verified Situation	Conclusion
<b>Project Participant (s)</b>		
Entity / Responsible person: MYOCEN S. de R.L. de C.V. (Plant Supervisor, Operation and Maintenance Technician, and his Auxiliary)	<p>Currently, the project is operated by an external company; MYOCEN S.de R.L. de C.V. This information coincides in both documents, PDD and MR and was corroborated on-site.</p> <p><b><u>Corrective Action Request No.2.</u></b></p> <ol style="list-style-type: none"> <li>1. The Project participants as per PDD are <b>Hidroelectricidad del Pacífico S. de R.L. de C.V.</b> and <b>Impulsora Nacional de Electricidad S.R.L. de C.V.</b> In the MR only <b>Hidroelectricidad del Pacífico S. de R.L. de C.V.</b> is mentioned. Please correct and/or clarify as necessary.</li> <li>2. It is not clear, neither in the PDD nor in the MR, the responsible person (i.e. General Manager). Please include this information in the MR.</li> </ol>	CAR
CDM Project management: MYOCEN is in charge of Operation and Maintenance, personnel carries out the data collection on-site. CFE generates monthly resumes from the Generated Energy which is compared to the measures on site. ENEL is in charge of the elaboration of the Monitoring Report and CERs calcula-	<p>The organization chart was provided to the DOE and corroborated during the on-site visit (IRL #11 )</p> <p>10 Positions:</p> <p>1 Plant Supervisor (Superintendente)</p> <p>4 Operation and Maintenance Technician (Técnico de Operación y Mantenimiento)</p> <p>5 Auxiliaries of the Technician (auxiliar de Técnico de O&amp;M)</p>	<input checked="" type="checkbox"/>

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### 1.3 Quality Management System

PDD	Verified Situation	Conclusion
<p>Quality Management Manual:  “Net generation QC and QA are undertaken through double measurement: at Trojes power plant instruments, and CFE’s measurement devices and procedures. CFE is certified under ISO 9001”.</p>	<p>During the visit the following Manual with Internal Procedures issued by MYOCEN was provided to the DOE:</p> <ul style="list-style-type: none"> <li>- 8 MW unit operation HPATRCROCOP-01</li> </ul> <p>These documents describe the procedures to operate the hydroelectric plant, step by step (IRL #20).</p> <p><b><u>Corrective Action Request No.3.</u></b></p> <p>During the visit, another manual was shown which describes the procedures to collect the data from the relevant measurement instruments and the personnel who carry out the collection. Nevertheless the manual is not specific neither on the frequency of collection nor way of collection (digital, manual, etc). Please provide to the DOE this manual with corrections.</p>	CAR
<p>Responsibilities:  “Since the monitoring of emission reduction will be achieved through the measurement of net electricity generation, no special operational and management structure is needed apart from normal electricity generation O&amp;M structure”.</p>	<p>The above described manual, together with the Organization Chart were delivered to the DOE. The verifier revised the information and considered to be complete and consistent regarding the responsibilities.</p>	<input checked="" type="checkbox"/>

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Qualification and Training: Not defined in the PDD	During the visit, the PP provided training records and lists of participation of the O&M personnel in the plant. Two relevant trainings took place during the verified period: About the Operation and Maintenance of the plant (procedures and data collecting); and about the CDM project developed through the hydroelectric; also at the moment of the visit the personnel talked about the learned issues in each training.	<input checked="" type="checkbox"/>
Implementation of QM-system Not defined in the PDD	All the documentation is available on site, and is known by the personal on-site. The verifiers have confirmed the correctly application of the procedures.	<input checked="" type="checkbox"/>

### 1.4 Remaining FARs from previous Verifications

Remaining Requests from Previous Verifications	Audit team conclusion
<b>FAR 1 (As per DNV Final Verification Report)</b> The personnel involved in data management and reporting can improve the knowledge of the structure of the project in order to increase the control and assure the adequate systematic management of the entire project. The effectiveness of this course will be reviewed during the next verification.	<input checked="" type="checkbox"/> FAR 1 is considered to be closed  Relevant CDM meetings took place in the Plant, evidence such as certificates and assistance lists were provided at the moment of the visit (IRL #15). Furthermore, at the moment of the visit the personnel talked about the learned issues about CDM. A complete and correct exposition was provided to the verifier.
<b>FAR 2 (As per DNV Final Verification Report)</b> The project participant does not show the analysis of the result of the evaluations of the competence of the personnel, in order to improve the current training program according to the necessities of the operation of the plant. The method to analyze the results of the evaluations of the personnel and the improved training	<input checked="" type="checkbox"/> FAR 2 is considered to be closed  Relevant CDM meetings took place in the Plant, evidence such as certificates and assistance lists were provided at the moment of the visit (IRL #15). Furthermore, at the moment of the visit the personnel talked about the learned issues about CDM. A complete

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Remaining Requests from Previous Verifications	Audit team conclusion
program, as well as the effectiveness of both will be reviewed during the next verification.	and correct exposition was provided to the verifier. Also the annual training programs were submitted to the DOE.
<b>FAR 3 (As per DNV Final Verification Report)</b> The project Participant can improve the control over the generated formal procedures, Data Flow Charts and Information Control. The effectiveness of this course will be reviewed during the next verification.	<input checked="" type="checkbox"/> FAR 3 is considered to be closed  Relevant manuals, such as Internal procedures manual, together with a manual which describes the procedures to collect the data from the relevant measurement instruments and the personnel who carry out the collection, were delivered to the DOE. The verifier revised the information and considered to be complete and consistent regarding the responsibilities and information control.

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## 2 Data Management System

### 2.1 Description

Structure of raw data archiving				
Describe all the different data collection systems				
Type	Name	Responsible	Procedures	Comments
Electronic	Energy generated	Supervisor assistant	The energy generation is compiled electronically through the SCADA system. Information is used by the supervisor to generate the weekly, monthly and yearly resumes.  Internal registers are also used to collect data manually.  The use of both ways of registration supports the reliability of the data collected.	Frequency: hourly
Manual	Invoice	CFE	Personal from CFE downloads information from the meter.	Frequency: monthly

### 2.2 Raw Data Archiving and Protection measures

Name	Description of data archiving and protection measures	Risks and comments	Concl.
Software	The energy generation is compiled electronically through the	None	<input checked="" type="checkbox"/>

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	SCADA system. Information is used by the supervisor to generate the weekly, monthly and yearly resumes. These resumes are the relevant information to compare with that from CFE. The access to the resumes is conditioned to passwords, which are only known by the Supervisor of the Plant, the operational Manager and the National Manager, both from ENEL.		
Invoices	Personal from CFE downloads information from the main meter every month. CFE is not interested in over measure the generated electricity.	None	<input checked="" type="checkbox"/>

### 2.3 Data transfer

Description of data transfer from raw data archiving to calculation tool			
Name	Description and responsibilities	Risks and comments	Concl.
Emission Reduction Calculations	<p>The annual resumes and invoices are provided from the Plant to ENEL. With the monthly invoices, ENEL captures the energy generated per month and per year. The consolidated electricity generation from the main meter is the delivered one, (The energy reported in the invoice reflects a compensation of energy generated and energy consumed. The energy, which is metered by CFE is the actual energy generated, which will be invoiced. If energy is produced, which cannot be allocated at the moment, CFE will store this energy as surplus energy inventory.)</p> <p>The Emission Factor from the grid is fixed ex-ante; EF=0.531 tonCO<sub>2</sub>e/MWh.</p>	LOW (due to typing mistakes)	<input checked="" type="checkbox"/>

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### 2.4 Data Processing

Description of data processing from transferred data to final results in the calculation tool			
Step	Description	Risks and comments	Concl.
Consistency	<p><b><u>Clarification Request No. 2.</u></b></p> <p>The total amount of ER in the MR exceeds the yearly estimated in the PDD. Please clarify the issue.</p>	LOW (due to typing mistakes)	CR
Calculation Tool description	<p>The calculation tool consists in:</p> <ol style="list-style-type: none"> <li>1. The Energy Generated measured with the internal plant meter and measured with the CFE meter.</li> <li>2. The Project Emissions (energy consumed from the grid)</li> <li>3. The Emission Reduction calculation: the Energy generated measured with the CFE meter, minus the project emissions; multiplied by the Emission Factor from the grid.</li> </ol> <p><b><u>Clarification Request No. 3.</u></b></p> <p>According to validation report the emission factor of the grid is 0.531 tCO<sub>2</sub>e/MWh and has been calculated ex-ante. However, this was not addressed in the MR, thus please clarify and also include a brief explanation in the MR.</p>	None	CR
Transformation from transferred data to useable data	The useable data obtained on-site is the energy generated, and this information is transferred through SCADA system	None	<input checked="" type="checkbox"/>
Elimination of not plausible data	<p><b><u>Clarification Request No. 4.</u></b></p> <p>Please clarify to the DOE, in case of a trouble shooting, how it is ensured that the collected data is reliable? Which are the procedures in case a trouble shooting occurs?</p>		CR

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Transformation from useable data to input data for further calculation	The useable data is the input data used in the Emission Factor calculation as for the followed methodology. The energy generated (input data) is multiplied by the Emission Factor.	None	<input checked="" type="checkbox"/>
Ex-ante data	Please refer to <b>Clarification Request No. 3</b>		OPEN
Default parameter	Not applicable	NA	<input checked="" type="checkbox"/>
Formulae check	There is only one formula for emission reduction calculation, and it is correctly applied.	None	<input checked="" type="checkbox"/>
Rounding functions	<b><u>Corrective Action Request No.4.</u></b> The BE should be rounded down, while the PE should be rounded up. The final ER should be rounded down.	LOW (due to excel auto rounding function)	CAR
Calculation tool changes and protection measures	Not applicable	None	<input checked="" type="checkbox"/>

## 2.5 Work Instruction out of protocol Algorithms

Description of data processing from transferred data to final results in the calculation tool			
Step	Description	Risks and comments	Concl.
Methodology formulae	Emission reduction = Electricity supply * emission factor	None	<input checked="" type="checkbox"/>
Describe the use of each formula in the calculation tool	Emission factor = 0.531 tCO <sub>2</sub> /MWh After % discount: Electricity generated Oct-Dec 2007 = 11 478.10 MWh	LOW (due to typing mistakes)	CAR

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	<p>Electricity generated Jan-Dec 2008 = 40 815.03 MWh</p> <p>Electricity generated Jan-Mar 2009 = 11 145.64 MWh</p> <p>Electricity consumed form the grid Oct-Dec 2007 = 22.07 MWh</p> <p>Electricity consumed form the grid Jan-Dec 2008 = 91.71 MWh</p> <p>Electricity consumed form the grid Jan-Mar 2009 = 21.03 MWh</p> <p>(Electricity Generated – Electricity Consumption) * (EF)= ER</p> <p>Emission reduction Oct-Dec 2007 = 11 456.03 * 0.531 = 6 083.15 tCO<sub>2</sub>e</p> <p>Emission reduction Jan-Dec 2008 = 40 723.32 * 0.531 = 21 624.08 tCO<sub>2</sub>e</p> <p>Emission reduction Jan- Mar 2009 = 11 124.62 *0.531 = 5 907.17 tCO<sub>2</sub>e</p> <p>Total emission reduction = 33 614 tCO<sub>2</sub></p> <p><b><u>Corrective Action Request No.5.</u></b></p> <p>Observations in the calculation tool:</p> <p>In the provided calculations file, sheet “NET GEN AND EMIS-SIONS” cell D15 does not correspond to information in other sheets of the file. Please correct.</p>		
Report any additional calculation use to obtain values use in the formulae	Not applicable	NA	<input checked="" type="checkbox"/>

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### 3 Monitoring Plan Implementation

#### 3.1 List of Parameter to be monitored

ID-PDD	ID-Meth.	ID-Internal	Description	Conclusion
Instrumentation				
1	EG		Electricity Generated by the project delivered to grid	<a href="#">Go to table</a>
Sampling				
N/A	N/A	N/A	N/A	
Accounting				
			Invoice of electricity generation from Trojes hydroelectric	<a href="#">Go to table</a>
			Invoice of electricity consumption from Trojes hydroelectric	<a href="#">Go to table</a>
External Data				
N/A	N/A	N/A	N/A	
Others				
N/A	N/A	N/A	N/A	

#### 3.2 Monitoring Instrumentation

##### 3.2.1 Instrument 1

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PDD	Verified Situation	Conclusion
Instrumentation Information		
ID-PDD:	1	<input checked="" type="checkbox"/>

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ID-Internal:	1	<input checked="" type="checkbox"/>
Data to be Measured:	Net electricity generation	<input checked="" type="checkbox"/>
Data Logging:	NA	<input checked="" type="checkbox"/>
Archiving of Raw Data:	SCADA System	<input checked="" type="checkbox"/>
Measurement Principle:	Integration of V and A measurement	<input checked="" type="checkbox"/>
Period of Operating Time:	<p>From the beginning of the project until 05/11/2007 the principal meter was N/S AR-0012A368-02, and then it was replaced because the equipment presented a % error higher than manufacture's specifications. From that date on, the backup meter was placed as principal with S/N PR-0506A068-02. Complete documentation was presented supporting the meter change (IRL #16)</p> <p><b><u>Corrective Action Request No.6.</u></b> Please provide a brief explanation of this change in the MR, as the change has been made during the verification period.</p>	CAR
Instrument Type:	Electricity meter, one way	<input checked="" type="checkbox"/>
Serial Number:	PR-0506A068-02	<input checked="" type="checkbox"/>
Manufacturer Model Nr.:	ION-8400	<input checked="" type="checkbox"/>
Specific Location:	Trojes power plant (Specifically in the CFE substation)	<input checked="" type="checkbox"/>
Measurement Range:	Not applicable	<input checked="" type="checkbox"/>
Measurement Unit:	kWh	<input checked="" type="checkbox"/>
Calibration:	<p><b><u>Corrective Action Request No.7.</u></b> During the on-site visit, the calibration reports were delivered to the DOE; please refer to the following observations:</p> <ol style="list-style-type: none"> <li>Please submit to the DOE the calibration report to support the measurements from October 2007.</li> </ol>	CAR FAR

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	<p>2. On 05/11/2007 calibration took place; the following calibration took place on 05/12/2008. The time between calibrations is one month longer than manufacture's specifications. For the period which the calibration is not made, please deduct from the Energy Generated the Manufacturer's percentage of error (0.2%) and recalculate the ER.</p> <p><b><u>Forward Action Request No. 2</u></b></p> <p>Internal meter with S/N 001067302 is operating since the beginning of the project (01/04/2003) and is used to compare information from CFE. This meter has never been calibrated. The meter should be calibrated at least once every 3 years to achieve better certainty of the collected data.</p>	
Required Calibration Frequency:	Every year	<input checked="" type="checkbox"/>
Accuracy Level:	0.2%	<input checked="" type="checkbox"/>
<b>Monitoring &amp; Calculation</b>		
Reading Frequency:	Continuously	<input checked="" type="checkbox"/>
Recording Frequency:	Hourly	<input checked="" type="checkbox"/>
Trouble Shooting:	Please refer to <b>Clarification Request No. 4</b>	OPEN

PDD	Verified Situation	Conclusion
<b>Instrumentation Information</b>		
ID-PDD:	1	<input checked="" type="checkbox"/>
ID-Internal:	1	<input checked="" type="checkbox"/>
Data to be Measured:	Net electricity generation	<input checked="" type="checkbox"/>
Data Logging:	NA	<input checked="" type="checkbox"/>

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Archiving of Raw Data:	SCADA System	<input checked="" type="checkbox"/>
Measurement Principle:	Integration of V and A measurement	<input checked="" type="checkbox"/>
Period of Operating Time:	<p>From the beginning of the project until 05/11/2007 the principal meter was N/S AR-0012A368-02, and then it was replaced because the equipment presented a % error higher than manufacture's specifications. From that date on, the backup meter was placed as principal with S/N PR-0506A068-02.</p> <p>For the meter with S/N AR-0012A368-02: One calibration was made on 03/03/2006 and the next one on 05/11/2007 the time between calibrations is longer than 1 year, also the last calibration shows a 0.3525 % error which is bigger than the manufacture's specifications, thus during the months of October and November 2007, a percentage error of 0.5% was deducted from the energy generation to compensate the founded error of 0.3525% in the calibration report. Taking into account that the back-up meter (now principal) was correctly calibrated and presented an error lower than specifications, the deduction is considered to be conservative and acceptable.</p> <p>Besides of this, at the moment when the calibration was performed and the meters were changed the plant was not in operation.</p> <p>For the meter with S/N PR-0506A068-02 (placed first as back up and nowadays designed as main meter): One calibration was made on 05/11/2007 and the next one on 05/12/2008 the time between calibrations is longer than 1 year, thus the manufacturer's percentage of error (0.2%) was deducted from energy generation of November and December 2008 to compensate the calibration delay. A current calibration report shows that the maximum error of the meter is lower than the manufacturer's specification, thus the deducted energy is conservative. The metering equipment are calibrated and checked annually for accuracy.</p> <p>The calculation data from the excel spreadsheet (from the designated main meter) was corroborated by the audit team (IRL #8). Also calibrations are available for the DOE (IRL</p>	CAR

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	#16) Please refer to <b>Corrective Action Request No.6</b>	
Instrument Type:	Electricity meter, one way	<input checked="" type="checkbox"/>
Serial Number:	N/S AR-0012A368-02	<input checked="" type="checkbox"/>
Manufacturer Model Nr.:	ION-8400	<input checked="" type="checkbox"/>
Specific Location:	Trojes Power Plant, CFE's Substation, Presa Trojes	<input checked="" type="checkbox"/>
Measurement Range:	Not applicable	<input checked="" type="checkbox"/>
Measurement Unit:	kWh	<input checked="" type="checkbox"/>
Calibration:	Please refer to <b>Corrective Action Request No.7</b> and <b>Forward Action Request No. 2</b>	CAR FAR
Required Calibration Frequency:	Every year	<input checked="" type="checkbox"/>
Accuracy Level:	0.2%	<input checked="" type="checkbox"/>
<b>Monitoring &amp; Calculation</b>		
Reading Frequency:	Continuously	<input checked="" type="checkbox"/>
Recording Frequency:	Hourly	<input checked="" type="checkbox"/>
Trouble Shooting:	Please refer to <b>Clarification Request No. 4</b>	OPEN

<b>Inspection Results During Verification</b>			
Operation of Instrumen- tation	Method of Verification	Verification Results	Conclusion
Measuring Principle:	Volt and ampere measurement	The instrument is owned by CFE	<input checked="" type="checkbox"/>

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	and internal integration to obtain the electricity		
Installation:	Observation and comparison to Meter calibrations(IRL #16)	The instrument is properly installed	<input checked="" type="checkbox"/>
Functionality:	Cross-check	A cross check between the instrument and equipment was performed on site to confirmed the functionality	<input checked="" type="checkbox"/>
Quality assurance:	The calibration reports of the Plant.	Please refer to <b>Corrective Action Request No.7</b>	OPEN
Maintenance:	Internal maintenance reports and schedules (IRL #18)	<b><u>Clarification Request No. 5.</u></b> At the moment of the visit the maintenance schedule was not updated. Please submit to the DOE the Maintenance schedule for 2007, 2008 and 2009 with updates and relevant modifications.	CR

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### 3.3 Sampling Information

#### 3.3.1 Sampling Point i

There is no any sampling point in this project.

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### 3.4 Accounting information

#### 3.4.1 Accounting 1

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PDD	Verified Situation	Conclusion
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Accounting Information		
ID-PDD:	1	<input checked="" type="checkbox"/>
ID-Internal:	1	<input checked="" type="checkbox"/>
Description of Accounted Component:	Invoice of electricity generation from Trojes hydroelectric	<input checked="" type="checkbox"/>
Accounting Unit:	kWh	<input checked="" type="checkbox"/>
Quality Assurance Measures / System:	Not applicable	<input checked="" type="checkbox"/>
Account Archived:	All invoices are archived in the project file.	<input checked="" type="checkbox"/>
Account Credible / in Line with PDD:	CFE is not interested in overestimate the Energy Generation. Invoices were revised on-site (IRL #9)	<input checked="" type="checkbox"/>

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PDD	Verified Situation	Conclusion
Accounting Information		
ID-PDD:	N/A	<input checked="" type="checkbox"/>
ID-Internal:	N/A	<input checked="" type="checkbox"/>
Description of Accounted Component:	Invoice of electricity consumption from Trojes hydroelectric	<input checked="" type="checkbox"/>
Accounting Unit:	kWh	<input checked="" type="checkbox"/>
Quality Assurance Measures / System:	Not applicable	<input checked="" type="checkbox"/>
Account Archived:	All invoices are archived in the project file.	<input checked="" type="checkbox"/>

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Account Credible / in Line with PDD:	Invoices were revised on-site	<input checked="" type="checkbox"/>
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### 3.5 External Data

#### 3.5.1 External Data 1

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### 3.6 Others

There is no any other data in this project.

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## 4 Data Verification

### 4.1 Internal Review

It is not necessary since each month there is an invoice from CFE

### 4.2 Usage of default values

Not applicable

### 4.3 Reproducibility

Description and performance of the assessment			
	Description	Comments and Results	Concl.
Procedure	According to the monthly invoices from CFE	All invoices are available in the file of the project.	<input checked="" type="checkbox"/>

### 4.4 Peculiarities

Description of Peculiarities and unexpected Daily Events during the verification period			
	Description	Comments and Results	Concl.
Performance	No peculiarities were presented in the performance of the Plant.	None	<input checked="" type="checkbox"/>
Documentation	No peculiarities were presented in the documentation	None	<input checked="" type="checkbox"/>
Measures	Please refer to <b>Corrective Action Request No.7</b>		OPEN

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### 4.5 Reliability and Plausibility

Description of crosschecks and plausibility checks			
	Description	Comments and Results	Concl.
Performance	The total amount of energy generation must be less than the theoretical possible energy generation with the installed equipment at full load.	The total energy generated in the verification period is less than the maximum possible energy to be generated in this period. It was verified on site. Additionally a cross check has been realised between the amount shown in the equipment and the invoices.	<input checked="" type="checkbox"/>

### 4.6 Completeness and Correctness

Description of completeness and correctness			
	Description	Comments and Results	Concl.
Correctness	The data provided are correct.	All supports of information were verified during on site visit.	<input checked="" type="checkbox"/>
Completeness	The data provided are complete.	All supports of information were verified during on site visit.	<input checked="" type="checkbox"/>

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## 5 Additional requirements

Description of additional requirements to be checked			
	Description	Comments and Results	Concl.
e.g. environmental issues	Not applicable		<input checked="" type="checkbox"/>
e.g. market price of the product	Not applicable		<input checked="" type="checkbox"/>

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## 6 Data Reporting

Description of the Monitoring Report		
	Comments and Results	Concl.
Compliance with UNFCCC regulations	Monitoring Report fulfills with all regulations of UNFCCC, and it clearly identified the verification period.	<input checked="" type="checkbox"/>
Completeness and Transparency	All information given in the monitoring report is complete and transparent and has been verified during on site visit.	<input checked="" type="checkbox"/>
Correctness	See all corrective actions and forward action requests presented in this protocol.	<input checked="" type="checkbox"/>

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## 7 Compilation and Resolutions of CARs, CRs and FARs

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<p><b><u>Corrective Action Request No.1.</u></b></p> <p>The list of equipment used in the project activity should be included in the monitoring report.</p>	<p>The list of equipment is now included. Please see page 4, Table 2 Technical Equipment</p> <p><b><u>Further Request from the DOE:</u></b></p> <p>As per EB48, Annex 68 paragraph 10, technical information about the meters used for the ER calculation, should be mentioned in the section 5 (Data monitored) of the MR.</p> <p><b><u>Response from Project Participant:</u></b></p> <p>Included in page 5 of the MR v6</p>	<p><input checked="" type="checkbox"/></p> <p>Information is included in “Table 2: Technical Equipment” of the MR version 6.</p>
<p><b><u>Corrective Action Request No.2.</u></b></p> <ol style="list-style-type: none"> <li>1. The Project participants as per PDD are <b>Hidroelectricidad del Pacífico S. de R.L. de C.V.</b> and <b>Impulsora Nacional de Electricidad S.R.L. de C.V.</b> In the MR only <b>Hidroelectricidad del Pacífico S. de R.L. de C.V.</b> is mentioned. Please correct and/or clarify as necessary.</li> <li>2. It is not clear, neither in the PDD nor in the MR, the responsible person (i.e. General Manager). Please include this information in the MR.</li> </ol>	<ol style="list-style-type: none"> <li>1. Both Project Participants are included now. Please see section 3. Project Participants</li> <li>2. Please refer to page 6, section 5. Data monitored where it is explained who is in charge of the data collection. For more information, please see “ORGANIGRAMA C.H. TROJES.pdf”. There is also a reference included in the Project Participant section.</li> </ol>	<p><input checked="" type="checkbox"/></p> <ol style="list-style-type: none"> <li>1. PP list is complete in section 3 of the M.R.</li> <li>2. Data collecting responsibilities are clear in PDD and included in the M.R. in table 3.</li> <li>3. Document: “MOC Annex 2 0649 Trojes Hydroelectric Project.pdf”, has been submitted to the DOE and the information match with the stated in the M.R.</li> <li>4. Clarification for this issue is stated in page 3 of the M.R.</li> </ol>

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	<p><b><u>Further Request from the DOE:</u></b></p> <p>3. Revised Monitoring Report provides contact information on project participants that is not congruent with the information provided in the PDD. Clarify if the contact details have changed as stated in the registered PDD and, if so provide evidence of the required communication to the EB that has to be done in these cases.</p> <p>4. The project title submitted in the MR is not congruent with the registered PDD even that is congruent with the information available in the UNFCCC webpage, this should be clarified in the final MR.</p> <p><b><u>Response from Project Participant:</u></b></p> <p>3. The contact detail information provided in the MR is consistent with the information of the new MOC valid since October 1, 2009. For more information, please refer to <a href="http://cdm.unfccc.int/Projects/DB/DNV-CUK1158843806.46/view">http://cdm.unfccc.int/Projects/DB/DNV-CUK1158843806.46/view</a>, where the new MOC has been published.</p> <p>Attached you can find the “MOC Annex 2 0649 Trojes Hydroelectric Project.pdf” which is the original document that was submitted for updating this information.</p> <p>4. The project title in the MR is congruent with</p>	

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	the information available in the UNFCCC and the previous monitoring reports. A clarification has been included in the MR.	
<b><u>Corrective Action Request No.3.</u></b> During the visit, another manual was shown which describes the procedures to collect the data from the relevant measurement instruments and the personnel who carry out the collection. Nevertheless the manual is not specific neither on the frequency of collection nor way of collection (digital, manual, etc). Please provide to the DOE this manual with corrections.	Please see the "Instructivo de Registro de Información Operativa de la C.Trojes v1.pdf"	<input checked="" type="checkbox"/> The manual was delivered to the DOE addressing the frequency of collection, personal in charge and way of collection in each stage.
<b><u>Corrective Action Request No.4.</u></b> The BE should be rounded down, while the PE should be rounded up. The final ER should be rounded down.	The calculations were done considering 2 decimal fractions to have a more accurate result and the final ER calculation is rounded down.	<input checked="" type="checkbox"/> Tables showed in the MR address decimals, nevertheless final ER in page 7 is expressed in complete number, rounding down the final result.
<b><u>Corrective Action Request No.5.</u></b> Observations in the calculation tool: In the provided calculations file, sheet "NET GEN AND EMISSIONS" cell D15 does not correspond to information in other sheets of the file. Please correct.	Corrected	<input checked="" type="checkbox"/> All the requested corrections were addressed leading to a clear and correct Emission Reduction calculation.
<b><u>Corrective Action Request No.6.</u></b> Please provide a brief explanation of this change in the MR, as the change has been	Description of the change is now included, please refer to MR page 4.	<input checked="" type="checkbox"/> The MR reflects changes made regarding the meters during the verified period.

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Corrective Action Requests by audit team	Summary of project owner response	Audit team conclusion
made during the verification period.		
<p><b><u>Corrective Action Request No.7.</u></b></p> <p>During the on-site visit, the calibration reports were delivered to the DOE; please refer to the following observations:</p> <ol style="list-style-type: none"> <li>1. Please submit to the DOE the calibration report to support the measurements from October 2007.</li> <li>2. On 05/11/2007 calibration took place; the following calibration took place on 05/12/2008. The time between calibrations is one month longer than manufacturer's specifications.</li> <li>3. For the period which the calibration is not made, a conservative approach has been adopted from the PP deducting (0.2%) which is the <b>maximum permissible error</b> gathered from the last calibration performed on 05/12/2008. This approach is adopted in relation to the manufacturer's specification when the calibration result showed either (a) no deviation or error, or (b) the deviation or error showed was smaller than the maximum permissible error for that instrument. This approach is consistent with the rules set out at paragraph 4(a) of the Guidelines for Assessing Com-</li> </ol>	<ol style="list-style-type: none"> <li>1. Report is attached, please see "IN-FORME CALIB TROJES01112007 1.pdf" and "INFORME CALIB TROJES 11112007 2.pdf"</li> <li>2. The energy generation of the project is measured by the main meter, which is CFE's property. CFE is the only entity responsible for calibrating the equipment and also responsible for the calibration periods. During the monitoring period, the energy was recognized by a third party (CFE) without any question about the accuracy of the measurements. CFE has no interest in recognizing more energy that the generated by Trojes.  Moreover, according to the INDICATIVE SIMPLIFIED BASELINE AND MONITORING METHODOLOGIES FOR SELECTED SMALL-SCALE CDM PROJECT ACTIVITY CATEGORIES (Version 12), the meter was calibrated according to the recommendation of the EB.</li> </ol> <p><b><u>Further request from DOE:</u></b></p> <ol style="list-style-type: none"> <li>1. Ok. Report submitted.</li> </ol>	<p><input checked="" type="checkbox"/></p> <p>For the meter with S/N PR-0506A068-02 (now a day's principal): manufacturer's percentage of error (0.2%) was deducted from energy generation of November and December 2008 to compensate the calibration delay. A current calibration report shows that the maximum error of the meter is lower than the manufacturer's specification, thus the deducted energy is conservative.</p> <p>For the meter with S/N AR-0012A368-02 (former principal): during the months of October and November 2007, a percentage error of 0.5% was deducted from the energy generation to compensate the founded error of 0.3525% in the calibration report. Taking into account that the back-up meter (now principal) was correctly calibrated and presented an error lower than specifications, the deduction is considered to be conservative and acceptable.</p>

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pliance with the Calibration Frequency Requirements 6 (the “ <b>Calibration Guidelines</b> ”), adopted at the 52nd meeting of the CDM Executive Board	<p>2. For the meter with S/N PR-0506A068-02: the mentioned guideline could only be used in case the PDD is not specific. Since the PDD specifies that “<i>Net generation QC and QA are undertaken through double measurement: at Trojes power plant instruments, and CFE’s measurement devices and procedures.</i>” then CFE’s standards should be followed. According to the contract with CFE the calibrations should be made every year. For the period which the calibration was not made (05/11/2008 to 05/12/2008), please deduct from the Energy Generated the Manufacturer’s percentage of error (0.2%) and recalculate the ER.</p> <p>For the meter with S/N AR-0012A368-02 and CFE ID 5F3C23: One calibration was made on 03/03/2006 and the next one on 05/11/2007 the time between calibrations is longer than 1 year, also the last calibration shows a 0.3525 % error which is bigger than the manufacture’s specifications, thus a 0.5% error could be deducted to address conservativeness for the period from 01/10/2007 to 05/11/2007.</p>	

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	<p><b><u>Response from Project Participant:</u></b></p> <p>Deductions are already considered in the MR v3 and the calculation sheet attached.</p>	
<p><b><u>Corrective Action Request No.8.</u></b></p> <p>According to technical specifications of the generators the installed capacity is higher than the 8MW stated in the PDD, clarify how the project has been implemented in accordance with the registered PDD as this has to be explained by PP and DOE and communicated to the EB as per the procedures approved in EB48 meeting.</p>	<p>The net power generation of Trojes is actually 8MW as stated in the PDD.</p> <p>Even when the capacity of the turbines and the generators may indicate a slightly bigger capacity, (0.3MW above the capacity mentioned in the PDD) this capacity is affected by several external factors as the efficiency, the real water flow and the losses in the rest of the equipment.</p> <p>The project was registered as a 8MW hydro-power project because that is the limit (net power) that the project can deliver to the national grid, according to the permits and licenses under which the project operates.</p>	<p><input checked="" type="checkbox"/></p> <p>Although the assessment team could notify a slightly difference in the installed capacity (8 MW versus 8.3 MW), it is important to note that the amount of CERs calculated during the monitoring period is not affected, because the CERs are calculated according to the approved baseline and monitoring methodology AMS-I.D version 08, using the amount of electricity supplied by the project to the national grid, and measured by Comisión Federal de Electricidad.</p> <p>The operation of the project during the monitoring period has been done in full compliance with the permits and licenses granted to the project. The DOE has verified that the project was implemented and operated in accordance with the descriptions in the registered PDD, by verifying the generation permit of Comisión Reguladora de Energía and the available capacity observed in the monitoring period.</p> <p>Therefore, it can be concluded that, independently of when the energy is paid, the ER achieved by the project activity were properly considered and the audit team assessment considers the requirements as fulfilled accord-</p>

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		ing to VVM 01.2, § 189.
<p><b><u>Corrective Action Request No.9.</u></b> Taking a conservative approach please clarify to the DOE why emission reductions are being calculated through CFE-generation metering instead of the data from the invoices.</p>	<p>As a renewable energy project will only generate energy when the resource is available, CFE has given the opportunity to these energy sources to store the energy that is not allocated at the moment that is being produced and demanded by the consumer partners.</p> <p>CFE meters the energy delivered to the grid through the fiscal or main meters, owned by CFE. When the energy produced by the project can't be allocated at the moment that is produced, CFE will store this energy as a Bank of energy or surplus energy inventory.</p> <p>The Interconnection Agreement with CFE considers the allocation of surplus energy stored during a given month, when the invoice process is taking place to compensate the energy demand of the consumer partners.</p> <p>So, the Energy reported and metered by CFE is the actual Energy generated by the project that is delivered to the grid, displacing energy from fossil fuels.</p> <p>Sometimes, the energy generated may exceed the demand of the consumer partners, and this surplus energy will be stored by CFE in the surplus energy inventory.</p>	<p>☑</p> <p>Explanation included in section 2, page 4 of the M.R.</p> <p>Table 9 "Electricity Generation" corrected.</p>

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	<p>When the project is not able to generate enough energy to cover the demand of the consumer partners, the energy stored in the inventory will be used to compensate this demand.</p> <p>The energy reported in the invoices reflects this compensation of energy generated and energy consumed. The project was registered as a 8MW hydro-power project because that is the limit (net power) that the project can deliver to the national grid, according to the permits and licenses under which the project operates.</p> <p><b><u>Further request from DOE:</u></b> Table 9 of the emission reductions the title from Electricity Generation (tCO<sub>2</sub>e) and the unit should be MWh.</p> <p><b><u>Response from Project Participant:</u></b> Corrected</p>	
Clarification Requests	Summary of project owner response	Audit team conclusion
<p><b><u>Clarification Request No. 1.</u></b> The GPS coordinates should be measured and submitted to the assessment team.</p>	<p>Corrected. GPS coordinates are now included, please check Section 2, page 3.</p>	<p><input checked="" type="checkbox"/> The GPS coordinates are included in the MR. The verifier corroborate this information with Google Earth.</p>

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### **Clarification Request No. 2.**

The total amount of ER in the MR exceeds the yearly estimated in the PDD. Please clarify the issue.

The available water for electricity generation is determined by the CNA (National Water Commission) according to the annual irrigation program. Normally, from July to December, the water extraction program for irrigation is zero; therefore the available water for the plant depends directly on the rainy season. For this monitoring period, the rainy season was regular, allowing HPA to request to the CNA water exceeding volumes during some specific months. The CERs estimation was made considering conservative volumes of available water in the dam, so during the crediting period of the project may be variations due to the regularity of the rainy season and the CNA irrigation program, that HPA cannot control nor forecast in a completely accurate manner. For more information, please refer to the document "RESUMEN DE OPERACIÓN DE LA C H TROJES 01 10 2007 A 31 03 2009.pdf"

There is also an explanation in the PDD, section A.4.3.1. Estimated amount of emission reductions over the chosen crediting period, where it says that: *In each crediting period, the amount of ERs generated by the project will vary directly with the metered net generation output from Trojes.*



The MR presents an overestimation of CERs for year 2008 compared to the PDD. Nevertheless this overestimation is not considerable (slightly over 5% more than estimation in the PDD). The mentioned document assess the energy generation based on the amount of received water from the dam.

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<p><b><u>Clarification Request No. 3.</u></b></p> <p>According to the validation report the emission factor of the grid is 0.531 tCO<sub>2</sub>e/MWh and has been calculated ex-ante. However, this was not addressed in the MR, thus please clarify and also include a brief explanation in the MR.</p>	<p>The OM used in the PDD was calculated using the Ex ante option: A 3-year generation-weighted average. According to the "Tool to calculate the emission factor for an electricity system", if the OM is calculated using the simple OM approach, the emission factor will be fixed ex ante, valid during the crediting period. Clarification is included, please refer to page 7, section 6 Emission Reductions.</p>	<p><input checked="" type="checkbox"/></p> <p>The emission factor is fixed ex-ante for the crediting period; the DOE verified the applied value is consistent with the public information from SENER (Energy National Ministry). MR includes relevant comments regarding the Emission Factor.</p>
<p><b><u>Clarification Request No. 4.</u></b></p> <p>Please clarify to the DOE, in case of a trouble shooting, how it is ensured that the collected data is reliable? Which are the procedures in case a trouble shooting occurs?</p>	<p>In order to solve a trouble shooting, the plant has main and backup systems. In case the main system fails, the backup system will replace it. The information is automatically collected from the equipment at the plant through the SCADA system.</p>	<p><input checked="" type="checkbox"/></p> <p>The SCADA system is a safe system in which a backup is being generated at the time the data is being generated. Thus the data generated in the Plant is considered to be reliable.</p>
<p><b><u>Clarification Request No. 5.</u></b></p> <p>At the moment of the visit the maintenance schedule was not updated. Please submit to the DOE the Maintenance schedule for 2007, 2008 and 2009 with updates and relevant modifications.</p>	<p>Documents attached</p>	<p><input checked="" type="checkbox"/></p> <p>Relevant maintenance documents were delivered to the DOE addressing the programmed and realized actions for every year.</p>

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Date of Completion: April 14<sup>th</sup>, 2011

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<p><b><u>Clarification Request No. 6.</u></b></p> <p>Taking into account the request for review of the second periodic verification, regarding the in-installed capacity, please clarify how the project has been implemented in accordance with the registered PDD</p>	<p>There is no request for review during the first periodic verification.</p> <p>During the second periodic verification, a request of review was raised related to the calibration periods and how the DOE verified the conservativeness of the emission reduction claimed in this monitoring period, and also on how DOE verified the requirement of at least three years of the measurement equipment calibration frequency. The evidence was provided and the CERs were issued.</p>	<p><input checked="" type="checkbox"/></p> <p>Request for Review of previous periods were addressed and CERs issued.</p> <p>The operation of the project during the monitoring period has been done in full compliance with the permits and licenses granted to the project. The DOE has verified that the project was implemented and operated in accordance with the descriptions in the registered PDD, by verifying the generation permit of Comisión Reguladora de Energía IRL 17 and 20 and the available capacity observed in the monitoring period.</p> <p>The clarification can be considered closed by the audit team.</p>
Forward Action Request	Summary of project owner response	Audit team conclusion
<p><b><u>Forward Action Request No. 1</u></b></p> <p>As per Paragraph 62 b) of Annex of Decision 3/CMP1 (CDM M&amp;P); <a href="http://cdm.unfccc.int/Reference/COPMOP/08a01.pdf#page=6">http://cdm.unfccc.int/Reference/COPMOP/08a01.pdf#page=6</a> ); "Conduct on-site inspections, as appropriate, that may comprise, inter alia, a review of performance records, interviews with project participants and local stakeholders, collection of measurements, observation of established practices and testing of the accuracy of monitoring equipment"</p> <p>In order to perform a correct verification audit</p>	<p>For the next verification, the visit will be scheduled according to the operating program of the plant.</p>	<p><b>Open</b></p> <p>An appropriate condition of the Plant should be assured before the on-site visit of the next verification</p>

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Date of Completion: April 14<sup>th</sup>, 2011

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Corrective Action Requests by audit team	Summary of project owner response	Audit team conclusion
and comply with this requirement is necessary to visit the project installations when the activity is performed / ongoing. Please be aware of this requirement in order to coordinate the visit in a way that could allow visiting the installations when they are running.		
<b><u>Forward Action Request No. 2</u></b> Internal meter with S/N 001067302 is operating since the beginning of the project (01/04/2003) and is used to compare information from CFE. This meter has never been calibrated. The meter should be calibrated at least once every 3 years to achieve better certainty of the collected data.	The sole meter recognized to quantify the energy generated by the project is the main meter (CFE's meter) and this is calibrated approximately every year.  We will discuss internally the calibration of the internal meter and organize it for the next verification.	<b>Open</b> The calibration for this meter will be revised during the next verification.




## **Annex 2:**


### **Information Reference List**

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Ref. No.	Issuance and/or submission date	Title/Type of Document	Author/Editor/Issuer	Additional Information (Relevance in CDM Context)
1	29/04/2009	3 <sup>rd</sup> Monitoring Report "Trojes Hydropower Project" version 1	Hidroelectricidad del Pacífico S. de R.L. de C.V.	For GSP
2	20/01/2011	3 <sup>rd</sup> Monitoring Report "Trojes Hydropower Project" version 7 <sup>th</sup> .	Hidroelectricidad del Pacífico S. de R.L. de C.V.	Final MR
3	13/09/2006	Validation Report "Trojes Hydroelectric Project in Mexico" revision 3	DNV	
4	19/04/2006	PDD "Trojes Hydroelectric Project" version 3	Hidroelectricidad del Pacífico S. de R.L. de C.V.	Registered PDD
5	03/03/2006	Methodology AMS-I.D: Grid connected renewable electricity generation, version 08	UNFCCC	
6	03/06/2009	Participant list of on-site interviews	TÜV SÜD	
7	03-04/06/2009	<p>On-site interviews conducted by TÜV SÜD.</p> <p>Validation Team:  Arturo Lemus      TÜV SÜD America de Mexico  Guadalupe Avendaño      TÜV SÜD America de Mexico</p> <p>Interviewed Persons:  Javier A. Ramírez Vargas      Operation and Maintenance, MYOCEN  Adolfo Macías Vargas      Operation and Maintenance, MYOCEN  José Antonio Mendoza      Trojes Supervisor, MYOCEN  Casiopea Ramírez      Business Developer, ENEL  Marco A. Hernández L.      Commercial and operation Engineer, ENEL</p>	TÜV SÜD	

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Ref. No.	Issuance and/or submission date	Title/Type of Document	Author/Editor/ Issuer	Additional Information (Relevance in CDM Context)
8	20/01/2011	CER Spread sheet "3rd_Monitoring Report_Trojes_27abr09v5.xls"	Hidroelectricidad del Pacífico S. de R.L. de C.V.	Baseline and project emissions, Emissions Reduction and Emission factor calculations.
9	Oct 2007-March 2009	Energy Generation invoices and resumes	CFE (Electricity National Commission)	Monthly invoices are compared to energy generation.
10	2007-2009	"RESUMEN DE OPERACIÓN DE LA C H TROJES 01 10 2007 A 31 03 2009"	MYOCEN	Generation resume based on the amount of water permitted by CNA
11	20/07/2009	"ORGANIGRAMA C H TROJES.pdf"	Hidroelectricidad del Pacífico S. de R.L. de C.V.	Organization chart
12	13/07/2009	"Instructivo de Registro de Información Operativa de la C. Trojes.pdf"	Hidroelectricidad del Pacífico S. de R.L. de C.V.	Data collection manual
13	July 2005	Technical specifications form the Electricity Meter ION-8400	Power measurement	Maximum percentage of error (0.2%)
14	29/11/2005	Technical specifications from the Turbine and generator	ALSTOM	Installed capacity evidence
15	2007-2009	Training programs and certificates	Hidroelectricidad del Pacífico S. de R.L. de C.V.	Annual Training programs and records of relevant trainings
16	2006-2008	Calibration reports Meter S/N AR-0012A368-02 Calibration reports Meter S/N PR-0506A068-02	CFE	Calibration reports show meters % of error.
17	-	"Contrato de interconexión"	Signed between Hidroelectricidad del Pacífico S. de R.L. de C.V. and	Contract between the PP and CFE, specifies clauses of connection to the grid.

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Ref. No.	Issuance and/or submission date	Title/Type of Document	Author/Editor/Issuer	Additional Information (Relevance in CDM Context)
			CFE	
18	2007-2009	"Annual Maintenance"	Hidroelectricidad del Pacífico S. de R.L. de C.V.	Maintenance programs for every year.
19	2009	<a href="http://www.tech-faq.com/scada.shtml">http://www.tech-faq.com/scada.shtml</a>	Tech-FAQ	SCADA System specifications
20	2009	- 8 MW unit operation HPATRCROCOP-01	MYOCEN	Internal procedures
19	01/10/2009	F-CM-MOC Form: ANNEX 2	UNFCCC	Document submitted to the UNFCCC in order to update the contact details information.
20	06/08/2010	Official minute of electricity contract between Hidroelectricidad del Pacífico S. de R.L. de C.V. and CFE	CFE	Official minute which specifies clauses of connection to the grid.
21	08/01/2007	Verification Report "Trojes Hydroelectric Project in Mexico", Monitoring Period: 01 April 2003 – 30 November 2006	DNV	
22	13/05/2008 06/08/2008	Verification Report "Trojes Hydropower Project in Mexico", Monitoring Period: 01 December 2006 – 30 September 2007, Version 01 After RfR Verification Report "Trojes Hydropower Project in Mexico", Monitoring Period: 01 December 2006 – 30 September 2007, Version 02	DNV	
23	January 2011	Embalse Presa CHTrojes – report with the historic data of the reservoir	Hidroelectricidad del Pacífico S. de R.L. de C.V.	



## **Annex 3**

### **Appointment Certificates**



Industrie Service

# CERTIFICATE OF APPOINTMENT

Mr Castro, Javier, fulfills the requirements of the Certification Body "climate and energy" of TÜV SÜD Industrie Service GmbH to participate in audits.

Qualification applicable to						
Standard	CDM	JI	GS	VCS	VER	Other
Date	22.03.11					

Qualification as						
Status	Trainee	Validator	Verifier	Team Leader	Technical Reviewer	Technical Expert
Date		22.03.11	22.03.11	22.03.11	22.03.11	

Other qualification					
Country Expertise					
Region	1	2	3	4	5
Date	22.03.11	22.03.11			
Financial Expertise					
Date	22.03.11				

Qualification in technical areas	
Technical Area	Date
1.2_Energy generation from renewable energy source	22.03.11
5.1_4.9_11.1_12.1_Chemical process industries	22.03.11
13.1_Waste handling and disposal	22.03.11
13.2_15.2_Animal waste management	22.03.11

This appointment is valid for 1 year from its date of signature below and is bound by internal requirements of the Management System of the Certification Body "climate and energy" of TÜV SÜD Industrie Service GmbH.

In case of loss of validity of this certificate as per result of an assessment according internal procedures or due to any other reason, it will be properly communicated to you.

Your Certificate has the internal reference No. CMS-Z-0003/00.

Date	Signature
22.03.11	<i>Thomas Klein</i>



Industrie Service

# CERTIFICATE OF APPOINTMENT

Mr Maharjan, Bhai Raja, fulfills the requirements of the Certification Body "climate and energy" of TÜV SÜD Industrie Service GmbH to participate in audits.

Qualification applicable to						
Standard	CDM	JI	GS	VCS	VER	Other
Date	23.03.11					

Qualification as						
Status	Trainee	Validator	Verifier	Team Leader	Technical Reviewer	Technical Expert
Date		23.03.11	23.03.11	23.03.11		

Other qualification					
Country Expertise					
Region	1	2	3	4	5
Date	23.03.11				
Financial Expertise					
Date					

Qualification in technical areas	
Technical Area	Date
1.2_Energy generation from renewable energy source	23.03.11
2.1_Electricity distribution	23.03.11

This appointment is valid for 1 year from its date of signature below and is bound by internal requirements of the Management System of the Certification Body "climate and energy" of TÜV SÜD Industrie Service GmbH.

In case of loss of validity of this certificate as per result of an assessment according internal procedures or due to any other reason, it will be properly communicated to you.

Your Certificate has the internal reference No. CMS-Z-0008/00.

Date	Signature
23.03.11	<i>Thomas Kleve</i>



Industrie Service

# CERTIFICATE OF APPOINTMENT

Ms Hartmann, Katrin, fulfills the requirements of the Certification Body "climate and energy" of TÜV SÜD Industrie Service GmbH to participate in audits.

Qualification applicable to						
Standard	CDM	JI	GS	VCS	VER	Other
Date	23.03.11					

Qualification as						
Status	Trainee	Validator	Verifier	Team Leader	Technical Reviewer	Technical Expert
Date		23.03.11	23.03.11	23.03.11		

Other qualification					
Country Expertise					
Region	1	2	3	4	5
Date	23.03.11				
Financial Expertise					
Date	23.03.11				

Qualification in technical areas	
Technical Area	Date
1.2_Energy generation from renewable energy source	07.04.11

This appointment is valid for 1 year from its date of signature below and is bound by internal requirements of the Management System of the Certification Body "climate and energy" of TÜV SÜD Industrie Service GmbH.

In case of loss of validity of this certificate as per result of an assessment according internal procedures or due to any other reason, it will be properly communicated to you.

Your Certificate has the internal reference No. CMS-Z-0013/00.

Date	Signature
07.04.11	



Industrie Service

# CERTIFICATE OF APPOINTMENT

Ms Wu, Cathy, fulfills the requirements of the Certification Body "climate and energy" of TÜV SÜD Industrie Service GmbH to participate in audits.

Qualification applicable to						
Standard	CDM	JI	GS	VCS	VER	Other
Date	23.03.11					

Qualification as						
Status	Trainee	Validator	Verifier	Team Leader	Technical Reviewer	Technical Expert
Date		23.03.11	23.03.11	23.03.11	23.03.11	

Other qualification					
Country Expertise					
Region	1	2	3	4	5
Date	23.03.11				23.03.11
Financial Expertise					
Date	23.03.11				

Qualification in technical areas	
Technical Area	Date
1.2_Energy generation from renewable energy source	23.03.11
2.2_Heat distribution	23.03.11
3.1_Energy demand	23.03.11
13.1_Waste handling and disposal	23.03.11

This appointment is valid for 1 year from its date of signature below and is bound by internal requirements of the Management System of the Certification Body "climate and energy" of TÜV SÜD Industrie Service GmbH.

In case of loss of validity of this certificate as per result of an assessment according internal procedures or due to any other reason, it will be properly communicated to you.

Your Certificate has the internal reference No. CMS-Z-0016/00.

Date	Signature
23.03.11	<i>Thomas Klein</i>



Industrie Service

# CERTIFICATE OF APPOINTMENT

Mr Kleiser, Thomas, fulfills the requirements of the Certification Body "climate and energy" of TÜV SÜD Industrie Service GmbH to participate in audits.

Qualification applicable to						
Standard	CDM	JI	GS	VCS	VER	Other
Date	25.03.11					

Qualification as						
Status	Trainee	Validator	Verifier	Team Leader	Technical Reviewer	Technical Expert
Date		25.03.11	25.03.11	25.03.11	25.03.11	

Other qualification					
Country Expertise					
Region	1	2	3	4	5
Date	25.03.11				
Financial Expertise					
Date	25.03.11				

Qualification in technical areas	
Technical Area	Date
1.1_4.10_Thermal energy generation...	25.03.11
1.2_Energy generation from renewable energy source	25.03.11
4.1_Cement sector	25.03.11

This appointment is valid for 1 year from its date of signature below and is bound by internal requirements of the Management System of the Certification Body "climate and energy" of TÜV SÜD Industrie Service GmbH.

In case of loss of validity of this certificate as per result of an assessment according internal procedures or due to any other reason, it will be properly communicated to you.

Your Certificate has the internal reference No. CMS-Z-0027/00.

Date	Signature
25.03.11	