

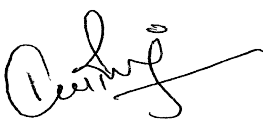


**Validation report form for post-registration changes for
CDM project activities
(Version 02.0)**

Complete this form in accordance with the instructions attached at the end of this form.

BASIC INFORMATION

Title and UNFCCC reference number of the project activity	Cucuna Hydroelectric Power Plant UNFCCC ref. #: 9830
Process track	<input type="checkbox"/> Prior approval <input checked="" type="checkbox"/> Issuance <input type="checkbox"/> Renewal of crediting period
Version number of the validation report on PRCs	01.0
Completion date of the validation report on PRCs	10/04/2019
Type(s) of PRCs	<input checked="" type="checkbox"/> Temporary deviations from the registered monitoring plan, applied methodologies or applied standardized baselines <input type="checkbox"/> Corrections <input type="checkbox"/> Changes to the start date of the crediting period <input type="checkbox"/> Inclusion of a monitoring plan <input checked="" type="checkbox"/> Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other applied standards or tools <input type="checkbox"/> Changes to the project design <input type="checkbox"/> Changes specific to afforestation and reforestation project activities
Version number of PDD to which this report applies	Version 5
Project participants	Empresa de Energía del Pacífico S.A. E.S.P.
Host Party	Colombia
Applied methodologies and standardized baselines	ACM0002 version 13 - Consolidated methodology for grid-connected electricity generation from renewable sources
Mandatory sectoral scopes linked to the applied methodology	Sectoral Scope 1 – Energy Industries (Renewable / Non-renewable Sources)
Conditional sectoral scopes linked to the applied methodologies	N/A
Name and UNFCCC reference number of the DOE	Earthood Services Private Limited (ESPL) (ref E- 0066)

<p>Name, position and signature of the approver of the validation report on PRCs</p>	 <p>Dr. Kaviraj Singh Managing Director</p>
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SECTION A. Executive summary

Brief summary of the project activity

The project activity consists in generating renewable energy through the construction of a small hydro power plant (SHP) with installed capacity of 58.16 MW. The SHP project also comprehends a small reservoir of approx. 0.3 ha (3,138 m²).

The project activity reduces the GHG emissions through dispatching GHG-free electricity to the Colombian National Interconnected System.

The SHP is located in the Cucuana River, Cucuana River basin, in the department of Tolima, municipalities of Roncesvalles, Colombia.

The operation start date of the SHP is on 14/06/2015^{/12/}.

Scope of validation

Empresa de Energía del Pacífico S.A. E.S.P and South Pole Carbon Asset Management S.A.S. have contracted Earthood Services Private Limited to conduct the verification and certification of emission reductions reported for the CDM project activity "Cucuana Hydroelectric Power Plant" for the period from 01/11/2014 to 31/12/2017 (including both days). Moreover, the DOE will be conducting the validation of this post registration change.

The verification is the periodic independent review and ex post determination of the monitored reductions in GHG emissions that have occurred due to the registered CDM project activity during the defined monitoring period.

The validation of the Post registration changes is the independent review of the deviations from the project monitoring plan that have occurred due to the registered CDM project activity during the defined monitoring period.

The scope of the validation is to establish/verify that:

- the temporary deviation proposed and the permanent change of the monitoring plan for the project activity are in accordance with applied version of the CDM Project Standard for PA, CDM Validation and Verification Standard for PA, applied methodology and tools;

Validation process

The validation of this Post Registration Change is part of the verification process of this Project Activity. For the details on this process, please refer to the Verification Report to which this report is attached. This Post registration change will be requested in the issuance track, as it does not involve prior approval by the board.

Conclusion

Earthood Services Private Limited has performed the validation of the correction of project information and change of start date of crediting period of the CDM PA "Cucuana Hydroelectric Power Plant".

The validation team has confirmed that this deviation request complies with all eligibility criteria for the Post registration Changes in the registered CDM PA and that:

- As the project start its operation after the start date of monitoring period, a temporary deviation with conservative approach was proposed.
- The change of monitoring plan mains uniquely to clarify that calculation of the $EF_{EL,y}$ will be based on the information available at the moment of the verification using the options provided by the applied "Tool to calculate emission factor for an electricity system"

The validation team concluded that the proposed deviations comply with all relevant CDM procedures/standards/guidance.

SECTION B. Validation team, technical reviewer and approver

This process is part of the verification process of this PA. For details, please refer to the section B of the Verification Report to which this report is attached.

SECTION C. Means of validation**C.1. Desk/document review**

A desk review was conducted by the validation team that included:

- a. a review of the data and information presented to verify its completeness;
- b. a review of installed equipment of all SHPs;
- c. A review of all applicable Standards, Guidelines and Procedures related to CDM PA.

A complete list of documents/evidences reviewed is included as Appendix 3.

C.2. On-site inspection

This process is part of the verification process of this PA. For details, please refer to the section D.2 of the Verification Report to which this report is attached.

C.3. Interviews

This process is part of the verification process of this PA. For details, please refer to the section D.3 of the Verification Report to which this report is attached

C.4. Sampling approach

Not applicable as no sampling has been used during the validation

C.5. Clarification requests (CLs), corrective action requests (CARs) and forward action requests (FARs) raised

Areas of validation findings	No. of CL	No. of CAR	No. of FAR
Compliance with PDD form			
Temporary deviations from the registered monitoring plan, applied methodologies or applied standardized baselines		1	
Corrections			
Changes to the start date of the crediting period			
Inclusion of a monitoring plan			
Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other applied standards or tools		1	
Changes to the project design			
Changes specific to afforestation and reforestation project activities			
Others (please specify)			
Total	-	2	-

SECTION D. Validation findings**D.1. Compliance with PDD form**

The revised PDD has applied the latest available CDM-PDD-Form version 10.1. All information were correctly transferred from registered PDD to this revised new version. Only information updated due to these proposed corrections have been changed. Moreover, the revised PDD was completed in accordance with instructions for completing the PDD form version 10.1.

D.2. Temporary deviations from the registered monitoring plan, applied methodologies or applied standardized baselines

Means of validation	<p>Description: A temporary deviation is being requested for the parameter "<i>EG_{facility,y}: Quantity of Net Electricity generation supplied by the project plant to the grid in year y</i>" from the start of monitoring period, 01/11/2014, until 13/06/2015 which is day before the operation start date. During this period the monitoring could not be carried out as per monitoring plan (SHP did not operate).</p> <p>Accuracy: The parameter $EG_{facility,y}$ is used to determine the baseline emissions of SHP. The proposed temporary deviation is considered accurate by the validation team as no operation has been registered during the informed period. The registration of measurements by the System operator (XM) was from 14/06/2015. Regarding Project Emissions and Leakage, as they were not foreseen in the PDD, they will be considered also equal to zero.</p> <p>Conservativeness: The measure proposed is conservative considers the ERs equal to zero to this period which measurements were not carried out as per monitoring plan. No operation of SHP has been observed</p> <p>Prior Approval This change does not require prior approval as per para 231) <i>" If the project participants are temporarily unable to monitor the registered CDM project activity in accordance with the monitoring plan in the registered PDD</i> b) <i>Apply the following most conservative values approach when alternative monitoring arrangements are not proposed. This does not require approval by the Board:</i> i) <i>Apply zero for baseline GHG emissions for the entire non-conforming monitoring period; and/or</i></p> <p>And Appendix of the CDM Project Standard for PA version 02.0 paragraph 1 b). <i>Temporary deviations from the registered monitoring plan for which alternative monitoring arrangements are proposed, if the proposed alternative monitoring arrangements produce a conservative estimate of greenhouse gas (GHG) emission reductions or net anthropogenic GHG removals</i></p> <p>The condition above is fulfilled as the parameter $EG_{facility,y}$ is determined conservatively the value of ERs was considered equal to zero during the proposed deviation.</p>
Findings	CAR 1

	<i>The parameter $EG_{Facility}$, was not monitored as per monitoring plan from start date of CP (01/11/2014)</i>
Conclusion	<p>A temporary deviation has been requested during this monitoring period as the monitoring was not carried out as per MP during the period informed above.</p> <p>Conservatively, the ERs are equalled to zero. Thus the determination of parameter $EG_{Facility,y}$ proposed in this alternative measurement is conservative.</p> <p>The temporary deviations from the registered monitoring plan were assessed in accordance with applicable validation requirements related to the temporary deviations from the registered monitoring plan in the VVS. Thus, it is concluded that this change falls under the Paragraph 1) b) of the Appendix of the Project Standard version 02.0 and can be requested under issuance track (without prior approval)</p>

D.3. Corrections

Not applicable to this Validation

D.4. Changes to the start date of the crediting period

Not applicable to this Validation

D.5. Inclusion of a monitoring plan

Not applicable to this Validation

D.6. Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other applied standards or tools

Means of verification	<p>Description</p> <p>During verification period, it was observed that the CO₂ emission factor of each power unit in year y (parameter $EF_{EL,y}$) was calculated using option A1 of the Tool to calculate the emission factor for an electricity system.. However it was stated in the PDD that the option A2 has been used during the validation phase and it is not clear in the PDD is the use of another option is allowed. This change aims clarify in the PDD that the parameter will be calculated as per applied tool.</p>
Findings	<p>CAR 9</p> <p>MR</p> <p><i>Section E.1: at the MR it is said that the selected option from the "Tool to calculate the emission factor for an electricity system" for calculating the emission factor of each plant is Option A1 of the tool. Nevertheless, the PDD states that the selected option is A2</i></p>
Conclusion	<p>During the validation phase of the PA, the PPs applied the option A2 of the tool to calculate the emission factor for an electricity system for calculating the parameter $EF_{EL,y}$ (CO₂ emission factor of each power unit in year y) as the information available by the informed source (Associated Services Management and XM Compañía de Expertos en Mercados S.A. E.S.P) was the heat rate (MBTU/MWh) of each power plant, which is the inverse of net energy conversion efficiency ($\eta_{m,y}$) in energy basis. However, the sources does not publish anymore this data, but the fuel consumption in energy basis (MBTU) and the installed capacity of each plant (MWh). Thus, the PP is requesting a Permanent Change of Monitoring Plan in order to clarify in the PDD that the PP will use the information that is available at the moment of the verification, applying either options A1, A2 or A3. It is important to point out that the options A2 and A3 are currently mentioned in the registered PDD section B.6.1, thus, it is assumed that both are allowed. Moreover, it is very important to state that the information available now is used to calculate the same Heat Rate - fuel consumption</p>

in MBTU per plant and installed capacity in MWh. But, as per definition, with this information, the option A1 of the tool is applied.

Conservativeness

No change in the conservativeness is observed due to this change as it will use data from the same source, but it will allow the PP to calculate the same parameter with data available at the moment of the verification, considering that the companies responsible for the data publication may change the way they present the public data. Prior, the heat rate was published (MBTU/MWh) and now the fuel consumption in energy basis (MBTU) and the installed capacity (MWh) are published separately.

Accuracy:

This clarification does not influence the accuracy of the calculation. In the validation phase, the data provided was energy consumed per installed capacity (MBTU/MWh). Now, the source provides the amount of fuel consumption in energy basis (MBTU) and the installed capacity (MWh) separately. Thus, the PP performs the calculation on its own. The reason for this request is to clarify that the calculation will be carried out in accordance with applied tool with information publicly available and not exactly as it was carried out in the validation phase.

Completeness

No impact in the completeness of the monitoring plan as the source of information will remain the same. Only the way of calculating the parameter $EF_{EL,y}$ will change based on the information available by the sources.

The compliance of the monitoring plan with the applied methodologies, and tools.

The monitoring plan will remain in accordance with applied methodology and tool. It will be only clarified that the calculations will use information available at the moment of the verification either using option A1, A2 or A3 of the "Tool to calculate the emission factor for an electricity system." It is important to point out that the monitoring plan currently allows the application of options A2 and A3. The difference will be that the option A1 will also be allowed.

The information regarding the change in the monitoring plan was duly corrected in a revised PDD as a PRC has been requested during this verification process. Moreover, the change does not adversely impact the application of methodology, additionality and scale of project activity.

Prior approval

The change of monitoring plan was assessed in accordance with applicable validation requirements related to the permanent changes of the registered monitoring plan in the VVS.

Thus, it is concluded that this change falls under the Paragraph 1) c) of the Appendix of the Project Standard version 02.0 and can be requested under issuance track (without prior approval), which says that:

Changes to the monitoring of a registered CDM project activity that have no material impact on the applicability of the applied methodologies or the other applied methodological regulatory documents, or the accuracy and completeness of the monitoring"

No material impact is observed due to this clarification

Clean and tracking changes revised PDD were provided to the validation team.

D.7. Changes to the project design

Not applicable to this Validation

D.8. Changes specific to afforestation and reforestation project activities

Not applicable to this Validation

SECTION E. Internal quality control

The assessment of Post Registration Changes that is prepared by validation team is reviewed by an independent technical review team (one or more members) to confirm if the internal procedures established and implemented by ESPL were duly complied with and such opinion/conclusion is reached in an objective manner that complies with the applicable CDM rules/requirements.

The technical review team is collectively required to possess the technical expertise of all the technical area/sectoral scope to which the project activity is related. All members of technical review team are independent of the verification team.

During the technical review process, additional findings may be identified or the closed out findings may be opened, which needs to be satisfactorily resolved before the request for issuance is submitted to UNFCCC. The independent technical reviewer may either approve the report as such or reject/return the same in such case providing the comments/findings/issues that needs to be resolved by the verification team. The decision taken by the technical reviewer is final and is authorized on behalf of ESPL

SECTION F. Validation opinion

The following changes were requested during this verification process.

- Temporary deviation of the monitoring plan as the operation start date of the PA was after the start of monitoring period.
- Permanent change of the monitoring plan to clarify that the calculation of the parameter $EF_{EL,y}$ (CO₂ emission factor of each power unit in year y) will be based on the information available at the moment of the verification using the options provided by the applied "Tool to calculate emission factor for an electricity system"

The first change does not require prior approval by the board as it falls under Appendix of the Project Standard version 02.0 paragraph 1b) as it corresponds to temporary deviation with conservative assumption to the ER calculations.

The second change requested does not require prior approval by the board as it falls under Appendix of the Project Standard version 02.0 paragraph 1c) as it has no material impact on the applicability of the applied methodologies or the other applied methodological regulatory documents, or the accuracy and completeness of the monitoring;

Appendix 1. Abbreviations

Please refer to Appendix 1 of the Final Verification Report to which this report is attached

Appendix 2. Competence of team members and technical reviewers

Competence Statement			
Name	Marcelo Sebben		
Country	Brazil		
Education	M.Sc. (Sustainable Energy System) B. Eng. (Chemical Engineering)		
Experience	12.5 Years		
Field	Chemical process industry, CDM, Energy, Climate Change		
Approved Roles			
Team Leader	Yes		
Validator	Yes		
Verifier	Yes		
Methodology Expert	Yes (ACM0001, ACM0002, ACM0006, AM0065, AMS ID)		
Local expert	Brazil, Chile, Honduras		
Financial Expert	No		
Technical Reviewer	Yes		
TA Expert	Yes (TA 1.1, 1.2, 5.1, 13.1)		
Reviewed by	Abhishek Mahawar	Date	01/03/2018
Approved by	Ashok Kumar Gautam	Date	01/03/2018

Competence Statement			
Name	Ricardo Lopes		
Country	Brazil		
Education	Technical Diploma in Data Processing		
Experience	12 years		
Field	CDM, Energy, Environment		
Approved Roles			
Team Leader	Yes		
Validator	Yes		
Verifier	Yes		
Methodology Expert	Yes (ACM0001, ACM0002, AM0026, AMS ID, AMS IIH)		
Local expert	Brazil, Argentina, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Honduras, Mexico, Nicaragua, Uruguay		
Financial Expert	NO		
Technical Reviewer	Yes		
TA Expert	Yes (1.2, 13.1)		
Reviewed by	Abhishek Mahawar	Date	22/02/2018
Approved by	Ashok Kumar Gautam	Date	22/02/2018

Competence Statement			
Name	Shreya Garg		
Country	India		
Education	M.Sc. (Climate Science & Policy), TERI University		
Experience	6 Years +		
Field	Climate Change		
Approved Roles			
Team Leader	Yes		
Validator	Yes		
Verifier	Yes		
Methodology Expert	AMS.I.A, AMS.I.C, AMS.I.D, AMS.I.F, AMS.II.D, AMS.II.G, AMS.II.J, AMS.III.AV, ACM0002, ACM0012		
Local expert	India		
Financial Expert	No		
Technical Reviewer	Yes		
TA Expert	1.2, 3.1		
Reviewed by	Abhishek Mahawar	Date	01/03/2018
Approved by	Ashok Gautam	Date	01/03/2018

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1.	UNFCCC	Standard: CDM PS for PA	version 02.0	Others
2.	UNFCCC	Standard: CDM PCP for PA	version 02.0	Others
3.	UNFCCC	Standard: CDM VVS for PA	version 02.0	Others
4.	UNFCCC	Form: CDM-MR-FORM	version 6.0	Others
5.	PP	Monitoring Report (draft)	version 1 – 31/10/2018	PP
6.	PP	Monitoring Report (revised/final)	version 2: 09/01/2019 Version 3: 02/04/2019 (final)	PP
7.	PP	ER Spreadsheet (draft)	31/10/2018	PP
8.	PP	ER Spreadsheet (final)	10/04/2019	PP
9.	PP	Registered PDD	version 4 – 02/12/2013	Others
10.	UNFCCC	Methodology: ACM0002 Consolidated baseline methodology for grid-connected electricity generation from renewable sources	version 13	Others
11.	UNFCCC	Tool to calculate the emission factor for an electricity system	version 03.0.0	Others
12.	XM – Operational Start date	1. XM support_Power Generation of the SIN_(kWh)_2015.xls. This spreadsheet is provided by the official electricity authority and informs all dates which the plants have dispatched. The start date of Cucuana plant is 14/06/2015		PP

13.	Reservoir Area	Cucuana: AutoCad topographical study with current reservoir area		PP
14.	AENOR	Validation Report issued by AENOR, report # 2013/120/CDM/19	Version 2, dated on 17/12/2013	Others
15.	CREG - (Commission of Gas and Energy Regulation)	Resolucion CREG 038 from 2014 (Art. 28) which regulates the frequency of calibration (2 years calibration frequency for type 1 Meter)		Others
16.	Electricity meter	Reports of electricity generated by the project activity for all period		PP
17.	XM	XM reports – Official source of electric data used for cross-check electricity measurements		PP
18.	EPSA	<u>Calibration Certificates:</u> <u>Electricity Meter:</u> 1. Main: Serial # MJ-1308A302-03, Schneider Electric, model ION7650 <ul style="list-style-type: none"> ○ Certificate # C-482-14 issued by EPSA calibrated on 20/11/2014 ○ Certificate # 020066/16 issued by CAM GyM calibrated on 20/08/2016 2. Backup: Serial # MJ-1308A303-03, Schneider Electric, model ION7650 <ul style="list-style-type: none"> ○ Certificate # C-482-14 issued by EPSA calibrated on 20/11/2014 ○ Certificate # 020070/16 issued by CAM GyM calibrated on 20/08/2016 		PP
19.	CORTOLIMA	Environmental License – No. 2411 from 19/12/2008 issued by CORTOLIMA (Autonomous Regional Corporation of Tolima)	Valid for all project lifetime	PP
20.	PP	<u>Installed capacity evidences</u> 1. Generators total installed capacity – equipment plaques		
21.	ANDRITZ	<u>Manuals:</u> Operation and Maintenance Manual of Power Plant Cucuana, Doc. No. 891124334 rev. 0	Issued on 14/05/2013	PP
22.	Pictures – DOE	1. Pictures of plaques of Generators and Turbines of SHP Cucuana 2. Pictures of Electricity meters of SE Mirolindo		PP
23.	PP	<u>Trainings and Duties of Personnel:</u> Operator: Wilson Cuellar		PP
24.	-	DNA of Colombia (Ministry of Environment and Sustainable Development)	http://www.minambiente.gov.co/	Other
25.	XM	Electric Market Operation in Colombia	www.xm.com.co/	

26.	CREG	CREG – Commission of Gas and Energy Regulation	www.creg.gov.co	Other
27.	IPCC	IPCC publications	www.ipcc-nggip.iges.or.jp	Other
28.	UNFCCC	UNFCCC	http://cdm.unfccc.int	Other
29.	PP	Revised PDD	Version 5: 02/04/2019	

Appendix 4. Clarification requests, corrective action requests and forward action requests

Table 1. CLs from this validation

Not applied

Table 2. CARs from this validation (the numbering of the findings is in accordance with verification report to which this report is attached).

CAR ID	01	Section no.		Date : 04/11/2018
Description of CAR				
The parameter $EG_{Facility}$, was not monitored as per monitoring plan from start date of CP (01/11/2014)				
Project participant response				Date : 20/12/2018
The parameter $EG_{facility}$ was monitored from the operational starting date of the project (14/06/2015). Since there was no generation before, this parameter was not monitored and would be zero from 01/11/2014 to 13/06/2015. There is no risk of project emissions or leakage, thus the monitoring of this parameters previously to operation is not relevant.				
Documentation provided by project participant				
Monitoring report_Cucuana_V02				
DOE assessment				Date: 14/01/2019
It is agreed that there this parameter cannot be monitored prior to the operation start date of the PA. Thus, BE are equal to zero between 01/11/2014 to 13/06/2015. Moreover, as no project emissions are predicted in this PA, they are considered equal to zero for the whole monitoring period.				
CAR is closed				

CAR ID	09	Section no.	E.4.5, E.6.2	Date : 04/12/2018
Description of CAR				
MR				
Section E.1: at the MR it is said that the selected option from the “Tool to calculate the emission factor for an electricity system” for calculating the emission factor of each plant is Option A1 of the tool. Nevertheless, the PDD states that the selected option is A2;				
Project participant response				Date : 29/03/2019
PDD and MR have been updated. The possibility of using option A1, A2 and A3 was included according to the availability of data.				
Documentation provided by project participant				
<ul style="list-style-type: none">- 190402_Monitoring report_Alto Tuluá_V03.docx- 190402_PDD_Alto Tuluá v4.0.docx				
DOE assessment				Date: 08/04/2019
Information has been duly included in the MR and in the revised PDD. A permanent change of monitoring plan has been requested to allow the calculation of $EF_{EL.m,y}$ using either option A.1, A.2 or A.3 of the applied version of the “Tool for calculating the emission factor for an electricity system”, depending on the information publicly available. For further details, refer to Assessment on post registration changes attached to this report.				
CAR is closed				

Table 3. FARs from this validation
Not applied

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Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
02.0	31 October 2017	Revision to align with the requirements in the “CDM validation and verification standard for project activities” (version 01.0).
01.0	23 March 2015	Initial publication.
Decision Class: Regulatory		
Document Type: Form		
Business Function: Registration		
Keywords: post-registration change, project activities, validation report		