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VERIFICATION/CERTIFICATION REPORT



Final

“82 MW Lau Renun hydro power plant, North Sumatra”
in
Indonesia

Monitoring period: 01/04/2009 to 31/03/2010

Report N° 2009-IQ-141-ME

Revision N° 1.2



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Project Title: 82 MW Lau Renun Hydro Power Plant, North Sumatra	Country: Indonesia	Estimated VERs (tCO₂e): 229,048 annual average
CDM Registration Reference N° (if any)	Monitoring period: 01/04/2009 to 31/03/2010	Certified VERs (tCO₂e): 197,295
Client: South Pole Carbon Asset Management Limited	Client contact: Mrs. Ikke Martha Prasetyaning	
Report No.: 2009-IQ-141-ME	Revision: 1.2	Date of this report: 07/06/2011
Approved by (Final Report – DCI Director approval):  Roberto Cavanna		Date of approval: 13/06/2011

Methodology

Number: ACM0002	Version: 10 of 28/05/2009	Title: Consolidated baseline methodology for grid-connected electricity generation from renewable sources	Scale 01	SS(s): Large
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RINA Services S.p.A. (RINA), commissioned by South Pole Carbon Asset Management Limited, has verified the greenhouse gas emission reductions reported for the project activity “82 MW Lau Renun Hydro Power Plant, North Sumatra” in Indonesia, for the period 01/04/2009 to 31/03/2010, with regard to the relevant requirements for CDM and VCS activities. The verification shall ensure that reported emission reductions are complete and accurate in accordance with applicable VCS/CDM requirements in order to be certified.

The project was validated by RINA SpA (validation report N° 2009-IQ-ME-142 issued on 16/11/2009) and it was registered on 24/08/2010. The GHG emission reductions were calculated on the basis of the approved methodology ACM0002, version 10, and consolidated baseline methodology for grid-connected electricity generation from renewable sources of 28/05/2009 and the monitoring plan included in the registered Project Description, version 3.1 of 17/01/2011. In conclusion, it is RINA's opinion that the project activity “82 MW Lau Renun Hydro Power Plant, North Sumatra”, in “Indonesia”, as described in the Monitoring Report version 2 of 16/03/2011, meets all relevant requirements for VCS/CDM activities and all relevant host Party criteria and correctly applies the baseline and monitoring methodology “ACM0002”, “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”, version 10 of 28/05/2009. Hence RINA is able to certify that the emission reductions from the project during the monitoring period 01/04/2009 to 31/12/2009 amount to 148,966tCO₂e and during the monitoring period 01/01/2010 to 31/03/2010 amount to 48,329tCO₂e summing to a total amount of 197,295tCO₂e.

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Work verified by (Final Report – CRT person responsible approval)

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Keywords:

Climate Change, Kyoto Protocol, Voluntary Carbon Standard, Verification



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Abbreviations

BE	Baseline Emissions
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDM M&P	Modalities and Procedures CDM
CER(s)	Certified Emission Reduction(s)
CH ₄	Methane
CL	Clarification Request
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
CRT	Coordination and Technical Control Staff
DCI	Certification Division of RINA Services Spa
DNA	Designated National Authority
DOE	Designated Operational Entity
EB	Executive Board
ER	Emission Reductions
FAR	Forward Action Request
GHG(s)	Greenhouse gas(es)
GWP	Global Warming Potential
HEPP	Hydro Electric Power Plant
IPCC	Intergovernmental Panel on Climate Change
MoV	Means of Verification
MR	Monitoring Report
NGO	Non-governmental Organization
ODA	Official Development Assistance
PE	Project Emission
PLTA	Pembangkit Listrik Tenaga Air
PP(s)	Project Participant(s)
Ref.	Document Reference
RINA	RINA Services Spa
SOP	Standard Operational Procedure
SS(s)	Sectoral Scope(s)
T and D	Transmission and Distribution
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Voluntary Carbon Standard
VCS PD	Voluntary Carbon Standard - Project Description
VVM	Validation and Verification Manual



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1 INTRODUCTION

South Pole Carbon Asset Management Limited has commissioned RINA to carry out the verification and certification of emission reductions reported for the registered “82 MW Lau Renun Hydro Power Plant, North Sumatra” project in Indonesia, for the period 01/04/2009 to 31/03/2010.

This report summarizes the findings of the verification of the project, performed on the basis of UNFCCC criteria for CDM and VCS, as well as criteria given to provide for consistent project operations, monitoring and reporting.

1.1 Objective

The objective of the verification is to have an independent review ex post determination by a Designated Operational Entity (DOE) of the monitored reductions in GHG emissions that have occurred as a result of the registered VCS project activity during a defined monitoring period. Certification is the written assurance by the DOE that, during a specific time period, a proposed VCS project activity achieved the reductions in anthropogenic emissions by sources of GHGs as verified.

The objective of this verification/certification was to verify and certify emission reductions, reported for the “82 MW Lau Renun Hydro Power Plant, North Sumatra” project in Indonesia for the period 01/04/2009 to 31/03/2010.

1.2 Scope

The verification scope is:

- to verify that actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan;
- to evaluate the GHG emission reduction data and express a conclusion with a reasonable level of assurance about whether the reported GHG emission reduction data is free from material misstatement;
- To verify that reported GHG emission data is sufficiently supported by evidence.

Verification shall ensure that reported emission reductions are complete and accurate in accordance with applicable UNFCCC criteria for CDM and VCS in order to be certified.

UNFCCC criteria for CDM refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures and the subsequent decisions by the CDM Executive Board.

The VCS criteria refer to VCS 2007.1 Standard and VCS Programme Guidelines.

Verification is not meant to provide any consultancy towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the monitoring.

2 METHODOLOGY

Verification was conducted using RINA procedures in line with the requirements specified in the VCS Requirements, CDM M&P, the latest version of the CDM Validation and Verification Manual, and relevant decisions of the COP/MOP and the CDM EB and applying standard auditing techniques.

The verification consisted of the following three phases:

- Desk review;
- On-site assessment;
- The resolution of outstanding issues and the issuance of the final verification report and certification.

The following sections outline each step in more detail.



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2.1 Desk Review

The monitoring report version 1 of 30/04/2010, the revised monitoring report version 2 of 16/03/2011 **/02/**, the emission reduction calculations provided in the form of a spreadsheet titled "Renun ER Calculation (DVR 2nd response)" submitted on 21/03/2011 **/07/**, were assessed as part of the verification. In addition, the registered Project Description (VCS PD) **/01/** in particular the baseline estimations and the monitoring plan, the validation report dated 16/11/2009 **/08/** for the project were reviewed.

The following table lists the documentation that was reviewed during the verification.

/01/	South Pole Carbon Asset Management Ltd.: VCS-PD for project activity "82 MW Lau Renun Hydro Power Plant, North Sumatra" in Indonesia, version 3.1 of 17/01/2011 and version 3 dated 06/11/2009.
/02/	South Pole Carbon Asset Management Ltd.: Monitoring report for project activity "82 MW Lau Renun Hydro Power Plant, North Sumatra" in Indonesia, version 2 of 16/03/2011 and previous version 1 of 30/04/2010 related to the monitoring period 01/04/2009 to 31/03/2010.
/03/	Voluntary Carbon Standard 2007.1 of 18/11/2008: Specification for the project-level quantification, monitoring and reporting as well as validation and verification of greenhouse gas emission reductions or removals.
/04/	Voluntary Carbon Standard Program Guidelines 2007.1 of 18/11/2008
/05/	CDM Executive Board: Validation and Verification Manual, version 01.2 of 30/07/2010
/06/	CDM Executive Board: Baseline and monitoring methodology "ACM0002", "Consolidated baseline methodology for grid-connected electricity generation from renewable sources", version 10 of 28/05/2009
/07/	South Pole Carbon Asset Management Ltd.: Emission reduction calculation sheet titled "Renun ER Calculation (DVR 2nd response)" submitted on 21/03/2011
/08/	RINA SpA: Validation report no. 2009 IQ ME 142 for the project "82 MW Lau Renun Hydro Power Plant, North Sumatra" dated 16/11/2009
/09/	CDM Executive Board: "Tool to calculate project or leakage CO ₂ emissions from fossil fuel consumption", version 02 dated 02/08/2008
/10/	Department of Energy, Indonesia: Copy of commissioning certificate dated 14/08/2006
/11/	Sector Pandan office, Lau Renun HEPP, PT PLN (PERSERO): Copy of monthly electricity transfer protocol report from 01/04/2009 to 31/03/2010.
/12/	Laboratorium Kalibrasi: A copy of calibration certificates dated 22/04/2010 for the meters with meter no. 36027216, 4674483, 36027222, 4674482, 36027194, 4674485.
/13/	PT.PLN : Copies of Standard Operation Procedures dated 17/09/2007 for calibration, monitoring, metering and emergency preparedness.
/14/	MINISTRY OF ENERGY AND MINERAL RESOURCES, Indonesian Government: Copy of regulation for calibration of meters (document no. 37 YEAR 2008) dated 27/11/ 2008
/15/	TUV Rheinland: ISO 14001:2004 certificate for sector office, Pandan dated 19/12/2008, ISO 9001 : 2008 certificate for sector office, Pandan dated 23/02/2010.
/16/	Lau Renun HEPP : Copies of the training certificates received for the employees for taking part in the training conducted by the PP.
/17/	South Pole Carbon Asset Management Ltd.: Deviation proposal for the project submitted on 05/01/2011.
/18/	Sidikalang and Berastagi substation: Monthly meter reading for the month April 2009 to March 2010



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/19/	South Pole Carbon Asset Management Ltd.: Excel sheet consisting of a comparison of net export as mentioned in the monthly electricity protocol of Renun HEPP and monthly meter reading maintained at Sidikalang and Berastagi substaion submitted on 04/01/2011
/20/	Renun HEPP: Diesel oil purchase receipts provided by different suppliers for the month June 2009 to September 2009 and February 2010.
/21/	VCS project database : web link that routes to the page in which this project is registered https://vcsprojectdatabase1.apx.com/mymodule/ProjectDoc/EditProjectDoc.asp?id1=488 in English language last retrieved on 12/04/2011.
/22/	PT PLN: Internal audit result for the audit conducted on 15/05/2010
/23/	PT.PLN: Minutes of management review meeting conducted on 03/08/2010
/24/	Calibration certificates for the main meters with serial numbers 36027216, 36027222, 36027194 dated 28/07/2005
/25/	DNA, Indonesia: Emission factor calculation sheet for the Sumatra grid for the year 2008, prepared in the month of December 2008.
/26/	IPCC: IPCC guidelines for National Greenhouse Gas Inventories: Workbook volume 2 chapter 1 Table 1.2 published in the year 2006.
/27/	PT.Pertamina (Persero): A report for the month June 2007 that provides the density of diesel
/28/	PT PLN: Monthly Sumatra Grid Evaluation Operation Report "Evaluasi Operasi Sistem Tenaga Listrik Sumatra" for the month starting from October 2009 to March 2010
/29/	Renun HEPP: Daily log sheets from 01/04/2009 to 31/03/2010
/30/	CDM Executive Board: "Tool to calculate emission factor for an electricity system", version 01.1, dated 29/07/2008.

2.2 On-site assessment

On 21/05/2010 and 22/05/2010, RINA visited the project site located in north western part of Lake Toba in North Sumatra province which is about 100 km from south of Medan city, Indonesia. During the on-site assessment of the project, RINA assessed the implementation and operation of the proposed project activity, reviewed the information flows for generating, aggregating and reporting the monitoring parameters, interviewed key personnel of the plant to confirm the operational and data collection procedures, cross-checked between information provided in the monitoring report and data plant, checked the monitoring equipment including calibration performance, reviewed calculations and assumptions made in determining the GHG data and emission reductions, checked the quality control and quality assurance procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters.

The key personnel interviewed and the main topics of the interviews are summarized in the table below.

	Date	Name and Role	Organization	Topic
/a/	21/05/2010 and 22/05/2010	Sudin Nadapdap, Plant Manager	PLTA, Renun	Project description, management review and internal audit
/b/	21/05/2010 and 22/05/2010	Mr. Mansahtua Purba, Operational Supervisor	PLTA, Renun	Data monitoring, recording, archiving of data, maintenance of machines.
/c/	21/05/2010 and 22/05/2010	Mr. Yan Elpha KHT, Operational Engineering Assistant	Sector Pandan	Data monitoring, recording, archiving of data, maintenance of machines.
/d/	21/05/2010 and 22/05/2010	Mr. Roniko Silalahi, Maintenance	PLTA Renun	Data monitoring, recording, archiving of data,



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		Supervisor		maintenance of machines.
/e/	21/05/2010 and 22/05/2010	Ms. Ikke Martha, Assistant project manager	South Pole Carbon Asset Management Limited	Monitoring report, ER calculation.

2.3 Resolution of outstanding issues

The objective of this phase of the verification is to resolve any outstanding issues which need to be clarified for RINA's positive conclusion on the monitoring report and emission reductions.

To guarantee transparency a verification protocol has been customized for the project. The protocol shows in a transparent manner the requirements, means of verification and the results from verifying the identified criteria.

The verification protocol consists of four tables; the different columns in these tables are described in the figure below (see Figure 1). The completed verification protocol is enclosed in Appendix A to this report.

A corrective action request (CAR) is raised if one of the following occurs:

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

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

A forward action request (FAR) is raised during verification for actions if the monitoring and reporting require attention and/or adjustment for the next monitoring period.

CARs, CLs and FARs identified are included in the verification protocol in Appendix A of this report.



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Figure 1 Verification protocol tables

Verification Protocol, Table 1 - Requirement checklist					
Checklist Question	Ref.	MoV	Comments	Draft Conclusion	Final Conclusion
The various requirements in Table 1 are linked to checklist questions the project should meet. The checklist is organized in seven different sections.	Makes reference to documents where the answer to the checklist question or item is found.	Explain how conformance with the checklist is investigated. Examples are document review (DR), interview or any other follow-up actions (I), cross checking (CC) with available information relating to projects, (N/A) means not applicable.	The discussion on how the conclusion is arrived at and the conclusion on the compliance with checklist question so far.	OK is used if the information and evidence provided is adequate to demonstrate compliance with CDM requirements. For CAR, CL and FAR see the definitions above.	OK is used if the information and evidence provided is adequate to demonstrate compliance with CDM requirements.

Verification Protocol, Table 2 - Resolution of Corrective Action Requests and Clarification			
Corrective action requests and/or clarification requests	Reference to Table 2	Response by project participants	Verification conclusion
The CAR and/or CLs raised in table 2 are repeated here.	Reference to the checklist question number in Table 2 where the CAR or CL is explained.	The responses given by the project participants to address the CARs and/or CLs.	The verification team's assessment and final conclusion of the CARs and/or CLs.

Verification Protocol, Table 3 - Forward Action Requests		
Forward action request	Reference to Table 2	Response by project participants Verification conclusion
The FAR raised in table 2 is repeated here.	Reference to the checklist question number in Table 2 where the FAR is explained.	Response by the project participants on how forward action request will be addressed.



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2.4 Internal quality control

All the revisions of the verification report before being submitted to the client were subjected to an independent internal technical review to confirm that all verification activities had been completed according to the pertinent RINA instructions.

The technical review was performed by a technical reviewer(s) qualified in accordance with RINA's qualification scheme for VCS and CDM validation and verification.

2.5 Verification team and the technical reviewer(s)

The verification team and the technical reviewers consist of the following personnel:

Role	Last Name	First Name	Country
Team Leader CDM/VCS	Menon	Rekha	India
Technical Expert VCS	Kumar	Ashok	India
Observer	Perne Narayanan	Sreeraj	India
Technical Reviewer	Valoroso	Rita	Italy

3 VERIFICATION FINDINGS

The findings of the verification related to the monitoring period from 01/04/2009 to 31/03/2010 as documented and described in the monitoring report version 2 of 16/03/2011 **I02I** are stated in the following sections.

The verification requirements, the means of verification, and the results from verifying the identified criteria are documented in more detail in the verification protocol in Appendix A.

3.1 Description of the project activity

The main information of the project is summarized in the table below.

Project Participant(s)	South Pole Carbon Asset Management Limited		
Project Title	82 MW Lau Renun Hydro Power Plant, North Sumatra		
Location of the project	North Sumatra, Indonesia		
Methodology(ies)	"ACM0002 ", "Consolidated baseline methodology for grid-connected electricity generation from renewable sources", version 10 of 28/05/2009 I06I		
Sectoral Scope(s)	01	RINA's Technical Area(s)	1.2
Registered PD	Revision 3 of 06/11/2009		
Date of registration	24/08/2010	CDM Registration Reference N°	Not Applicable
Revised monitoring plan	Revision 3.1 of 17/01/2011		



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Starting date of the crediting period	01/09/2006
Project's crediting period	01/09/2006 to 31/06/2016
Monitoring period	01/04/2009 to 31/03/2010
Project documentation link	https://vcsprojectdatabase1.apx.com/mymodule/ProjectDoc/EditProjectDoc.asp?id1=488

The project activity includes the installation of two turbines with a unit capacity of 41 MW, resulting a total capacity of 82 MW which is then coupled to generators. The purpose of the project activity is to generate clean electricity from renewable hydro power source and export to the regional grid, thereby leading to the reduction of GHG emissions by displacing the equivalent amount of electricity which would have been generated predominantly from fossil fuel fired power projects connected to the grid.

3.2 Remaining issues (FARs) from previous validation or verification

Based on the review of validation report **/08/**, 1 FAR was raised during the validation. The FAR states that all data required in calculation of emission reductions need to be archived regularly. Also, the metering devices involved in this project activity need to be calibrated once a year. Furthermore, the PP was requested to establish procedures to identify meter faults and to take into account the emergency and uncertainties involved in the generation readings in such case. PP had closed the same during the validation stating that the calibration would be conducted for every year and a detailed procedure would be included in the SOP for the identification of meter faults and to take note on the emergency and uncertainties involved in the generation readings. However, during the site visit for verification, it was noted that the initial calibration of the main meters were done on 28/07/2005 and the subsequent calibration was performed on 14/04/2010 and the certificate for the same was issued on 22/04/2010 **/12/**. Accordingly RINA raised a CAR on the same. However PP had gone for a deviation which stated that as per the Indonesian regulation, the Ministry of Energy and Mineral's resource regulation Number 37 year 2008 dated November 27, 2008 on the Grid Code Sumatra Electricity Power System, the calibration of kWh meter must be done once every 5 (five) years (stated in the Metering Code section, MC 4.1.1. Verification team has checked the said regulation **/14/** and confirmed that the justification provided by PP was appropriate. Hence the proposed deviation was accepted and the CAR was closed accordingly. Further, PP has also included a detailed procedure both in the monitoring report and the SOP for identification of meter faults and the action that would be taken on occurrence of the same **/13/**. Verification team has checked the SOP and monitoring report and found that the method prescribed is appropriate and conservative. Hence the issues raised in the FAR is taken into account appropriately and successfully closed.

3.3 Project implementation

As per the registered PD, version 3 dated 06/11/2009 and the final PD after deviation in monitoring plan, version 3.1 dated 17/01/2011 **/01/**, the project activity consists of the installation of two vertical shaft type Francis turbines with an unit capacity of 41 MW. The water from the regulating pond is fed to these turbines through penstock and this falling water rotates the turbines, which drive the generators and produce electricity. The generator converts the mechanical energy generated from the turbines into electricity. This electricity is then transmitted to the Sumatra grid through Sidikalang and Berastagi PLN substations. Unit 2 was commissioned on 14/08/2006 and Unit 1 was commissioned on 19/12/2006 **/10/**, which was much ahead of the validation of the project activity, dated 16/09/2009 **/08/**. The verification team has cross checked the same by referring the commissioning certificates **/10/** during the site visit and found to be appropriate. The verification team confirms that all the components of the project activity as stated in the PD are in place



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and were in operation. Furthermore, the verification team verified the technology and confirms that the technology is not substituted. It is also confirmed that the commissioning date is same as the actual operational date of the plant.

The project is fully implemented according to the description presented in the PD. The verifier confirms, through the visual inspection that all physical features of the VCS project activity including data collecting systems and storage have been implemented in accordance with the PD, version 3.1, dated 17/01/2011 **/01/**. The project activity is completely operational and the same has been confirmed on-site.

3.4 Methodology for determining Emission Reductions.

According to the applied methodology “ACM0002”, “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”, version 10 of 28/05/2009 **/06/**, the emission reductions have been calculated based on the following formula:

$$ER_y = BE_y - PE_y$$

Where,

ER_y : Emission reductions in year y (tCO₂e/yr)

BE_y : Baseline emissions in year y (tCO₂e/yr)

PE_y : Project emissions in year y (tCO₂e/yr)

Baseline emissions are calculated as follows:

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

Where,

$EG_{PJ,y}$: Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the project activity in year y (MWh/yr)

$EF_{grid,CM,y}$: Combined margin CO₂ emission factor for grid connected power generation in year y (tCO₂/MWh)

The representatives of both Renun HEPP and transmission unit record the main meter readings on a monthly basis and a report is prepared based on this readings. This report is named as the monthly electricity transfer protocol report and is signed by the representatives of Renun HEPP and the transmission department **/11/**. The value of $EG_{PJ,y}$ is taken from this report and amounts to 265,538MWh/yr for the period from 01/04/2009 to 31/03/2010. The verification team has checked the monthly electricity transfer protocol reports for each month of the said period and confirmed that the value mentioned above is in line with the monthly electricity transfer protocol reports **/11/**.

The combined margin emission factor was fixed ex ante and was calculated based on “tool to calculate emission factor for an electricity system”, version 01.1, dated 29/07/2008 **/30/**. The value fixed ex ante is 0.743 (tCO₂/MWh) **/01/**.

Project emissions were calculated as follows:

$$PE_y = PE_{FF,y} + PE_{GP,y} + PE_{HP,y}$$

Where,

$PE_{FF,y}$: Project emissions from fossil fuel consumption in year y (tCO₂/yr)

$PE_{GP,y}$: Project emissions from the operation of geothermal power plants due to the release of non-condensable gases in year y (tCO₂/yr)

$PE_{HP,y}$: Project emissions from water reservoirs (tCO₂/yr)



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Since the project activity is not a geothermal project activity and the power density calculated at the time of validation itself was above 10 W/m², project emission is accounted only due to usage of fossil fuels.

Project emission from fossil fuel consumption was calculated based on "the tool to calculate project or leakage CO₂ emissions from fossil fuel combustion", version 02 dated 02/08/2008 **/09/**, which is listed as follows:

$$PE_{FF,y} = PE_{FC,j,CO_2}$$

$$PE_{FC,j,CO_2} = \sum FC_{i,j,y} \times COEF_{i,y}$$

Where,

PE_{FC,j,CO_2} : CO₂ emissions from fossil fuel combustion in process j during year y (tCO₂/y)

$FC_{i,j,y}$: Quantity of fuel type i combusted in process j during the year y (ton/y)

$COEF_{i,y}$: CO₂ emission coefficient of fossil fuel type i in year y (tCO₂/ton)

i : Fuel types combusted in process j during year y

As per the registered PD, version 3 dated 06/11/2009 **/01/**, the fuel consumption in DG sets has to be calculated based on the installed static graduated level gauges and the fuel injection tanks. However, it was unable to find any of such instruments installed in the DG sets during the onsite inspection for verification. Hence a CAR was raised for the same. PP further requested for a deviation in monitoring plan of the registered PD. As per that, PP will monitor the running hours of the DG sets and the diesel consumption will be calculated based on the following equation.

$$FC_{\text{diesel fuel (ton)}} = \text{running hours (hour)} \times \text{Engine fuel consumption (litre/hour)} \times \text{fuel density (ton/litre)}$$

Fuel consumption at 100% load will be considered in order to be conservative. However, for this particular monitoring period, as the running hours were not monitored, the PP considered the diesel fuel purchase receipts to calculate the diesel consumption. The verification team has accepted the same as the fuel purchase receipts would provide the total fuel consumed in the plant other than the project activity and is hence conservative. Nevertheless, the data is only available from June to September 2009 and February 2010. The PP has chosen the maximum value (100 liters) available for one of these months for all the months of this monitoring period in a conservative manner and accordingly the project emissions from diesel consumption are calculated **/20/**. Thus, the quantity of diesel consumed in the plant through DG sets for this particular monitoring period (01/04/2009 to 31/03/2010) is 1200 liters. Since the same is conservative, the verification team has accepted.

$COEF_{i,y}$ is calculated using option B. Option B calculates the $COEF_{i,y}$ based on the net calorific value and the CO₂ emission factor of fuel type i, as follows:

$$COEF_{i,y} = NCV_{i,y} \times EF_{CO_2,i}$$

Where,

$NCV_{i,y}$: Weighted average net calorific value of fuel type i in year (GJ/kg)

$EF_{CO_2,i}$: Weighted average CO₂ emission factor of fuel type i in year y (tCO₂/GJ)

PP has calculated the project emission based on the above equations and found to be less than 1% of baseline emissions **/07/**. Hence the same is neglected. Verification team has checked the calculation and found appropriate.

Leakage emissions: As per the methodology ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources", version 10 of 28/05/2009 **/06/**, no leakage emission is considered.



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The value of EG_y for this monitoring year is 265,538MWh **/01/07/** and EF_y is 0.743tCO₂/MWh, which would result in CERs of 197,295tCO₂e for this monitoring year.

3.4.1 Compliance of the monitoring plan with the monitoring methodology

As per the applied methodology, ACM0002, "Consolidated baseline methodology for grid-connected electricity generation from renewable sources", version 10 of 28/05/2009 **/06/**, monitoring shall consist of metering the net electricity supplied to the grid by the project activity during the year y and project emissions from fossil fuel consumption in year y. As per the monitoring plan of the registered PD, version 3 dated 06/11/2009 **/01/**, the parameters monitored are the net electricity supplied to the grid by the project activity during the year y and amount of diesel fuel used in the hydro power plant during the year y. Hence, the monitoring plan included in the registered PD is in accordance with the applied methodology. However, it was indicated in the registered PD that all the meters will be calibrated once in a year and the quantity of electricity exported to the grid can be cross checked with the sales receipts/invoice. It was also indicated in the registered PD that the fuel consumption in DG sets has to be calculated based on the static graduated level gauges installed and the fuel injection tanks. Verification team during the site visit found that none of these were followed at site. Hence a CAR was raised for the same **/CAR 1/ /CAR 3/**. To close the same, PP had gone for the following deviations in the monitoring plan of the registered PD **/17/**.

1. The calibration of KWh meters would be conducted once in five years.

PP has confirmed that the calibration of energy meters will be done once in 5 years, instead of once in a year, which is as per the Indonesian regulation, the Ministry of Energy and Mineral's resource regulation Number 37 year 2008 dated 27/11/2008. Verification team checked the said regulation **/14/** and confirmed that the justification provided by PP was appropriate. Hence accepted the same.

2. The electricity exported to the grid as recorded in the monthly electricity transfer protocol would be cross checked with the monthly meter reading recorded from the meter maintained at transmission substation.

Two dedicated meters with meter number 0629076 for Sidikalang substation and 0629078 for Berastagi substation are installed in the transmission substation in order to monitor the quantity of electricity received from the Renun HEPP. Both the meters are manufactured by OSAKI ELECTRIC with an accuracy class of 1s. During the site visit, the verification team visited the transmission substations and confirmed two dedicated meter are installed at the substations for monitoring the electricity coming to the grid from Renun HEPP. Also, they are maintaining a log book and recording the readings on a monthly basis **/18/** which is signed by both the manager and the supervisor of the substations. Verification team has accepted this proposal as it was found to be credible and appropriate. It was also noted by the verification team during the site visit that the accuracy class for meter at Renun HEPP is 0.2s whereas for the meter at substation is 1s. PP has provided a working in an excel sheet consisting of comparison of meter reading at Renun HEPP and substation **/19/**. PP has made comparison in the following 4 ways:

1. Comparing both the readings without any data adjustments
2. Comparing the substation reading with plant reading by providing maximum error limit (0.2%) to the plant reading
3. Comparing plant reading with substation reading by providing maximum error limit (1%) to the substation reading
4. Comparing plant reading with substation reading by providing maximum error limit to both the substation reading and plant reading.

The verification team has checked all cases and found that for all the months in this particular monitoring year (01/04/2009 to 31/03/2010), the difference is found to be less than 5%, which is considered as T and D loss that may occur during the transfer of electricity from Renun HEPP to the substations. However as the monthly electricity protocol reading is cross checked with the reading taken from the transmission substations, PP is requested to also calibrate that meter installed in transmission substation at a frequency as per the Indonesian regulation or as per manufacturer whichever is less and the same will be checked during the next verification **/FAR 2/**.



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3. Monitoring of the running hours of DG sets and then calculating the diesel fuel consumption based on full load

The PP will be monitoring the running hours of the DG sets and the diesel consumption will be calculated based on the following equation.

$$FC_{\text{diesel fuel (ton)}} = \text{running hours (hour)} * \text{Engine fuel consumption (litre/hour)} * \text{fuel density (ton/litre)}$$

Fuel consumption at 100% load will be considered in order to be conservative. Since the running hours of DG sets for this monitoring period was not monitored, PP considered the diesel fuel purchase receipts for this monitoring year (01/04/2009 to 31/03/2010) to calculate the quantity of diesel consumed. The verification team has accepted the same as the fuel purchase receipts would provide the total fuel consumed in the plant other than the project activity and is hence conservative.

4. Accuracy of check meters changed to 1s.

As per the registered VCS PD version 3 dated 06/11/2009 **/01/**, the accuracy class of main and check meters installed at plant is of accuracy class 0.2s. However during the site visit, the verification team confirmed that the accuracy class of main meter is 0.2s, whereas the accuracy of the check meters (production meters) is 1s. Hence, the PP had gone for a deviation. As per that, the PP requested to change the accuracy class of check meters to 1s. The verification team has accepted the same as the check meters located at the site is of class 1s.

3.4.2 Compliance of monitoring with monitoring plan

As per the PD, version 3.1 dated 17/01/2011, validation report dated 16/11/2009 and the monitoring report, version 2 of 16/03/2011 **/01/ /08/**, the project activity involves the following monitoring key parameters.

1. Net electricity supplied to the grid by the project activity during the year y
2. Quantity of diesel fuel combusted in diesel gensets

The project consists of two main meters, installed in each unit of the plant, with serial numbers 36027216 in unit 1 and 36027222 in unit 2 to measure the net electricity generation. Both meters are of accuracy class 0.2s. The same was confirmed by the verification team during the site visit. An Electricity Transfer Protocol Report is prepared every month based on the readings taken from these meters and is signed by the official representatives of Renun hydro power plant which are the generating unit and PT PLN, the transmission unit. During the site visit, verification team verified the Electricity Transfer Protocol Report for the period 01/04/2009 to 31/03/2010 **/11/** and found that it contains all the details like electricity export to the grid, import from the grid, serial number of the meters from which it is monitored, accuracy class, and total electricity supplied to the grid. As discussed above, the Electricity Transfer Protocol Report was also signed by both the representatives of generation unit and transmission unit. Furthermore, the revised PD version 3.1 dated 17/01/2011 **/01/** and the monitoring report version 2 of 16/03/2011 **/02/** is transparent on the procedure that will be followed in case of meter failure. If main meter fails, the production meter which is located at the generation site of each power generation unit will be used as cross-check meters, measuring the quantity of electricity exported from the project to the Sumatra grid. An own consumption meter is also installed in the plant in order to monitor the auxiliary consumption of electricity within the plant. The details of the meters with their meter numbers, type, made and accuracy class are as follows:

Meter No.	Type	Factory	Accuracy Class	Purpose
36027216	SL 7000	Actaris	0.2s	Main meter - to monitor the net electricity exported to the grid from unit 1
4674483	ELB7W6a	Schlumberger	1.0s	Production meter - to monitor the electricity generated from unit 1. It is also used as cross check meter for the main meter of unit 1.



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36027222	SL 7000	Actaris	0.2s	Main meter - to monitor the net electricity exported to the grid from unit 2
4674482	ELB7W6a	Schlumberger	1.0s	Production meter - to monitor the electricity generated from unit 2. It is also used as cross check meter for the main meter of unit 2.
36027194	SL 7000	Actaris	0.2s	Main meter – to monitor the auxiliary consumption of electricity within the plant.
4674485	ELB7W6a	Schlumberger	1.0s	Cross check meter for the main meter that monitors the auxiliary consumption of electricity within the plant.

During the site visit it was noted that all the main meters are located at the main control house of the plant and check meters are located at the engine room of the plant. All the above mentioned details were checked by the verification team during the site and found appropriate. It is further noted that there was no instance of any meter failure, and meter replacement within this monitoring period. This was confirmed by checking the meter numbers and comparing the same with calibration certificates for the meters, conducted on 28/07/2005 and 22/04/2010 **/24/12/** and further by cross checking the monthly electricity protocol **/11/** for this monitoring period.

The plant has 2 DG sets which will be used in case of emergencies. As per the registered PD, version 3 dated 06/11/2009 **/01/** diesel consumed by these DG sets should have been monitored with the help of static graduated level gauges on the fuel injection tanks. However during site visit, the verification team noticed that there was no fuel injection tank in the DG sets. Hence, the PP has proposed a deviation of the monitoring plan **/17/**. As per this, the PP monitors the running hours of DG sets, which will be used to calculate the diesel consumption. Fuel consumption at 100% load will be considered in order to be conservative. However for this particular monitoring period, as the running hours were not monitored, PP considers the diesel fuel purchase receipts to calculate the diesel consumption. Verification team has accepted the same as the fuel purchase receipts would provide the total fuel consumed in the plant other than the project activity and is hence conservative. PP has submitted diesel purchase receipts for the month of June 2009 to September 2009 and February 2010 **/20/**. PP runs the DG sets only in the case of emergencies, for instances, during the plant shut down. Verification team during the site visit noted that there were no such break down / shut down. So PP operates the DG sets every month just to ensure that it is working properly. Hence the fuel purchased for above said months was enough for the whole year. Verification confirmed the same during the site visit and through discussion with plant operators. However PP has considered the maximum purchase amount which is 100 litres for every month so as to be conservative. Even using this maximum amount for monthly purchase, the calculation result shown that the $PE_{FF,y}$ is still below 1% of BE calculation, therefore $PE_{FF,y}$ amount is neglected.

PP has revised the monitoring plan of the registered PD based on the deviation proposed and submitted the final VCS PD version 3.1 of 17/01/2011 **/01/**. Verification team accepted the deviation as it was conservative and appropriate. Hence, the monitoring complies with the revised monitoring plan in the final PD.

The following parameters have been monitored in accordance with the monitoring plan in the final PD **/01/** and the monitoring report **/02/**.



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3.4.2.1 Data fixed ex-ante

The parameters that are not monitored and was available at the time of validation were $EF_{grid,CM,y}$, $NCV_{i,y}$, $EF_{CO2,i,y}$ and P_i . The details are as follows:

DATA/ PARAMETER	Source of data	Reported value for the project period	Assessment/ Observation
Grid emission factor of Sumatra ($EF_{grid,CM,y}$)	DNA of Indonesia http://dna-cdm.menlh.go.id/id/database Filename "DNA CDM_Grid_Sumatra_JAMALI_2008".	0.743 tCO ₂ /MWh	The verification team has verified the value with the excel sheet provided by DNA of Indonesia for the year 2008 /25/ and registered PD /01/ and found to be correct and consistent. Hence accepted.
Net caloric value of diesel fuel ($NCV_{i,y}$)	2006 IPCC Guidelines for National Greenhouse Gas Inventories: Workbook volume 2 chapter 1 Table 1.2	0.043 GJ/kg (1 GJ/kg = 1 TJ/ton)	Verification team has checked the 2006 IPCC guidelines for National Greenhouse Gas Inventories: Workbook volume 2 chapter 1 Table 1.2 /26/ and the registered PD /01/ and found to be correct and consistent. Hence accepted.
Density of diesel fuel (P_i)	Pertamina diesel fuel specification	0.815 kg/litre or 815 kg/m ³	Verification team has checked the report provided by PT.Pertamina (Persero) in the month of June 2007 /27/ and the registered PD /01/ and found to be correct and consistent. Hence accepted.
Weight average CO ₂ emission factor of diesel fuel in year 'y' ($EF_{CO2,i,y}$)	2006 IPCC Guidelines for National Greenhouse Gas Inventories: Workbook volume 2 chapter 1 Table 1.4	74.1 tCO ₂ /TJ	Verification team has checked the 2006 IPCC guidelines and the registered PD /01/ and found to be correct and consistent. Hence accepted.



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3.4.2.2 Monitored data

DATA/PARAMETER	EG _y																												
Data Unit	kWh																												
Description	Net electricity supplied to the grid by the project activity during the year y																												
Source of data to be used	Monthly electricity generation/protocol report “Berita Acara tentang Penyerahan dan Penerimaan kWh Penyaluran”/11/. This is also referred as Joint meter reading.																												
Value data for the monitoring period	265,538 This is the sum of net export as measured from meters installed for both units (unit 1 and unit 2).																												
Measuring frequency	Continuously by digital watt hour meter installed in the main control house																												
Reporting frequency and recording procedure	The reporting frequency is monthly and recording frequency is hourly for each of the unit, which is in accordance with the monitoring plan and monitoring methodology.																												
Type of monitoring equipment	The monitoring equipments used are digital watt hour meter as seen at site and the details of the meters are as follows. <table><tr><th>Meter No.</th><th>Type</th><th>Factory</th><th>Accuracy Class</th></tr><tr><td>36027216</td><td>SL 7000</td><td>Actaris</td><td>0.2s</td></tr><tr><td>4674483</td><td>ELB7W6a</td><td>Schlumberger</td><td>1.0s</td></tr><tr><td>36027222</td><td>SL 7000</td><td>Actaris</td><td>0.2s</td></tr><tr><td>4674482</td><td>ELB7W6a</td><td>Schlumberger</td><td>1.0s</td></tr><tr><td>36027194</td><td>SL 7000</td><td>Actaris</td><td>0.2s</td></tr><tr><td>4674485</td><td>ELB7W6a</td><td>Schlumberger</td><td>1.0s</td></tr></table> As per the monitoring report, version 2 dated 16/03/2011 /02/ and the monitoring plan of the final VCS PD /01/, the energy meters of each unit measures the export and import of the electricity generated. The representatives of both Renun HEPP and transmission unit takes the meter readings on a monthly basis and this reading is cross checked with readings taken from the transmission substation meter reading. Verification team during the site visit checked the same and confirm that the same procedure is followed at site.	Meter No.	Type	Factory	Accuracy Class	36027216	SL 7000	Actaris	0.2s	4674483	ELB7W6a	Schlumberger	1.0s	36027222	SL 7000	Actaris	0.2s	4674482	ELB7W6a	Schlumberger	1.0s	36027194	SL 7000	Actaris	0.2s	4674485	ELB7W6a	Schlumberger	1.0s
Meter No.	Type	Factory	Accuracy Class																										
36027216	SL 7000	Actaris	0.2s																										
4674483	ELB7W6a	Schlumberger	1.0s																										
36027222	SL 7000	Actaris	0.2s																										
4674482	ELB7W6a	Schlumberger	1.0s																										
36027194	SL 7000	Actaris	0.2s																										
4674485	ELB7W6a	Schlumberger	1.0s																										
Is accuracy of the monitoring equipment as stated in the PD?	As per the registered VCS PD version 3 dated 06/11/2009 /01/, the accuracy class of main and check meters installed at plant is of accuracy class 0.2s. However during the site visit, verification team confirmed that the accuracy class of main meter is 0.2s and that of check meters also called as production meters is 1s. Hence PP had gone for a deviation. As per that PP requested to change the accuracy class of check meters to 1s. Verification team has accepted the same as the check meters located at the site is of class 1s. The same was also confirmed by cross verifying the calibration certificates dated 22/04/2010 /12/.																												
Calibration frequency/interval	As per the registered PD, calibration should have been done																												



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	annually. However during the site visit, verification team found that, calibration was not done as per the requirement. Hence a CAR was raised. So, PP had gone for a deviation of the monitoring plan in the registered PD. As per that, PP claimed that, calibration frequency will be performed once in five years, which is as per the Indonesian regulation, the Ministry of Energy and Mineral's resource regulation Number 37 year 2008 dated 27/11/2008 on the Grid Code Sumatra Electricity Power System (stated in the Metering Code section, MC 4.1.1. Verification team has checked the said regulation /14/ and confirmed that the justification provided by PP was appropriate. Hence accepted and the CAR was closed.
Is the calibration interval in line with the monitoring plan of the PD?	The calibration interval is once in five years and is inline with the revised monitoring plan of the registered PD, version 3.1 dated 17/01/2011.
How were the values in the monitoring report verified and cross-checked?	As per the registered VCS PD, the net electricity export should have been cross checked with the sales receipt/invoices. However during site visit, verification team was unable to find such procedures. Hence a CAR was raised on the same. However, the PP had gone for a deviation in the monitoring plan of the registered PD, version 3 dated 06/11/2009. As per that, the electricity exported to the grid would be cross checked with the meter reading at the transmission substation. Two dedicated meters, with meter number 0629076 for Sidikalang substation and 0629078 for Berastagi substation are placed in the transmission substation in order to monitor the quantity of electricity received from the Reun HEPP. Both the meters are manufactured by OSAKI ELECTRIC with an accuracy class 1s. During the site visit, the verification team visited the substation and confirmed that the substation is having a dedicated meter to monitor the electricity coming to the grid from Renun HEPP. Also they are maintaining a log book and recording the readings on a monthly basis /18/. Verification team has accepted this proposal as it was found to be credible and appropriate. It was also noted by the verification team during the site visit that the accuracy class for meter at Renun HEPP is 0.2s whereas for the meter at substation is 1s. Hence PP was requested to provided the monthly meter reading maintained at the substation /18/ and a working in an excel sheet consisting of comparison of meter reading at Renun HEPP and substation /19/, wherein PP has made comparison in the following 4 ways: 1. Comparing both the readings without any data adjustments 2. Comparing the substation reading with plant reading by providing maximum error limit (0.2%) to the plant reading 3. Comparing plant reading with substation reading by providing maximum error limit (1%) to the substation reading 4. Comparing plant reading with substation reading by providing maximum error limit to both the substation reading and plant reading. In all the cases, it was found that for all the months in this particular monitoring year, the difference is found to be less than 5% which is considered as T and D loss and the error that would have occurred due to the difference in the accuracy class of the meters at substation and at Renun HEPP. Verification team has checked the



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	calculation and found appropriate. Hence accepted the meter reading (electricity received) at transmission substation as a cross check to the meter readings (electricity export) at Renun HEPP.
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions?	Electricity generation data is monitored on continuous basis using the digital watt hour meters of each unit and the plant personnel takes the monthly reading of each meters in the presence of officials from the transmission department. A monthly electricity transfer protocol is prepared by PP based on this reading. The emission reduction calculation is based on this document and hence this ensures the correct value of electricity generation taken for the emission reductions calculation. Verification team has checked all the monthly electricity protocol /11/ and confirms that the values considered for the emission reduction calculation are accurate and in line with the said document. These readings will be cross checked from the check meters located in the power station. PP is also maintaining the log book on a daily basis /29/ . The readings are also stored in a computer based on SCADA system. Hence there are no possibilities of manual errors to be occurred during the transposition between data sets. The same was confirmed and checked by the Verification team during the site visit.
If only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	All the data necessary for the emission reduction calculation were available for the whole monitoring period.



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DATA/PARAMETER	FC _{i,y}
Data Unit	litre
Description	Amount of diesel fuel used in the hydropower plant operation during the year y
Source of data to be used	Calculated Diesel fuel operational logbook
Value data for the monitoring period	1200 This is as per the diesel fuel purchase receipt for the maximum quantity of diesel fuel purchased in a month in this monitoring year and calculated for the whole year /20/
Measuring frequency	Continuous
Reporting frequency and recording procedure	The reporting frequency is monthly and recording frequency is hourly for each of the DG sets.
Type of monitoring equipment	As per the registered PD, version 3 dates 06/11/2009 /01/ , fuel consumption in DG sets has to be calculated based on the static graduated level gauges installed and the fuel injection tanks. Verification team during the site visit was unable to find any of such instruments installed in the DG sets. Hence a CAR was raised for the same. PP further requested for a deviation in monitoring plan of the registered PD. As per that, the PP will monitor the running hours of DG sets and the diesel consumption will be calculated based on the following equation. $FC_{\text{diesel fuel (ton)}} = \text{running hours (hour)} * \text{Engine fuel consumption (litre/hour)} * \text{fuel density (ton/litre)}$ Fuel consumption at 100% load will be considered in order to be conservative. However for this particular monitoring period, as the running hours were not monitored, PP considered the diesel fuel purchase receipts to calculate the diesel consumption. Verification team has accepted the same as the fuel purchase receipts would provide the total fuel consumed in the plant other than the project activity and is hence conservative. However, a FAR /FAR1/ is raised to ensure that the running hours of the DG sets are monitored to calculate the quantity of diesel consumed and the same needs to be checked during the next verification.
Is accuracy of the monitoring equipment as stated in the PD?	Not applicable for this monitoring period
Calibration frequency/interval	Not applicable for this monitoring period
Is the calibration interval in line with the monitoring plan of the PD?	Not applicable for this monitoring period
How were the values in the monitoring report verified and cross-checked?	The diesel consumption is cross-checked with the purchase receipts for the diesel purchased by the PP for this monitoring period /20/ .
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions?	Renun HEPP purchased diesel oil fuel for the months from June to September 2009 and February 2010 /20/ . From those purchase receipts, the maximum purchase amount is 100 litre per month. To be conservative, PP used the maximum amount for each month for this monitoring period. There are no possibilities of manual errors to be occurred during the transposition between data sets as it is directly taken from the fuel purchase receipts.



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If only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	The consumption data for diesel was only available between June and September 2009, as well as February 2010. To be on a conservative side PP has chosen the maximum value (100 liters) available for one of these month for all the months of this monitoring period and accordingly the project emissions from diesel consumption is calculated /20/ . Since the same is conservative, verification team accepted.
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3.4.3 Accuracy of emission reduction calculations

The emission reduction calculations provided in the spreadsheet titled "Renun ER Calculation (DVR 2nd response)" submitted on 21/03/2011 **/07/** have been verified to be correct and in line with the final monitoring report, version 2 of 16/03/2011 **/02/**. The emission reductions from the project for the monitoring period 01/04/2009 to 31/03/2010 as reported in the monitoring report version 02 of 16/03/2011 **/02/** is equivalent to 197,295 tCO_{2e}. The reported emission reductions are 14% lower than the estimated emission reduction of 229,048 tCO_{2e} for the period as per the registered PD **/01/**. Verification team has checked the registered VCS PD **/01/**, the monthly electricity transfer protocol report **/11/** for the current monitoring year and confirmed that the expected annual power generation was 313,500 MWh whereas the achieved generation is 265,538 MWh with a capacity factor of 36.967%. The reason for the same was less flow rate. PP had submitted the Monthly Sumatra Grid Evaluation Operation Report "Evaluasi Operasi Sistem Tenaga Listrik Sumatra" prepared by PT PLN **/28/**. This is a summary report issued by PT PLN (Persero) P3B / Load Dispatcher Division report and consists of a comparison of monthly electricity generation with the same month of previous year. Report clearly indicated that the generation in Renun HEPP in this current monitoring period (01/04/2009 to 31/03/2010) is less compared to previous year for every month. The same is also supported with daily log sheet maintained at plant **/29/**. The verification team had checked both documents and confirmed that the generation was less compared to previous year and both the turbines were not working for 24 hours. It was also confirmed that there was no major shut down/maintenance for this HEPP. Hence the verification team concluded that the generation was lower than the expected as per the registered PDD as the water flow rate is lower during this monitoring period. However PP was requested to conduct an analysis on the reduced electricity generation if any compared to the estimated generation as mentioned in the registered VCS PD during the next internal audit. The same is raised as a FAR **/FAR 4/**.

The electricity generation is calculated based on the monthly electricity protocol **/11/**. The same is cross checked with the transmission substation meter reading **/18/**. Verification team has checked both the documents and confirmed that the amount of electricity exported from the HEPP to the grid as shown in the monthly electricity protocol is same as the electricity received at the substation as shown in the log book **/18/** maintained at site after deducting the T&D loss of 5%. Hence verification team confirms that the values considered for the emission reduction calculation are accurate and in line with the said document. Further these readings will be cross checked from check meters located in the power station. PP is also maintaining the log book on a daily basis. The readings are also stored in a computer based on SCADA system. Hence there are no possibilities of manual errors to be occurred during the transposition between data sets. Verification team during the site visit confirmed that these procedures are followed by PP at site.

The quantity of diesel oil consumed at plant is taken from diesel purchase receipts. Renun HEPP purchased diesel oil fuel for the months from June to September 2009 and February 2010 **/20/**. From those purchase receipts, the maximum purchased amount is 100 litre per month. To be conservative, PP used the maximum amount for each and every month on this monitoring period. There are no possibilities of manual errors to be occurred during the transposition between data sets as it is directly taken from the fuel purchase receipts.

The data presented in the monitoring report, version 2 of 16/03/2011 **/02/** were assessed by reviewing in detail the project documentation, collection of monitored data, observation of established monitoring and reporting practices and assessment of the reliability of monitoring equipment. Sufficient evidence was presented and verified by RINA for the reported emission reductions as listed in the above Section 3.4.2.2.



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3.4.4 Management system and quality control

The verification team has done the site visit on 21/05/2010 and 22/05/2010 and cross-checked the procedures being followed at site in monitoring and calculating the electricity generation which is exported to the grid. The team confirmed that PP follows the procedures as mentioned in the registered PDD **/01/**. Further, the PP has their own standard operation procedures for operation of plant, calibration of equipments, preparation of Electricity Transfer Monthly Protocol Report, electricity transfer and emergency response **/13/**. PP strictly follows these procedures and the same was confirmed by the verification team during the site visit. Further, the team has verified the monthly electricity protocol for the period from 01/04/2009 to 31/03/2010 **/11/**, monthly meter reading maintained at Sidikalang and Berastagi substation **/18/** and confirmed that the net electricity exported from the Renun HEPP is same as the quantity received at substation. Verification team has also checked the documents pertaining to internal audit **/22/**, minutes of management review meeting **/23/** and confirmed that no NCs / observations was raised with respect to the project. It was also noticed that the internal audit does not concentrate on the requirements of VCS project to be met by the PP. Hence a FAR **/FAR4/** was raised on the same. PP had confirmed that from the next verification period onwards, PP through their internal audit team will check whether all of the monitoring and data management are done as per the VCS requirement.

All data are being archived in the log books and is maintained at plant. A monitoring team has been established in the Renun hydro power plant for this project activity, which is headed by a VCS manager. The verification team has confirmed the same during the site visit. All these documents will be archived up to two years after the end of the crediting period or last issuance of this project activity whichever comes later.

However as per the registered VCS PD, version 3 dated 06/11/2009 **/01/**, a formal set of monitoring procedures has been established prior to the implementation of project activity that includes the details of the organization, control and steps required for certain key monitoring system features including VCS staff training, VCS data and record keeping arrangements, data collection, VCS data quality control and quality assurance, equipment maintenance, equipment calibration and equipment failure. These procedures will be agreed and signed by PT PLN (Persero) and South Pole Carbon Asset Management Ltd. However during the site visit the verification team found that there were no such procedures prepared and PP is following their own standard procedures. Hence PP has confirmed that South Pole Carbon Asset Management Ltd. will develop a procedure consisting of

- a. The monitoring data/parameter
- b. The PIC to collect the data
- c. Data storage

A FAR **/FAR3/** was raised to verify the same in next verification.



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4 VERIFICATION AND CERTIFICATION OPINION

RINA Service Spa (RINA) has performed verification of the emission reductions reported for the project activity “82 MW Lau Renun Hydro Power Plant, North Sumatra” in Indonesia, for the period 01/04/2009 to 31/03/2010, with regard to the relevant requirements for CDM and VCS activities.

The project participants of the “82 MW Lau Renun Hydro Power Plant, North Sumatra” project are responsible for:

- the preparation of greenhouses gas emissions data and the reported greenhouse gas emission reductions from the project on the basis set out in the revised monitoring plan contained in the project description version 3.1 of 17/01/2011
- the development and maintenance of records and reporting procedures in accordance with that plan, including the calculation and determination of greenhouse gas emission reductions of the project

It is the responsibility of RINA to express an independent verification opinion about the project's conformity with the requirements of paragraph 62 of the CDM modalities and procedures and on the reported greenhouse gas emission reductions from the project.

Based on documented evidence and corroborated by an on-site assessment RINA can confirm that:

- the project has been implemented and operated as per the registered VCS-PD, version 3 dated 06/11/2009 and final VCS PD with revised monitoring plan, version 3.1 of 17/01/2011 ;
- the monitoring report and other supporting documents provided are complete and verifiable and in accordance with the applicable CDM and VCS requirements;
- the monitoring is in place as per the applied baseline and monitoring methodology;
- the monitoring complies with the monitoring plan in the final VCS-PD, version 3.1 of 17/01/2011;
- the monitoring plan in the final VCS PD, version 3.1 of 17/01/2011 is as per the applied baseline and monitoring methodology.

It is RINA's opinion that the GHG emission reduction stated in the monitoring report version 2 of 16/03/2011 for the “82 MW Lau Renun Hydro Power Plant, North Sumatra” project in Indonesia for the period 01/04/2009 to 31/03/2010 are fairly stated. The GHG emission reductions were calculated correctly on the basis of the approved monitoring methodology “ACM0002”, “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”, version 10 of 28/05/2009 and the monitoring plan contained in the final VCS PD, version 3.1 of 17/01/2011.

Hence RINA is able to certify the emission reductions from the project as follows:

Reporting period: 01/04/2009 to 31/12/2009:

Verified emissions in the above reporting period:

Project Emissions: 0 tCO₂ equivalents

Baseline emissions: 148,966 tCO₂ equivalents

Emission reductions: 148,966 tCO₂ equivalents

Reporting period: 01/01/2010 to 31/03/2010:

Verified emissions in the above reporting period:

Project Emissions: 0 tCO₂ equivalents

Baseline emissions: 48,329 tCO₂ equivalents

Emission reductions: 48,329 tCO₂ equivalents



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Mumbai, 07/06/2011

Rekha Menon
CDM/VCS Team Leader
RINA India Pvt. Ltd.

Genova, 13/06/2011

Paolo Teramo
Authorized officer signing for the DOE
RINA Services S.p.A.



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APPENDIX - A VCS 2007.1 VERIFICATION PROTOCOL

This document contains a generic Verification Protocol for VCS projects, which must be seen in conjunction with the VCS 2007.1 and VCS Programme Guidelines and the Verification Report Template. The entries in the protocol should be adjusted and amended as appropriate to prepare for the verification of a particular project.

This verification protocol serves the following purposes:

- It organizes, details and clarifies the requirements a VCS project is expected to meet; and*
- It ensures a transparent verification process by inducing the Verifier to document how a particular requirement has been verified and which conclusions have been reached;*

This protocol contains two tables with generic requirements for verification projects. Table 1 consists of a checklist with verification questions. The checklist questions may not be applicable for all investors, and should not be viewed as mandatory for all projects. Where a finding is issued, a corrective action request or clarification request are stated. The resolution and final conclusions of these requests should be described in Table 2 of this protocol.

Before this generic verification protocol can be applied to verify a specific project, the Verifier must review and adjust/amend the protocol to make it applicable to individual project characteristics and circumstances as well as individual investor criteria. The application of the verifier's professional judgment and technical expertise should ensure that checklist amendments cover all necessary specific project requirements that have impact on project performance and acceptance of the project. Given the above, the checklist part of the protocol is neither exhaustive nor prescriptive.

Table-1 Requirement Checklist

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
1. Remaining issues, any material discrepancy, from previous validation					
1.1.1. Has the project documentation been reviewed (i.e. registered VCS PD, monitoring plan, validation report and previous verification reports, if any)?	/1//2//3/	DR	Yes. The project documents VCS PD dated 06/11/2009, version 03, final validation report dated 16/11/2009 and Monitoring report dated 30/04/2010, version 01 of project activity (monitoring period from 01/04/2009 to 31/03/2010) has been reviewed and found to be complete and verifiable and in accordance with the VCS requirements. Since this is the first verification for this project activity, no other previous verification reports are available. Further during the site visit and interaction with the PP, it is noted that site visit for the validation was completed on 07/08/2009 and final validation report was issued on 16/11/2009. However, submission of the VCS PD dated 06/11/2009, version 03 to registration is still under process. Supporting documents of the same needs to be provided for verification.	~~CL-1~~	OK
1.1.2. Are there findings and remaining issues from the previous validation/determination stage or from previous Verification reports (if any) of the project?	/1//2//3/	DR	The Validation report of the project activity was reviewed to find out any Forward Action Request (FAR). It was evident from the Validation report that a FAR was raised during the validation time regarding the calibration frequency and inclusion of detailed procedure in SOP in order to identify meter faults and to take care the emergency and uncertainties involved in the generation readings. Subsequently the same was closed by the PP by	~~CAR-1~~	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			providing the justification that calibration for the meters will be conducted once in a year and SOP with detailed procedures will be submitted at the time of verification. However verification found that calibration is done only once in five years. Hence PP is requested to justify on the same.		
1.1.3. If yes, can they be considered solved or be closed?	/1//2//3/	DR	Not applicable		OK
2. Project implementation					
2.1.1. Does implementation of the project comply with the project activities described in the registered VCS PD?	/1//2//3/	DR/I	As per the VCS-PD dated 06 November 2009, version 03 the project has two units with 41 MW capacity each. Unit 2 was commissioned on 14/08/2006 and Unit 1 was commissioned on 18/12/2006, which was much before validation of the project activity, dated 16/09/2009. The verification team has also cross checked the same by referring the commissioning certificates dated during the site visit and found appropriate. Hence, verification team confirms that the PP has operated the VCS project activity as per the final VCS-PD. However, the monitoring report states that project has been commissioned and commercialized since August 2006. PP is requested to mention the exact commissioning date and the actual operation of the VCS project activity. As per the VCS-PD, the crediting period starts from 1/09/2006. However, the crediting period	CAR-2	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			in the monitoring report starts from 01/04/2009. The PP is requested to justify on not claiming the emission reductions for first two and a half years.		
3. Monitoring					
3.1. Monitoring Methodology					
3.1.1. Is the monitoring methodology implemented as described in the VCS PD?	/1//2// 3//5/	DR	Yes. The methodology used in the project activity is approved consolidated methodology ACM 0002 version 10 of EB 47. The same was mentioned in the final VCS PD and in the monitoring report submitted by the PP. PP is requested to mention the sources of data required for monitoring the parameter electricity supplied by the project activity to the grid clearly. It is not transparent on which type of meter the parameter electricity supplied is monitored.	~~CL-2~~	OK
3.1.2. Have all the relevant GHG sources, to be monitored as per the VCS PD, effectively been monitored?	/1//2// 3//9/	DR/I	As per the VCS PD if main meter fails, production meter which is located at generation site of each power generation unit will be used as cross-check meters, measuring the quantity of electricity exported from the project to the Sumatra grid. An own consumption meter is also installed in the plant in order to monitor the auxiliary consumption of electricity within the plant. The same was also verified by the verification team during the site visit and found to be in line. However monitoring report is not transparent on procedure to be followed to monitor electricity supplied by the project	~~CAR-3~~	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			activity to the grid. As per the PD, validation report and the monitoring report, the project activity involves the following monitoring key parameters. 1. Electricity supplied to the grid. 2. Amount of diesel consumption in hydropower plant. An Electricity Transfer Protocol Report is prepared every month and is signed by the official representatives of Renun hydro power plant which are the generating unit and PT PLN, the transmission unit. During the site visit the verification team verified Electricity Transfer Protocol Report for the period of 01 April 2009 to 31 March 2010 and found satisfactory as it contained all the details like electricity export to the grid, import from the grid, serial number of the meters from which it is monitored, accuracy class, and total electricity supplied to the grid. Further the verification team also tried to cross check the same with sales electricity receipts. However it was noted that there are no such procedure of raising invoice, which is inconsistent with what is mentioned in the PD and the validation report. It was also noted that Electricity Transfer Protocol Report doesn't consider the reading from own consumption meter. PP needs to justify on the same.		

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			PP is requested to submit the the monthly record of diesel consumption and daily records of electricity generation, own consumption, export and import.		
3.1.3. Are all the data and parameters, used for the GHG calculation and required by the VCS approved monitoring methodology and by the monitoring plan, monitored?	/1//2// 3//5/	DR	Yes. PP is monitoring all the parameters used for GHG calculation as per the VCS approved methodology and as mentioned in the monitoring plan. The parameters monitored are electricity supplied by the project activity to the grid, amount of diesel fuel used in hydro power plant operation during the year y		OK
3.1.4. Are all the data and parameters monitored according to the unit measures, source of data and frequency of measurements required by the VCS approved monitoring methodology and by the monitoring plan?	/1//2// 3/	DR/I	Units of all the data and parameters measured, sources of data and frequency of data measured are provided in the monitoring report and is consistent with the final VCS PD and final validation report except for the NCV of diesel fuel. Further verification team also verified the same during the site visit and found that the units of all data and parameters monitored except NCV of diesel fuel are same as mentioned in monitoring report, final VCS PD and final validation report. The unit mentioned for NCV of diesel fuel in the VCS PD is not matching with the monitoring report and emission reduction spread sheet.	~~CL-3~~	OK
3.1.5. Are the measurement procedures (if any) implemented according to the VCS approved monitoring methodology and monitoring plan?	/1//2// 3/	DR	The measurement of electricity generation is monitored continuously, summarized daily and recorded monthly. However the monitoring	~~CL-3~~	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			procedure is not clear on the recording and reporting frequency of net electricity supplied to the grid. Quantity of diesel fuel used in diesel generator sets are measured with the help of static graduated level gauges on the fuel injection tanks of the diesel generator set and a log book is maintained by the PP to monitor the same. PP is requested to submit the purchase receipts of diesel oil.		
3.2. Monitoring equipment					
3.2.1. Is the monitoring equipment used for the data/parameters collected calibrated in a regular way?	/1//2// 3//10/	DR/I	The PP has provided the copies of calibration certificates dated 22/04/2010 for the following : 1. main meters with serial numbers 36027216 in unit 1 and 36027222 in unit 2 that measures the net electricity generation 2. main meter with serial number 36027194 for measuring the own consumption of the plant and 3. For all the cross check meters with serial numbers 4674483, 4674482 and 4674485 installed in Renun hydro power plant. However calibration certificate for the meter with serial no. 4674484 is yet to be provided by the PP. Calibration was conducted on 14/04/2010 and was issued on 22/04/2010. The next due is on April 2011 as mentioned in the calibration certificates. The verification team also checked	~~CAR-1~~	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			the previous calibration test certificate dated 28/07/2005, which clearly implies that the calibration was done in 5 years. However as per the final VCS PD, calibration of meters has to be done yearly. Hence, PP is requested to justify the same.		
3.2.2. Is the measurement equipment calibrated according to current good practice?	/1//2// 3//13/	DR	Calibration is done once in five years as per the regulation passed by the Ministry of Energy and Mineral Resources, Republic of Indonesia dated 27 November 2008. PP had provided a copy of the same which verification team has verified and found appropriate. However it was mentioned in the final VCS PD that the calibration will be done annually. So PP needs to justify.	CAR-1	OK
4. Emission Reduction Calculations (accuracy, correctness)					
4.1. Accuracy of Emission Reduction Calculations					
4.1.1. Are the formulas and connections used for the Emission Reduction Calculations correctly applied in the spreadsheet?	/1//2// 3//4//5 /	DR/I	PP has correctly applied all the formulas as per the approved consolidated methodology ACM 0002 version 10 of EB 47 for calculating the emission reduction and is in line with the final VCS PD. Baseline emissions are calculated as follows: $BE_y = EG_{PJ,y} \times EF_{grid,CM,y}$ Where, BE_y = Baseline emission during the period y , $EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the project activity in year y, and $EF_{grid,CM,y}$ = Combined margin CO ₂		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			emission factor for grid connected power generation in year y. Project emissions are calculated as follows : $PE_{FC,j,CO_2} = \sum FC_{i,j,y} \times COEF_{i,y}$ Where, PE_{FC,j,CO_2} =CO₂ emissions from fossil fuel combustion in process j during year y, $FC_{i,j,y}$ =Quantity of fuel type i combusted in process j during the year y, $COEF_{i,y}$ =CO₂ emission coefficient of fossil fuel type i in year y and i = Fuel types combusted in process j during year y As per the methodology ACM002, version 10 no leakage emissions are considered. The main emissions potentially giving rise to leakage in the context of electric sector projects are emissions arising due to activities such as power plant construction and upstream emissions from fossil fuel use (e.g. extraction, processing, transport). These emissions sources are neglected. The parameters like $EG_{PJ,y}$, $FC_{i,j,y}$ are monitored as per the methodology and is found in line. $EF_{grid,CM,y}$ is fixed ex-ante and is taken from the data published by the Indonesian DNA for the year 2008 which was the latest available data at the time of submission of PDD. The value selected is 0.743tCO₂e/MWh. Verification team has verified the same with the emission factor calculation sheet prepared by the Indonesian DNA provided by the PP and found		

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			appropriate. COEF _{i,y} is calculated as per the tool to calculate project or leakage CO ₂ emissions from fossil fuel combustion. The factors like NCV and weighted average CO ₂ emission factor for diesel oil are fixed ex-ante and is taken from IPCC published in 2006. Verification team has verified all the formulas and default values used in the monitoring report and the emission reduction calculation sheet and compared with the methodology and the VCS PD and found appropriate and in line.		
4.1.2. Are the conversions correctly implemented?	/1//2// 3/	DR	Yes, the conversions have been correctly implemented. The only conversion involved in this project activity is the conversion of KWh to MWh and has been done correctly.		OK
4.1.3. Are the aggregations correctly implemented?	/1//2// 3//16/	DR	Yes. The electricity readings are taken on a daily basis in log books and the same is aggregated monthly. Verification team has verified these documents and found to be in place.		OK
4.1.4. Are the factors used in line with the monitoring plan and VCS approved methodology?	/1//2// 3//4//5 /	DR	Yes. The factor such as Combined margin CO ₂ emission factor for grid connected power generation in year y used in this project activity in order to calculate the emission reductions are in line with the methodology. However it is mentioned in the monitoring report that baseline emissions are calculated from gas projection. PP is requested to elaborate. Value of baseline emission mentioned in the section 4.3.2 of monitoring report is 265,007 tCO ₂ e which is contradicting with the emission	CL-4	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			reduction spread sheet and section 6 of the monitoring report. It is also noted that the value used for CO2 emission factor of fuel type i is contradicting within the spreadsheet. PP is requested to clarify.		
4.1.5. Could manual errors occur during the transposition between data sets?	/1//2// 3//9//1 6/	DR/I	The monthly electricity reports are made in the presence of official representatives of Renun hydro power plant which are the generating unit and PT PLN, the transmission unit. . These readings are taken from main meter located in main control house which acts as the transaction point. These readings will be cross checked from check meters located in the power station. PP is also maintaining the log book on a daily basis. The readings are also stored in a computer based on SCADA system. Hence there are no possibilities of manual errors to be occurred during the transposition between data sets. However these details are not transparent in the monitoring report.	~~CL-5~~	OK
4.1.6. Is there a risk of uncertainty in the calculations due to technological limitations (i.e. use of particular equipment such as meters)?	/1//2// 3//10/	DR/I	Refer section 3.2.1	CAR-1	OK
4.1.7. Are all the measurements conducted with calibrated measurement equipment?	/1//2// 3//10/	DR/I	Refer section 3.2.1	CAR-1	OK
4.1.8. Are there sources lacking data or using default data?	/1//2// 3/	DR	No, the parameters monitored are electricity supplied to grid and diesel fuel consumption in the DG sets. These are monitored in the main meter and level gauges respectively. Parameters fixed ex-ante are emission factor for the electricity supplied to grid which is taken from		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			Indonesian DNA published grid emission factor for Sumatra, NCV, density and Weighted average CO2 emission factor of diesel oil which are taken from 2006 IPCC guidelines for National Green house gas Inventories .		
4.1.9. Are there additional data from other sources (for example, from non-routine or exceptional events)?	/1//2// 3//9/	DR	No, all the data are from available sources. (main meters, Electricity Transfer Protocol Report and logbook of diesel generator set operational data)		OK
4.1.10. Are the key physical process parameters that are critical for the determination of GHG emissions (e.g. meters, sampling methods) identified?	/3//4/	DR	PP has calculated the project emissions from the combustion of diesel in DG sets. There are no other GHG emissions involved in this project activity.		OK
4.2. Quality of Evidence to Determine Emission Reductions					
4.2.1. Is the evidence collected enough to support the Emission Reduction results?	/1//2// 3//4//9 /	DR/I	Emission reductions are calculated on the basis of monthly electricity protocol signed by both the parties of grid as well as the PP. Verification team has verified the copies of these protocols with the original copies and found that these protocols were signed by the officials from transmission department representing the grid and officials from generation department representing the Renun hydro power plant and is appropriate. However it was mentioned in the final VCS PD that these readings can be cross verified with the sales electricity receipts. Verification team was not able to find these documents during the site visit and also came to know that there are no such procedures followed in the plant. PP is	CAR-3	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			requested to justify on the same. It is also noted that the PP has deducted an amount of 0.2% from the actual monitored values mentioned in the monthly electricity report. The same is not mentioned in the registered PDD. Hence it is not clear on why PP has done this data adjustment and on what basis it has been done. The emission reduction value mentioned in the final VCS PD is 229,048 tCO ₂ e. Whereas the value mentioned in the monitoring report is 196,894 tCO ₂ e. PP is requested to explain why this difference has occurred.		
4.2.2. Is the evidence of appropriate quality?	/9/	DR/I	Yes. Verification team has verified the original copies of monthly electricity protocol signed by the grid officials and officials from PP and is found appropriate. Refer section 4.2.1	CAR-3	OK
4.2.3. Is the evidence collected reliable?	/1//2// 3//4//9 /	DR/I	Refer section 4.2.1 and 4.2.2.	CAR-3	OK
5. Management and Operational System					
5.1.1. Is a GHG information management system implemented, including location and retention of stored data?	/1//2// 3/	DR/I	As per the VCS PD, a monitoring team has been established in the Renun hydro power plant for this project activity which is headed by a VCS manager. He has the overall responsibility for the monitoring system on this project. Whereas monitoring report says that the sector manager is responsible for overall monitoring system on this project. PP is requested to clarify on the same. As per the VCS PD a formal set of monitoring	CL-6	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			procedures has been established prior to the implementation of project activity that includes the details of the organization, control and steps required for certain key monitoring system features including VCS staff training, VCS data and record keeping arrangements, data collection, VCS data quality control and quality assurance, equipment maintenance, equipment calibration and equipment failure. These procedures will be agreed and signed by PT PLN (Persero) and South Pole Carbon Asset Management Ltd. However during the site visit the verification team found that there were no such procedures prepared and PP is following their own standard procedures. PP is requested to justify on the same.		
5.1.2. Is there a monitoring report that includes all the monitoring data, calculations, estimations, conversion factors and other standard factors?	/1//2// 3//5/	DR	Yes. The monitoring report includes all the monitoring data, calculations, estimations, conversion factors and other standard factors. The monitored data are the electricity supplied by the project activity to grid and the amount of diesel fuel used in the hydro power plant operation during year y. The calculations and formulas used to calculate the baseline emission, project emission and emission reduction are as per the methodology and VCS PD. Baseline emissions are calculated as the product of the net electricity supplied to the grid by this project activity and combined margin CO ₂ emission factor for the grid connected power generation in year y. Project		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			emissions are the emission caused due to the consumption of fossil fuel in year y. as per the methodology, leakage is found to be zero. Hence the emission reduction will be the difference between the baseline emission and the project emission. The only factors used are combined margin CO ₂ emission factor for the grid connected power generation in year y which is taken from data published by DNA of Indonesia from the year 2008 and CO ₂ emission coefficient of fossil fuel type i in year y which is calculated based on net calorific value and CO ₂ emission factors of fuel type i. Net calorific value and CO ₂ emission factors of fuel type I are taken from IPCC 2006 values.		
5.1.3. Are the QA/QC procedures for the monitored data/parameters implemented according to the monitoring methodology?	/1//2//3/	DR/I	The QA/QC procedures for the monitored data/parameters implemented are as per the monitoring methodology. The accuracy of the data collections and management are ensured by internal audits. The document relevant for the same has been verified by the verification team during the site visit and found satisfactory. External audit was also conducted in this plant for ISO 9001:2008 dated 23/02/2010 and ISO 14001:2004 dated 19/12/2008. PP had also received the certificate for the same which was also verified by the verification team during the site visit and is satisfactory. PP is requested to submit a copy of the report submitted by the auditor of the internal and external audit. However, the monitoring report is not very	~~CL-7~~	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			much clear on how the internal audit will be conducted and its frequency. PP is also requested to mention whether any NC's was raised in the internal/external audits and if raised what are the steps taken to close those issues.		
5.1.4. Are the procedures to collect, record and report all the data for the calculation of emission reductions correctly implemented?	/1/	DR	The monitoring report is not transparent on the procedures followed to collect, record and report the data required for calculation of emission reductions.	~~CAR-4~~	OK
5.1.5. Is there a correctly and efficiently implemented procedure to ensure the appropriateness, accuracy, consistency and completeness of the data?	/1/	DR	The monitoring report is not transparent on the procedures implemented to ensure the appropriateness, accuracy, consistency and completeness of the data.	~~CAR-4~~	OK
5.1.6. Is there a correctly and efficiently implemented procedure for internal audits and non-conformance handling?	/1//11/	DR/I	Yes. PP is conducting the internal audits as per the Standard Operational Procedure (SOP) prepared by the company. Verification team has cross verified the SOP and found that the PP is following all the procedures as mentioned in the SOP. However monitoring report does not talks about the same.	~~CL-8~~	OK
5.1.7. Is the management review frequency defined?	/1/	DR	The monitoring report doesn't address management review frequency. Please provide the copy of the same.	~~CL-9~~	OK
5.1.8. Is the management review undertaken according to the frequency established?	/1/	DR	Refer section 5.1.7	~~CL-9~~	OK
5.1.9. Is a procedure in place and implemented to take into account the collection, recording and reporting of additional data of other sources coming from non-routine or exceptional	/1/	DR	Yes. PP has identified specific procedures that have to be followed during any uncertainties or unexceptional events such as main or cross check meter failure. However monitoring report	~~CL-10~~	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
events?			is not transparent on the same.		
5.1.10. Is the role of each person involved in the GHG data management process defined in the procedures?	/1//11/	DR	PP has an SOP which specifies the roles, responsibilities and competence required for each person involved in GHG data management process. Verification team has verified the SOP and found that PP is following the same without any failure.		OK
5.1.11. Are the defined competence and responsibilities correctly applied?	/1//11/	DR	Refer section 5.1.10		OK
5.1.12. Are the personnel competencies for each aspect of the GHG determination process suitable?	/1//11/	DR	Refer section 5.1.10		OK
5.1.13. Do the procedures guarantee the quality and correctness of the calculated emission reductions, identifying and reducing to a minimum the risk of mistakes (e.g. manual errors, meters, internal reporting, sampling methods...) and uncertainty?	/1//2// 3//9//1 6/	DR	Refer section 4.1.5	CL-5	OK
5.1.14. Have data protection measures for databases/spreadsheets/internal reporting been implemented?	/1//2// 3/	DR/I	As per the VCS PD, at the end of each month all the monitoring data needs to be filed electronically. These files also need to have CD back-up and/ or print out. All written documentation such as maps, drawings, EIA and the feasibility report should be stored and be available until two years after the end of the crediting period. During the site visit, verification team has found that PP is storing all the records both electronically and in the form of hard copy and is available at any time until two years after the end of the crediting period.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
5.1.15. Has the IT System used for GHG monitoring and reporting been tested and documented?	/1//2//3/	DR/I	Refer section 5.1.14		OK
6. Grouped projects					
6.1.1.Has a proper sample of sites been verified according to the IAF Guide to ISO/IEC Guide 66:1999?	/1/	DR	The project is not grouped project. Hence sampling is not required.		OK
6.1.2.Is there just one central GHG Information System and controls associated with the project and its monitoring?	/1/	DR	Not applicable		OK

TABLE 2 RESOLUTION OF CORRECTIVE ACTION REQUESTS AND CLARIFICATION REQUESTS

Draft report clarifications and corrective action requests	Ref. to table 1	Summary of project participants' response	Verification team conclusion
CAR 1 PP is requested address the following issues and submit the revised monitoring report accordingly. 1. It was evident from the final validation report that a FAR was raised during the validation time regarding the calibration frequency and inclusion of detailed procedure in SOP in order to identify meter faults and to take care the emergency and uncertainties involved in the generation readings. Subsequently the same was closed by the PP by providing the justification that calibration for the meters will be conducted once in a year and SOP with detailed procedures will be submitted at the time of verification. However verification found that calibration is done only once in five years. Hence PP is requested to justify on the same. 2. The calibration certificate for the meter with serial no. 4674484 is yet to be provided by the PP.	1.1.2, 3.2.1, 3.2.2, 4.1.6, 4.1.7	1. The Renun HEPP as part of the PT. PLN (Persero), a state-own electricity enterprise has to follow the national regulation. From the Ministry of Energy and Mineral's resource regulation Number 37 year 2008 dated November 27,2008 on the Grid Code Sumatera Electricity Power System, the calibration of kWh meter must be done once every 5 (five) years (stated in the Metering Code section, MC 4.1.1). A deviation for Monitoring Report proposal has been submitted to RINA to address this issue and has been accepted. 2. The requested Calibration Certificate is attached. There was typo error on the Certificate's serial number from the Calibration Office. "Generator 2 analog", "STR 2 Analog" and "kWh Analog". All three of them are having same serial number → 4674482. Meter at "Generator 2 Analog" was using correct number (4674482), while the meter "STR 2 analog" should be	1. As per the deviation proposal, calibration frequency has been changed from once in a year to once in five year based on the Indonesian regulation. Verification team has checked the regulation pertaining to calibration and found appropriate. Hence accepted. 2. PP has submitted the calibration certificate for the meter with serial no.4674484. Verification team has checked the same and found appropriate. The letter sent from Pandan sector office to the calibration office regarding the discrepancy in the

3. Calibration was conducted on 14/04/2010 and was issued on 22/04/2010. The next due is on April 2011 as mentioned in the calibration certificates. The verification team also checked the previous calibration test certificate dated 28/07/2005, which clearly implies that the calibration was done in 5 years. However as per the final VCS PD, calibration of meters has to be done yearly. Hence, PP is requested to justify the same.		4674484 and “kWh analog” is 4674486. Each meter calibration test was performed correctly (typo error only on meter ID number), each Calibration Certificate shows individual meter test result. Pandan Sector Office staff has submitted a formal letter to the calibration office regarding this. (The official letter and translations attached). 3. The calibration frequency has been revised from annual calibration into once every five years calibration as per the VCS PD Deviation proposal. As per Indonesia regulation that calibration of the meter shall be conducted once every 5 years.	serial number mentioned in the calibration certificates has been submitted by the PP. The revised calibration certificates for the meters with numbers 4674484 and 4674486 have also been submitted by the PP. Verification team has checked these documents and found appropriate. Hence accepted. 3. As per the deviation proposal, calibration frequency has been changed from once in a year to once in five year based on the Indonesian regulation. Verification team has checked the regulation pertaining to calibration and found appropriate. Hence accepted. Since all the issues are closed, CAR 1 is closed.
CAR 2 PP is requested to submit the revised monitoring report by addressing the following issues. 1. As per the VCS-PD, the crediting period starts from 01/09/2006. However, the crediting period in the monitoring report starts from 01/04/2009. The PP is requested to justify on not claiming the emission reductions for first two and a half	2.1.1	1. The reason for not claiming the emission reductions for monitoring period 2006 – 2009 is because there is no demand from buyer for old VCU credits. Unlike the Compliance Buyers under Kyoto Protocol, VCU buyer widely consider Large Hydro project to be not very attractive, because of	1. The justification provided by PP is acceptable since it doesn't impact the emission reductions of the current monitoring period (01/04/2009 to 31/03/2010) under verification.

years. 2. The monitoring report states that project has been commissioned and commercialized since August 2006. PP is requested to mention the exact commissioning date and the actual operation of the VCS project activity.		the negative perception spread about the bad impact of the project to the environment. Even if Renun HEPP is a large hydro that has small impact to the environment (run-of-river only), it was rather difficult to sell the credit and convincing such potential VCU buyer. Thereby decision for not claiming credit from year 2006 – 2009 and focus to sell VCU credits from monitoring period 2009 – 2010. 2. The exact commissioning date (also the actual operation of the VCS Project) has been made transparent in Monitoring Report section 2.1 page 3 : 14 August 2006 commissioned.	2. PP has included the exact commissioning date in the revised monitoring report and is found appropriate as it is in line with the registered PD and commissioning certificate. Hence accepted. Since all issues are closed, CAR 2 is closed.
CAR 3 PP is requested to submit the revised monitoring report by addressing the following issues. 1. Monitoring report is not transparent on procedure followed to monitor electricity supplied by the project activity to the grid.	3.1.2, 4.2.1, 4.2.2, 4.2.3	1. Procedure to monitor electricity supplied by the project activity to grid has been made transparent in Monitoring Report section 3 (page 4 -10).	1. As per the procedure followed at site, on a predetermined day, representatives from both the transmission unit and production unit together note the electricity export and import readings from main meter installed at main control house and a monthly electricity transfer protocol is prepared by the PP based on this reading. This is then verified and

2. The verification team tried to cross check the electricity exported by the project activity to the grid with sales electricity receipts. However it was noted that there are no such procedure of raising invoice, which is inconsistent with what is mentioned in the PD and the validation report. PP is requested to justify.		2. The QA/QC procedure to cross-check the electricity transfer to the grid has been revised by VCS-PD Deviation proposal. Under the Deviation proposal, the electricity exported by the project activity to the grid will be cross-checked with the meter reading at transmission sub-station (Grid dispatcher, P3B).	signed by both the parties. PP has incorporated the same in the revised monitoring report. Verification team has checked the same and found to be in line and consistent with what mentioned in the registered PD. 2. As per the registered VCS PD and the methodology applied, electricity exported by the project activity to the grid has to be cross checked with sales electricity receipts. Since PP doesn't have such kind of procedures, PP had submitted a proposal for deviation. As per the proposal, substation to which the electricity generated from Renun HEPP is supplied has a dedicated meter for monitoring the electricity received from the Renun HEPP and also maintains a log book. PP has proposed to use this log book for cross checking the data in the monthly electricity protocol. Verification team during the site visit had visited the substation and confirmed that the substation is having a dedicated meter to monitor the electricity coming to the grid from RENUN HEPP. Also they are maintaining a log book and recording the readings on a monthly basis. Verification team
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3. It was also noted that Electricity Transfer Protocol Report doesn't consider the reading from own consumption meter. PP is requested to justify on the same.		3. The net electricity transferred is total amount of electricity transferred to the grid after deduction of Own Consumption. According to "Official Report regarding Joint Reading of Main kWh Meter for Electricity Energy Transfer between PT PLN (Persero) Sumbagut Sector", both parties has agreed to use Main Meter (net production) for transaction purpose, and the own consumption meter reading (gross) is no longer needed (document attached "Joint Reading Agreement, 16 Dec.2006 and English translation).	has accepted this proposal as it was found to be credible and appropriate. It was also noted by the verification team during the site visit that the accuracy class for meter at Renun HEPP is 0.2s whereas for the meter at substation is 1s. PP has provided a working in an excel sheet consisting of comparison of meter reading at Renun HEPP and substation. Verification team has checked the same and found that for all the months in this particular monitoring year, the difference is found to be less than 5% which is considered as T and D loss and the error that would have occurred due to the difference in the accuracy class of the meters at substation and at Renun HEPP. Hence accepted. 3. PP has submitted the agreement signed between PT PLN (Persero), Sumbagut sector and P3B, Sumatera regarding the joint reading of main kWh meter for electricity transfer. As per this agreement, meters with serial number 36027216 and 36027222 installed at Renun HEPP with accuracy class 0.2s , Aktaris made will be used as the main meter for the energy readings and own
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4. PP is requested to submit the monthly record of diesel consumption and daily records of electricity generation, own consumption, export and import.		4. Calculation of project emission for this crediting period has been revised (please refer to VCS PD Deviation proposal). For current monitoring / verification period, to calculate the project emission from diesel fuel consumption, we use total diesel fuel amount from the monthly purchase receipt. In the section 3.3 of VCS PD the monitor data / parameter is the net electricity supplied to the Grid, with source of data used for monitoring data is the monthly electricity generation report form. This monthly data was cross-checked with kWh meter reading at the transmission sub-station. The daily log book has been submitted to RINA. 2nd response: The running hours are displayed on the panel of emergency diesel generator. The Renun operator will record the initial and the final running hours	consumption will not be considered. Verification team has checked the document and confirms that the net electricity transferred from the Renun HEPP to the grid is measured from the main meters installed at the plant with serial numbers 36027216 and 36027222, accuracy class 0.2s. The electricity transfer protocol is prepared based on the readings taken from these meters and hence the justification provided by the PP is accepted. 4. As per the registered VCS PD, fuel consumption in DG sets has to be calculated based on static graduated level gauges installed and the fuel injection tanks. However during the site visit, verification team confirmed that there was no such instrument installed. Hence PP has gone for deviation and the fuel consumption will be calculated from the monitored running hours of the DG sets. PP confirmed that the running hours of the DG sets will be monitored henceforth. Hence verification team has raised a FAR on the same. However PP is requested to clarify on whether the meter used in monitoring the running hours of DG sets is
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		before and after doing the activity ‘Konservasi’ or ‘warming-up activity’. The running hours will be recorded on document title “Kartu Riwayat Peralatan Unit PLTA Renun” or “Equipment Historical Card of Renun HEPP Generation Unit” The example of the document is attached under name “Diesel Oil Usage 2009 (Equipment Historical Card).pdf”. Renun HEPP purchase diesel oil fuel for this following months: June, July, August, September 2009 and February 2010. From those purchase receipts, the maximum purchase amount is 100 litre per month. To be conservative, we use the maximum amount for each and every month on this monitoring period. Even using this maximum amount for monthly purchase, the calculation result shown that the $PE_{FF,y}$ is still below 1% of BE calculation, therefore $PE_{FF,y}$ amount is neglected. For such typically small amount of diesel oil purchase (not higher than 100 litres), Renun’s staff purchase the diesel oil from nearby public gas station, instead having supply contract with supplier.	installed or if it is not installed, a tentative time period in which the meter will be installed. So for this particular monitoring period, PP calculated the diesel consumption based on the fuel purchase receipt. Verification team has accepted the same as the fuel purchase receipts would provide the total fuel consumed in the plant other than the project activity and is hence conservative. Also as per the ER sheet, PP has consumed 100 litres of diesel every month. However PP has submitted diesel purchase receipts only for the month of June 2009 to September 2009 and February 2010. PP is requested to submit the copies of purchase receipts for the rest of the months in this monitoring year. PP is also requested to submit the fuel purchase agreement signed between the PP and the supplier. 2nd response. Justification on monitoring of running hours of the DG sets is accepted as it will be displayed in the panel of the diesel generator and PP will be maintaining a log book on the same. Further PP’s justification for the inclusion 100litres as the diesel fuel consumption in the plant for every
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5. It is also noted that the PP has deducted an amount of 0.2% from the actual monitored values mentioned in the monthly electricity report. The same is not mentioned in the registered PDD. Hence it is not clear on why PP has done this data adjustment and on what basis it has been done.		5. The deduction of 0.2% during initial verification process was being made to conclude the calibration interval issue being longer than required. However, after the approval of our deviation proposal for the same (calibration interval following host country regulation), the ER calculation has revised to the actual value without deduction. 2nd response: Revised ER Calculation sheet is submitted to DOE.	month is as to be conservative is also accepted. Justification for not having the fuel purchase agreement is also acceptable as they are not purchasing frequently and that too in large quantity. Hence this part of CAR is closed. 5. PP is requested to submit the revised ER calculation sheet. 2nd response: PP has submitted the revised ER sheet. It is noted that PP has included the actual monitoring values of electricity exported to grid mentioned in the monthly electricity report for the calculation of baseline emission without deducting 0.2%. In the initial monitoring report, PP had deducted an amount of 0.2% from the actual monitored values of electricity exported to grid. This was done as there was a delay in calibration for the meters and hence followed "Guidelines for assessing compliance with the calibration frequency requirements", EB 52, annex 60, version 01. As per the registered VCS PD, meters had to be calibrated once in a year. However PP had gone for a deviation on the same and proposed to conduct calibration once in five year. Verification team accepted the same as
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6. The emission reduction value mentioned in the final VCS PD is 229,048 tCO₂e. Whereas the value mentioned in the monitoring report is 196,894 tCO₂e. PP is requested to explain why this difference has occurred.		6.The emission reduction mentioned in the VCS PD was calculated based on capacity factor 43.68% as stated in the detail design report on 1988 (VCS PD page 8, Table 3 – row 5). The ER value in the monitoring report calculated based on actual net electricity supplied to the Grid (generated from the same installed capacity as designed). The value is lower because the power plant is not 100% operated due to the low water flowrate condition. 2nd response Renun HEPP operates according to actual load and resources condition, as determined by powerplant operation team. The 1st supporting document is the Monthly Sumatera Grid Evaluation Operation Report “Evaluasi Operasi Sistem Tenaga Listrik Sumatera”. This document is a summary report issued by PT PLN (Persero) P3B / Load Dispatcher Division. Clearly stated from this report, the net electricity production for Renun HEPP compare to the same month from the previous year (2008) having negative growth (for example : October – November 2009, January – March 2010). The 2nd supporting document is the daily log book of the Generation Unit Renun HEPP. This log book clearly show that the Generator Units were not fully operated everyday for each and every	this was proposed based on the Indonesian regulation. Hence PP has made necessary corrections in the MR and ER sheet and is accepted. 6. Verification team has checked the registered VCS PD, the monthly electricity transfer protocol report for the current monitoring year and confirms that the expected annual power generation was 313,500MWh whereas the achieved generation is 265,538 MWh with a capacity factor of 36.967%. Further it is mentioned that power plant was not 100% operational due to the low flow rate conditions. PP is requested to provide supporting evidence for the same. 2nd response: PP has submitted the Monthly Sumatera Grid Evaluation Operation Report “Evaluasi Operasi Sistem Tenaga Listrik Sumatera” prepared by PT PLN. This report consists of a comparison of monthly electricity generation with the same month of previous year. Report clearly indicates that the generation in Renun HEPP in this current monitoring period (01/04/2009 to 31/03/2010) is less compared to previous year for every month. The same is also supported with
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		month. The summary sheet of the Operational Hour (taken from the Daily Log Book) shows that the Generator Operational Hour range from 35% - 59%. Therefore the annual electricity generation significantly lower than the expected annual electricity generation.	daily log sheet maintained at plant. Verification team has checked both the documents and confirmed that the generation was less compared to previous year and both the turbines were not working for 24 hours. It was also confirmed that there was no major shut down/maintenance for this HEPP. Hence verification team concluded that the generation was less due to less flow rate. Hence accepted. However PP is requested to conduct an analysis on the reduced electricity generation if any compared to the estimated generation as mentioned in the registered VCS PD during the next internal audit. The same is raised as a FAR. Since all the issues are closed, CAR 3 is closed.
CAR 4 PP is requested submit the revised monitoring report by addressing the following issues. 1. The monitoring report is not transparent on the procedures followed to collect, record and report the data required for calculation of emission reductions.	5.1.4, 5.1.5	1. Monitoring report has been revised (section 3.4 - page 9) to be transparent and consistent with VCS PD.	1. Monitoring report has been revised accordingly and is now transparent on the procedures followed to collect, record and report the data required for calculation of emission reductions. As per the procedure followed at site, on a predetermined day, representatives from both the transmission unit and production unit together notes the reading from

2. The monitoring report is not transparent on the procedures implemented to ensure the appropriateness, accuracy, consistency and completeness of the data.		2. Monitoring report has been revised (section 3.2-3.3; page 5-9) to be transparent and consistent with VCS PD, specifically on page 8 “Stand meter reading”, page 9 “Meter failure”.	main meter and a monthly electricity transfer protocol is prepared by the PP based on this reading. This is then verified and signed by both the parties. The value of electricity exported to grid by the HEPP for calculating the baseline emission is taken from this monthly electricity transfer protocol. PP has incorporated the same in the revised monitoring report. Verification team has checked the same and found to be in line and consistent with what mentioned in the registered PD. 2. The revised monitoring report is now transparent on the procedures implemented to ensure the appropriateness, accuracy, consistency and completeness of the data. The monthly electricity reports are made in the presence of official representatives of Renun hydro power plant which are the generating unit and PT PLN, the transmission unit. . These readings are taken from main meter located in main control house which acts as the transaction point. These readings will be cross checked from check meters located in the power station. PP is also maintaining the
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			log book on a daily basis. The readings are also stored in a computer based on SCADA system, which also serves as a backup. Hence there are no possibilities of manual errors to be occurred during the transposition between data sets. Since all the issues are closed, CAR 4 is also closed.
CL 1 PP is requested to provide the following clarification and submit the revised monitoring report accordingly. Submission of the VCS PD dated 06/11/2009, version 03 to registration is still under process. Supporting documents of the same needs to be provided for verification.	1.1.1	The “82 MW Lau Renun Hydro Power Plant, North Sumatra” project has been registered under VCS standard (ID 488) on August 23, 2010. Please follow the link below for complete information: https://vcsprojectdatabase1.apx.com/mymodule/ProjectDoc/EditProjectDoc.asp?id1=488	Verification team has checked the web link /16/ provided by the PP and confirmed that the project has been registered under VCS standard with ID 488 and uploaded in the registry on 24/08/2010. Hence accepted. CL 1 is closed.
CL 2 PP is requested to provide the following clarification and submit the revised monitoring report accordingly. 1. PP is requested to mention the sources of data required for monitoring the parameter electricity supplied by the project activity to the grid clearly. It is not transparent on which type of meter the parameter electricity supplied is monitored.	3.1.1	1. Monitoring report has been revised (section 3.3; page 5-9) to be transparent and consistent with VCS PD.	The descriptions of all the monitoring parameters mentioned in the revised monitoring report are now in line with the registered VCS PD. The type of the meter used to monitor the electricity supplied to the substation is Actaris SL 7000 and the same is included the revised monitoring report. Revised monitoring report is also clear on the sources of data required for monitoring the parameter electricity supplied by the project activity to the grid. Hence accepted. CL 2 is closed.

CL 3 PP is requested to provide the following clarification and submit the revised monitoring report accordingly. 1. The unit mentioned for NCV of diesel fuel in the VCS PD is not matching with the monitoring report and emission reduction spread sheet. PP is requested to clarify. 2. Monitoring procedure is not clear on the recording and reporting frequency of net electricity supplied to the grid.	3.1.4, 3.1.5	1. The unit mentioned for NCV of diesel fuel in the monitoring report has been revised accordingly (Table 2 - page 8). 2nd response: Revised ER calculation sheet is submitted to DOE. 2. Monitoring report has been revised to be transparent and consistent with VCS PD page 7 : Table 1 “The electricity generation’s data used for monitoring is the monthly electricity generation report delivered to grid signed by both parties of generation department and transmission department (Joint Meter Reading, monthly)” 2nd response: The SOP ‘ProsedurTransfer Tenaga Listrik antara PT PLN (Persero) Pembangkitan Sumbagut, PT PLN (Persero) Pembangkitan Sumbagsel dengan PT PLN (Persero) P3B Sumatera’ is a general procedure for all Generation Unit located in	1. The unit mentioned for NCV of diesel fuel in the revised monitoring report is now consistent with the registered VCS PD. However PP is requested to submit the revised ER sheet. 2nd response: PP has submitted the revised ER calculation sheet incorporating the relevant changes. The unit for NCV is now consistent within the MR, registered PD and ER sheet. Hence accepted. 2. Revised monitoring report is now clear on recording and reporting frequency of net electricity supplied to the grid. However it states that the metering of net electricity supplied to the grid is done by following the SOP “Prosedur tetap transfer tenaga listrik antara PT PLN (Persero) Pembangkitan Sumbagut, PT PLN (Persero) Pembangkitan Sumbagsel dengan PT PLN (Persero) P3B Sumatera”. However it is noted that the procedure mentioned in the revised monitoring report is not matching
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3. PP is requested to submit the purchase receipts of diesel oil.	South and North Sumatera. As a general procedure it doesn't really show the normal procedure occurred in the Renun HEPP Generation Unit. SOP page 7 shown 4 points (point a, b, c and d), which are not continuing steps. The point c is an additional activity by special requirement (one party allowed to read the stand meter on other party side if there is request from the stand meter owner). The steps shown in the revised Monitoring Report page 8 (also described on the registered VCS PD page 34), is the detail procedure taken from the 'Prosedur pembuatan BA Pengiriman Energi Listrik PLTA Renun' or 'Procedure to develop Renun HEPP Monthly Electricity Protocol Report' Revised Monitoring Report page 7, Table 1 'Key monitored parameter' has been revised : 'BAP transfer listrik' revised into 'Berita Acara tentang Penyerahan dan Penerimaan kWh Penyaluran' 3. The purchase receipts of diesel oil attached. Renun operator / staff (receipt named "konservasi" for diesel warming-up activity) bi-weekly as Renun's normal procedure. For each warming-up activity, it consumed around 3 liters of diesel oil. The diesel purchase receipt available from June to	with the steps indicated in the SOP submitted by PP. Also the title of this SOP is contradicting with the title mentioned in Appendix 2 of this monitoring report. 2nd response: PP is having a general procedure for monitoring the electricity transfer named as "Prosedur Tetap Transfer Tenaga Listrik antara PT.PLN Pembangkitan Sumbagut, PT. PLN Pembangkitan Sumbagsel dengan PT. PLN (P3B) Sumatera". However Renun HEPP is having a detailed procedure for monitoring the same which is titled "Prosedur pembuatan BA (Berita Acara) Pengiriman Energi Listrik PLTA Renun". The procedure mentioned in the revised monitoring report is now consistent with this SOP. Title of the SOP mentioned is also consistent within the revised monitoring report. Hence accepted. 3. As per section 4.2.2 of the revised monitoring report, PP has purchased 100litres of diesel in every month of this monitoring year. Hence justification provided by PP is contradicting to the monitoring report.
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		September 2009 and February 2010 with 100 liters purchase amount in maximum, for conservative Project Emissions calculation. The purchase receipt also mentioning the purchase purpose, written as “untuk Genset” (means for diesel generator, “Genset” is a local nickname for emergency diesel generator set). Because the actual monthly usage amount is lower than the purchase amount, Renun operator did not purchase diesel fuel for each and every month. It explained why the diesel purchase receipt for full 12 months were not available (also described in Deviation proposal : The diesel fuel usage calculation based on the diesel fuel purchase receipt is applied only for this verification period) 2nd response: PP did not purchase 100 liters of diesel in every month of this monitoring year (please refer to above CAR 3 – point 4). To be conservative, we use the maximum value for each and every month during the crediting period. The calculation result shown that the $PE_{FF,y}$ (or PE_{FC,CO_2}) was below 1% of BE (revised Monitoring Report page 14 <i>‘Since total PE_{FC,j,CO_2} accounts for less than 1% of the baseline emissions, and in accordance with ACM0002 version 10, the project emission can be neglected. Therefore $PE_y = 0$</i>)	2nd response: Justification provided by PP is accepted as it is conservative. Hence this issue is closed. Since all the issues are closed, CL 3 is closed.
CL 4	4.1.4		

PP is requested to provide the following clarification and submit the revised monitoring report accordingly. 1. It is mentioned in the monitoring report that baseline emissions are calculated from gas projection. PP is requested to elaborate. 2. Value of baseline emission mentioned in the section 4.3.2 of monitoring report is 265,007 tCO₂e which is contradicting with the emission reduction spread sheet and section 6 of the monitoring report. PP is requested to clarify. 3. It is also noted that the value used for CO₂ emission factor of fuel type i is contradicting within the spreadsheet.		1. It was a typo error. Monitoring report has been revised accordingly (section 4.1.1 - page 11, deleted the sentence “Baseline emissions calculated from gas projection refer to equation (1)”). 2. It was a typo error. The baseline emission value on the Monitoring report section 4.3.2 – page 14 has been revised accordingly in-line with the section 6. EG_{PJ,y} value (section 4.1 – page 11) has been revised to be in-line with value on the emission reduction calculation sheet. 2nd response: The revised ER sheet was submitted to DOE 3. The EF_{CO₂,i} as mentioned on the monitoring report has been revised to be similar with register VCS PD. The EF_{CO₂,i} is 0.074 tCO₂/GJ. The ER spreadsheet is using 74.1 tCO₂/TJ because the calculation is using ton as the unit. 2nd response: The revised ER sheet was submitted to DOE	1. PP has made necessary changes to the revised monitoring report and is found appropriate. 2. Revised monitoring report is consistent on the value of baseline emission. However PP is requested to submit the ER sheet. 2nd response: PP has submitted the revised ER sheet by making appropriate changes. Verification has checked the same and confirmed that the value of baseline emission mentioned in the monitoring report is consistent with the revised ER sheet. Hence accepted. 3. The value of CO₂ emission factor in the revised monitoring report is now consistent with the registered PD. However PP is requested to submit the revised ER sheet. 2nd response: PP has submitted the revised ER sheet by making appropriate changes. Verification has checked
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			the same and confirmed that the value of CO₂ emission factor mentioned in the revised monitoring report is consistent with the revised ER sheet and registered PD. Hence accepted. Since all the issues are closed, CL 4 is closed.
CL 5 PP is requested submit the revised monitoring report by addressing the following issue. The monthly electricity reports are made in the presence of official representatives of Renun hydro power plant which are the generating unit and PT PLN, the transmission unit. . These readings are taken from main meter located in main control house which acts as the transaction point. These readings will be cross checked from check meters located in the power station. PP is also maintaining the log book on a daily basis. The readings are also stored in a computer based on SCADA system. Hence there are no possibilities of manual errors to be occurred during the transposition between data sets. However these details are not transparent in the	4.1.5, 5.1.13	1. Monitoring has been revised (section 3.4 – 3.5 page 9-10) to be transparent and in line with the VCS PD (and Deviation proposal, which describes another substation cross-check meter reading)	PP has included the necessary details in the revised monitoring report /2/ and is appropriate. Hence accepted. CL 5 is closed.

monitoring report.			
CL 6 PP is requested to provide the following clarification and submit the revised monitoring report accordingly 1. As per the VCS PD, a monitoring team has been established in the Renun hydro power plant for this project activity which is headed by a VCS manager. He has the overall responsibility for the monitoring system on this project. Whereas monitoring report says that the sector manager is responsible for overall monitoring system on this project. PP is requested to clarify on the same. 2. As per the VCS PD a formal set of monitoring procedures has been established prior to the implementation of project activity that includes the details of the organization, control and steps required for certain key monitoring system features including VCS staff training, VCS data and record keeping arrangements, data collection, VCS data quality control and	5.1.1	1. The correct title is the 'VCS Manager'. Monitoring report has been revised accordingly (section 3.4 - page 9). 2. As this is a VCS project, PP has been following their owned procedurals (for previous period, prior to VCS-PD validation, registration and verification for this monitoring period). Description on Monitoring Report (section 3.4 – page 9) “South Pole has organized one time monitoring training... ..found in the SOP monitoring plan.” Procedures SOP monitoring plan to be applied on the next monitoring period, consist of : a. The monitoring data/parameter	1. PP has revised the monitoring report accordingly and is now consistent with the registered VCS PD. Hence accepted. 2. PP has their own standard operation procedures for operation of plant, calibration of equipments, preparation of Electricity Transfer Monthly Protocol Report, electricity transfer and emergency response. PP strictly follows these procedures and the same was confirmed by the verification team during the site visit. Hence the argument provided by PP is accepted. However a FAR is raised

quality assurance, equipment maintenance, equipment calibration and equipment failure. These procedures will be agreed and signed by PT PLN (Persero) and South Pole Carbon Asset Management Ltd. However during the site visit the verification team found that there were no such procedures prepared and PP is following their own standard procedures. PP is requested to justify on the same.		b. The PIC to collect the data c. Data storage The Monitoring training documentation is attached.	to verify the procedure developed by SP that has to be followed henceforth by the PP. Moreover South Pole has already provided training for all the VCS team members at the project site. The verification team has cross checked the supporting documents for the same such as the attendance sheet, photographs taken, invitation letter sent by South Pole to PP, PP's reply and confirms that a proper training was given to PP focusing on the monitoring procedures as required for this project as per the VCS requirements. Since all the issues are closed, CL 6 is also closed.
CL 7 PP is requested to provide the following clarification and submit the revised monitoring report accordingly 1. PP is requested to submit a copy of the report submitted by the auditor of the internal and external audit.	5.1.3	1. Report was submitted	1. PP is yet to submit any documents pertaining to external audit conducted at site. Moreover it is not clear on whether the non conformity mentioned in the revised monitoring report was raised during the internal or external audit. 2nd response:

2. The monitoring report is not very much clear on how the internal audit will be conducted and its frequency.		2. Internal audit described on the Monitoring Report section 3.4 page 9, and appendix 3 page 19.	PP conducts both internal and external audits at plant annually. It was found that there were no issues/observations raised based on the VCS project during the internal audit. Verification team has checked the issues rose in the internal audit and confirmed the same. Further it was noted that internal audit is not focusing on the VCS project. Hence verification team has raised a FAR to include the same as a point during next internal audit. External audit was also conducted for renewing the certificates such as ISO 9001:2008, ISO 140001:2004 and OHSAS. Verification team has checked all the relevant certificates and confirmed that PP has renewed the same and is still valid. Hence justification provided by PP is accepted. 2. PP has included the details of internal audit in the revised monitoring report and is satisfactory. However PP is requested to kindly refer point number 1 of this CL. 2nd response: Kindly refer the comment for point number 1. 3. Kindly refer point number 1 of this
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3. PP is requested to also mention whether any NC's was raised in the internal/external audits and if raised what are the steps taken to close those issues.		3. Finding and NCs relevant to Renun HEPP focused on management system, health, safety, etc (none on ER related issue). 2nd response to point 1, 2 and 3 : Additional paragraph regarding the Internal and External Audit has also been added to the revised Monitoring Report section 3.4 page 9.	CL. 2nd response: Kindly refer the comment for point number 1. Since all the issues are closed, CL 7 is closed.
CL 8 PP is requested to provide the following clarification and submit the revised monitoring report accordingly 1. PP is conducting the internal audits as per the Standard Operational Procedure (SOP) prepared by the company. Verification team has cross verified the SOP and found that the PP is following all the procedures as mentioned in the SOP. However monitoring report does not talks about the same.	5.1.6	1. The Monitoring Report section 3.4 page 9-10 was revised as above – CL 6.	Monitoring report has been revised accordingly and is now transparent on the internal audits conducted at site. Hence this CL is closed.
CL 9 PP is requested to provide the following clarification and submit the revised monitoring report accordingly The monitoring report doesn't address management review frequency. Please provide the copy of the same.	5.1.7, 5.1.8	1. Monitoring report has been revised accordingly (section 6 - page 15), management review conducted once for every monitoring period. The sentence "... at the end of the monitoring period" is not intended to a specific date right after the period end. The monitoring training taken place on early April 2010 while the verification site visit conducted on mid of May, 2010. As this is the first verification process, they	Justification provided by the PP is accepted. PP has submitted the minutes of the management review meeting conducted on 03/08/2010. Verification team has checked the same and found to be acceptable. Hence accepted. CL 9 is closed.

		did the management review after the site visit conducted. For budget efficiency, the VCS agenda was included on the Sector Pandan annual management meeting that was conducted on August 2010.	
CL 10 PP is requested to provide the following clarification and submit the revised monitoring report accordingly PP has identified specific procedures that have to be followed during any uncertainties or unexceptional events such as main or cross check meter failure. However monitoring report is not transparent on the same.	5.1.9	1. Monitoring report has been revised accordingly. (refer to section 3.5.2 page 10 “Monitoring equipment malfunctions”)	PP has certain Standard Operational Procedures (SOP) that has to be followed during equipment maintenance, calibration and failure of meters. PP follows these procedures as and when required and the same was confirmed by the verification team during site visit. PP has revised the monitoring report accordingly and is now transparent on the procedures to be followed during any uncertainties or unexceptional events such as main or cross check meter failure. It was also checked by the verification team during the site visit that there was no metering device break down or malfunction reported during the respective monitoring period. Hence CL 10 is closed.

TABLE 3 FORWARD ACTION REQUEST

Forward action request	Reference to Table 2	Response by project participants Verification Conclusion
FAR 1 As per the deviation done by the PP, running hours of the DG sets in the Renun HEPP has to be monitored by installing an instrument. However the same needs to be monitored during next verification.	CAR 3	Respond: The diesel consumption will be calculated by monitoring the running hours and the same is made transparent in the deviation. The diesel consumption can be cross-checked with the purchase receipts. If any discrepancy is found in the readings, the most conservative value will be considered for calculation of project emission.
FAR 2 It is noted that the electricity exported from the plant, Renun HEPP is also metered at substation, Sidikalang and Berastagi. The readings of the same are also recorded in the log book. Since the cross checking of the electricity supplied to the grid from the HEPP is done based on the meter at the substation, this meter needs to be calibrated at a frequency as per the Indonesian regulation or manufacturer whichever is less and the same needs to be checked during the next verification.	CAR 3	Respond: The meters located at the Sidikalang and Berastagi substation henceforth will be calibrated at a frequency as per the Indonesian regulation and checked during the next verification period.
FAR 3 SP will develop a procedure consisting of a. The monitoring data/parameter b. The PIC to collect the data c. Data storage The same has to be verified in the coming verification.	CL 6	Respond: SP will develop a procedure consisting of : a. The monitoring data/parameter b. The PIC to collect the data c. Data storage The VCS Procedure will be made available on the next verification process. PP will follow the procedure prepare by SP parallel with their own procedural.
FAR 4 During the next internal audit, PP is requested to focus on the VCS project and justification on the variation if any on the electricity generation compared to the	CAR 3, CL 7	Respond: At this moment, no issue related to the VCS project audited on the last internal audit process. For the next verification period onward, PP through their internal audit team will check whether all of the monitoring and data management are done as per the VCS requirement on their

Forward action request	Reference to Table 2	Response by project participants Verification Conclusion
estimated generation as mentioned in the registered VCS PD.		internal audit. The audit team will also audit the electricity generation and supply to the Sumatera Grid and make a comparison evaluation between actual and estimated electricity generation.