VERIFICATION/CERTIFICATION REPORT

HAPUGASTENNE AND HULU GANGA SMALL HYDROPOWER PROJECTS IN SRI LANKA

REPORT NO. 2007-9001/1

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DET NORSKE VERITAS

VERIFICATION/CERTIFICATION REPORT

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Summary:

Det Norske Veritas Certification AS (DNV) has performed the verification of the emission reduction of the "*Hapugastenne and Hulu Ganga Small Hydropower Projects*" in Sri Lanka (Regsitration Ref No. 0085) for the period 1 January 2006 to 31 December 2006.

In our opinion, the GHG emission reductions reported for the project in the revised monitoring report of 07 August 2007 are correctly stated. The GHG emission reductions were calculated correctly on the basis of the approved monitoring methodology AMS-1.D. Version 05, the monitoring plan and formulae given in the registered PDD of the "*Hapugastenne and Hulu Ganga Small Hydropower Projects"*.

As a consequence, Det Norske Veritas Certification AS is able to certify that the emission reductions from the "*Hapugastenne and Hulu Ganga Small Hydropower Projects"* during the priod of 1 January 2006 to 31 December 2006 amount to 43,661 tonnes of CO_2 equivalent.

Report No.: 2007-9001/1	Subject Group: Environment	
Report title: Hapugastenne and Hulu Ganga Small Hydropower Projects in Sri Lanka		
Work carried out by: Buddika Hemashantha, Santhosh Jayaram		
Work verified by: K.Venkata Raman		
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Abbreviations

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEA	Central Environmental Authority
CEB	Ceylon Electricity Board
CEF	Carbon Emission Factor
CER	Certified Emission Reduction(s)
CH_4	Methane
CO_2	Carbon dioxide
CO_{2e}	Carbon dioxide equivalent
DNV	Det Norske Veritas
DNA	Designated National Authority
ERU	Emission Reduction Units(s)
FAR	Forward Action Request
GHG	Greenhouse gas(es)
IPCC	Intergovernmental Panel on Climate Change
MP	Monitoring Plan
MVP	Monitoring and Verification Plan
N_2O	Nitrous oxide
NGO	Non-governmental Organisation
ODA	Official Development Assistance
PDD	Project Design Document
TIN	Total Inorganic Nitrogen
UNFCCC	United Nations Framework Convention for Climate Change
GWP	Global Warming Potential

1 INTRODUCTION

The International Resources Group has commissioned Det Norske Veritas Certification AS (DNV) to carry out the verification and certification of emission reductions reported by the "*Hapugastenne and Hulu Ganga Small Hydropower Projects"* in Sri Lanka (UNFCCC Ref No. 0085) for the period 1 January 2006 to 31 December 2006. This report contains the findings of the verification and a certification statement for certified emission reductions.

The verification team consists of the following personnel:

Mr. Santhosh Jayaram	DNV Colombo, Sri Lanka	Team Leader, GHG auditor
Mr. Buddika Hemashantha	DNV Colombo, Sri Lanka	GHG auditor
Mr. K.Venkata Raman	DNV Bangalore, India	Technical Verifier

1.1 Objective

Det Norske Veritas Certification AS has been engaged by International Resource Group to verify and certify the greenhouse gas (GHG) emission reductions reported for the "*Hapugastenne and Hulu Ganga Small Hydropower Projects*" for the period from 01 January 2006 – 31 December 2006, equating to 43,661 tonnes of CO_2 equivalent.

Verification is the periodic independent review and *ex post* determination by the Designated Operational Entity (DOE) of the monitored reductions in GHG emissions that have occurred as a result of a registered CDM project activity during a defined verification period.

Certification is the written assurance by a DOE that, during a specific period in time, a project activity achieved the emission reductions as verified.

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 the reported GHG emission data is sufficiently supported by evidence, i.e. monitoring records.

The verification shall ensure that reported emission reductions are complete and accurate in order to be certified.
The verification team has, based on the recommendations in the Validation and Verification Manual /6/, employed a risk-based approach, focusing on the identification of significant reporting risks.

1.3 Description of the Project Activity

Project Parties:	Sri Lanka and Netherlands
Title of project activity:	Hapugastenne and Hulu Ganga Small Hydropower Projects
UNFCCC registration No:	0085
Project Entity:	Eco Power (Private) Limited of Sri Lanka, IFC-Netherlands Carbon Facility (INCaF).
Location of the project activity:	The Hapugastenne phase I and phase II small hydropower projects are located within close proximity of one another at Hapugastenne estate, near town of Ratnapura, Ratnapura district, Sabaragamuwa Province, Sri Lanka. The Hulu Ganaga I and II projects are located at near the Panwila village, north of the Kandy town, Kandy district, central province, Sri Lanka.

The project is a bundle of four small-scale, run-of-river hydro power plants in Sri Lanka. The four projects are Hapugastenne Phase I and II and Hulu Ganga Phase I and II. Electricity generated is supplied to the national grid through Ceylon Electricity Board (CEB).

Hapugastenne phase I consists of two Pelton turbines of rated capacities 2.526 MW each and phase II comprises of a single Pelton turbine of rated capacity 2.526 MW. As per the registered PDD the rated capacities of the Hapugastenne phase I and II turbines is 2.4 MW each, but as evidenced at the verification site visit and also reported in the first verification report, the installed turbines at the Hapugastenne phase I and II are of 2.526 MW capacity each. The Hulu Ganga phase I consists of two Francis turbines of rated capacity of 1.5 MW each and the Hulu Ganga phase II consists of two Francis turbines of rated capacity 1.5 MW each. The total capacity of the Hulu Ganga phase I and II is 6.0 MW.

The project's emission reductions are determined as the product of the net electricity generated and exported to the grid by the project and the validated *ex-ante* fixed grid emission coefficient of 0.8496 tCO_2 / MWh. According to the validated project design, there are no project emissions and leakage effects associated with the project.

2 METHODOLOGY

The verification of the emission reductions has assessed all factors and issues that constitute the basis for emission reductions from the project. As the CDM Executive Board has not yet formally endorsed the application of any materiality principle for verification of emission reductions from CDM projects - implying that emphasis should be on the significant contributors to emission reductions - DNV has for this assignment decided to check all factors and issues with the same emphasis. Despite this, the team has during its preparations identified the key reporting risks and used the assessment to determine to which extent the project operator's control systems were adequate for mitigation of these key reporting risks. In addition, other areas that can have an impact on reported emission reductions have also undergone detailed audit testing. All CEB invoices and community development expenditures have been examined and verified for the reporting period.

Duration of verification

Preparations: *13 March 2007 and 9 April 2007.*

On-site verification: *27, 28 April 2007.*

Reporting*:* *22 May 2007*

2.1 Review of Documentation

The basis for the verification has been the initial and the revised monitoring report from the project proponent for the period 01 January 2006 – 31 December 2006, the approved baseline and monitoring methodology of AMS I D version 05 applicable to the project, the registered PDD /4/, the validation protocol /5/ and the emission reduction spreadsheets (initial and revised) /6/.

2.2 Site Visits

Detailed verification of all data contained in the monitoring report was performed during a site visit at Hapugastenne and Hulu Ganga projects on the 27th and 28th April 2007. During the site visit, the following person was interviewed and assisted the verification team.

Name	Organization	Position
Mr. Lionel	Eco Power (Private) Ltd	Operations Manager

2.3 Assessment

The data presented in the monitoring reports was assessed by reviewing in detail the Ceylon electricity board (CEB) invoices, CEB calibration reports, payment vouchers of Eco Power (Private) Ltd and interviews with personnel at Eco Power (Private) Ltd. This has enabled the verification team to assess the accuracy and completeness of reported monitoring results and verify the correct application of the approved monitoring methodology.

2.4 Reporting of Findings

Findings established during the verification may be that:

i) the verification is not able to obtain sufficient evidence for the reported emission reductions or part of the reported emission reductions. In this case these emission reductions shall not be verified and certified;

ii) the verification has identified material misstatements in the reported emission reductions. Emission reductions with material misstatements shall be discounted based on the verifier's ex-post determination of the achieved emission reductions.

A forward action request (FAR) should be issued, where:

the actual project monitoring and reporting practices requires attention and /or adjustment for the next consecutive verification period, or an adjustment of the monitoring plan is recommended.

In the context of FARs, risks have been identified, which may endanger the delivery of high quality CERs in the future, i.e. by deviations from standard procedures as defined by the

monitoring plan. As a consequence, such aspects should receive a special focus during the next consecutive verification.

3 VERIFICATION FINDINGS

3.1 Remaining Issues, CARs, FARs from Previous Validation or Verification

CAR # at Second Periodic verification	Description of the CAR	Comments	Conclusions
CAR # 1	Electricity output of June 2006 for Hapugastenne Phase I is incorrect.	Agreed. The correct output should be 1,433,850 kWh rather than the 1,433,580 shown.	DNV confirms that correct output is 1,433,850 kWh and monitoring report and the excel spreadsheet has been revised with this change. The change is minor and effects the emission reduction in the decimal places only and hence the CERs remain same in the revised monitoring report submitted.
CAR # 2	Nature of expenditure of community development for Hapugastenne Phase I and II dated 4th January 2006 is incorrect.	Agreed. The expenditure was for "repair of Rathgama Vathura Kanuwa road."	Accepted. DNV confirms that the expenditure is for "repair of Rathgama Vathura Kanuwa road" and monitoring report has been revised with this change.
CAR # 3	Nature of expenditure of community development for Hapugastenne Phase I and II dated 1st March 2006 is incorrect.	Agreed. The expenditure was for "repair of Rathgama Vathura Kanuwa road."	Accepted. DNV confirms that the expenditure is for "repair of Rathgama Vathura Kanuwa road" and monitoring report

			has been revised with this change.

FAR # at Initial verification	Description of the CAR	Comments	Conclusions
FAR 1	Monitoring of environmental parameters as required by the CEA is not part of the monitoring plan. This FAR had been raised in the initial verification and the project participants had agreed to include the same in the subsequent monitoring reports.	Monitoring plan for the Hapugastenne and Hulu Ganga small hydro power projects as required under the CEA approvals for the projects have been submitted to the CEA on June 12, 2007 and copies of the plans are attached. The plans propose testing of water quality and monitoring of any adverse impacts on flora and fauna along the course of the river **on an annual basis**. This work is to be done by an independent party. The plan also includes **monthly** inspections of river bank erosion and sediment accumulation to be done by Eco Power personnel. Water quality testing has been done by an independent party and a report is available for inspection at the Eco Power office. An independent expert to review any adverse impacts on flora and fauna has not yet been appointed. This will be done in the near future. However, it is relevant to state that other than for the initial impact on riverbank flora and perhaps the migration of some fish species between the weir and the tailrace to a point downstream below the tailrace that would have occurred soon after the commissioning of the plant and the diversion of water (which results in a permanent reduction of water in the portion of the river below the diversion point), there can be no other subsequent adverse impacts on flora and fauna. A request will be made from the CEA to allow a suitably trained person from Eco Power to undertake monitoring of this aspect in the future. The monthly inspections for erosion and sediment build up has been undertaken by the Eco Power Operations Manager when he visits the site to supervise periodic maintenance of plant equipment (greasing, etc.). If there is sediment build up this is flushed and if there is	DNV confirms that project proponent has prepared a monitoring plan as per the CEA requirement to monitor the environmental parameters. DNV observed that water test report doesn't include the BOD, COD and TIN (Total Inorganic Nitrogen) as required by CEA but project proponent has included those parameters in their new monitoring plan and agrees to monitor those in future.

		erosion of the riverbank corrective actions have been taken. Other aspects such as weakening of areas due to heavy rain and the possibility of earth slips are also assessed at such times and corrective actions taken. This process is part of the ongoing maintenance of the plant and no written records are kept of such aspects. If the CEA requires it in the future we will maintain written records. It makes no sense to assign these tasks to an independent outside party because they are part of the normal day to day operational concerns of any small hydro power plant. The Operations Manager of Eco Power has been appointed as the Environmental Officer to oversee the environmental monitoring exercise on behalf of the company.	

All the CARs and FARs were addressed by the project proponent.

3.2 Project Implementation.

The project commissioning dates are as given below:

Hapugastenne Phase I – 14 August 2001
Hapugastenne Phase II – 9 September 2002
Hulu Ganga Phase I – 3 June 2003
Hulu Ganga Phase II – 25 October 2006

Although the different phases of the project started operation at different periods, 1 January 2003 is considered as the start date for crediting in order to meet the requirement of single crediting period.

3.3 Completeness of Monitoring

The monitoring of the project is complete and in accordance with the approved monitoring methodology AMS I.D. Version 05, and the monitoring plan contained in the registered PDD. In line with the monitoring plan of the registered PDD, the monitoring is divided in to two parts, the monitoring of a) electrical output indicators and b) project social benefit indicators.

Under the electrical output indicators, the electricity generated and exported to the grid from the Hapugastenne phase I and II and the Hulu Ganga project are monitored.

Under the project social benefit indicators the total short and long-term employment positions created and project sponsor financial contributions to local development projects are being monitored.

3.4 Accuracy of Emission Reduction Calculations

The emission reductions are calculated as the product of the electricity generated and exported to the grid and the grid emission factor of the connecting grid. The electricity generated for the Hapugastenne phase I is read directly from an uploading meter. The meter is owned by the CEB and the maintenance and calibration is done by CEB on an annual basis. The Hapugastenne phase II electricity exported to the grid is read from a separate meter also under the custody of CEB. The electricity exported from the Hulu Ganga project phase I and II is read from a single meter which is also under the custody of CEB. The grid emission factor of the CEB has been validated and is fixed at 0.8496 t CO_2/MWh for the entire crediting period. This has been estimated as the average of the CEB grid with the operating margin of 0.8719 tCO_2/MWh and a build margin of 0.8273 tCO_2/MWh.

It has been verified during the site visit that the monthly electricity generation during the monitoring period has not exceed the rated capacity for each of the four sub projects.

An error in transposing of the June 06 electricity generation figure for the Hapugastenne Phase I sub-project was noticed (CAR # 1) and has been corrected in the revised monitoring report.

The emission reductions of 43,661 tCO_2 reported in the revised monitoring report dated 07 August 2007, for the period of 1 January 2006 to 31 December 2006, are less than the yearly estimated emission reduction figure of 44,842 tCO_2 as stated in the registered PDD. The emission reduction figures in the initial monitoring report and the final monitoring report remain the same (the difference is in the decimal place (due to CAR-1)).

3.5 Quality of Evidence to Determine Emission Reductions

All necessary documentation is collected, referenced and aggregated and is easily accessible in hard-copy or electronic format. Measurements are performed by calibrated equipment, and the calibration certificates have been evidenced and the key data can also be cross-checked via other sources, such as sales and inventory data. No assumptions are used that have any material influence on reported emission reductions.

3.6 Management System and Quality Assurance

Monitoring and reporting of electricity generation is part of normal operations for the power plant. The site operators are trained on the job for operating the equipment. There is no formal internal audits and management review, but the CEO of EPL reviews the project performance at least once in a month.

4 PROJECT SCORECARD

Risk Areas		Conclusions			Summary of findings and comments	Error/Discounted Uncertainty Tonnes
		Baseline Emissions	Project Emissions	Calculated Emission Reductions		
Completeness	• Source coverage/ boundary definition	All sources have been covered	No project emissions	Calculation are complete	All the sources of emissions have been identified and are as per the registered PDD.	NA
Accuracy	• Physical Measurement and Analysis	All the meters are calibrated and hence accurate	No project emissions	Calculations are accurate.	All the date measurement is from meters that are maintained and calibrated by the Ceylon Electricity Board (CEB).	NA
	• Data calculations	Comprehensive and accurate.	NA	Comprehensive and accurate.	Calculations are as per the registered PDD and hence acceptable.	NA
	• Data management & reporting	Good.	NA	Good.	All the data is easily accessible and reported in a comprehensive manner.	NA

Risk Areas		Conclusions			Summary of findings and comments	Error/Discounted Uncertainty Tonnes
		Baseline Emissions	Project Emissions	Calculated Emission Reductions		
Consistency	• Changes in the project	No changes from the initial verification.	NA	No changes from the initial verification report.	There are no changes from the initial verification report.	NA

5 VERIFICATION STATEMENT

Introduction

Det Norske Veritas Certification AS (DNV) has been engaged by International Resource Group to verify the greenhouse gas (GHG) emission reductions of 43,661 tonnes of CO_2 equivalent reported for the "Hapugastenne and Hulu Ganga Small Hydropower Projects" for the period 1st January 2006 – 31 December 2006.

The project has applied the approved baseline and monitoring methodologies AMS I.D. Version 05*, and emission reductions are reported in the revised monitoring report dated 07 August 2007. We express no opinion on the baseline methodology neither on the project nor on the validated and registered PDD.*

Responsibilities of the Hapugastenne and Hulu Ganga Small Hydropower Project management of Eco Power (Private) Ltd and Det Norske Veritas Certification AS.

The management of the Hapugastenne and Hulu Ganga Small Hydropower Projects is responsible for the preparation of the GHG emissions data and the reported GHG emission reductions on the basis set out within the revised monitoring report (dated 07 August 2006). The development and maintenance of records and reporting procedures is in accordance with the approved monitoring methodology AMS.I.D. Version 05*, and the monitoring plan contained in the registered PDD, including the calculation and determination of GHG emission reductions from the project, is the responsibility of the management of the Hapugastenne and Hulu Ganga Small Hydropower Projects.*

It is DNV's responsibility to express an independent verification statement on the GHG emission reductions reported for the project for the period from 1 January 2006 – 31 December 2006 based on the verified emissions for the same period and the project's compliance with the approved baseline and monitoring methodology AMS.I.D. Version 05*, and the monitoring plan contained in the registered PDD.*

Basis of GHG verification opinion

Our verification approach was based on the requirements as defined under the Kyoto Protocol, the CDM modalities and procedures, as well as those defined by the CDM Executive Board and by the baseline and monitoring methodology AMS.I.D. Version 05.

Our verification approach draws on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate these. Our examination includes assessment of evidence relevant to the amounts and disclosures in relation to the project's GHG emission reductions reported for the period from 01 January 2006 – 31 December 2006.

We planned and performed our work to obtain the information and explanations that we considered necessary to provide sufficient evidence for us to give reasonable assurance that the reported amount of GHG emission reductions for the period from 01 January 2006 – 31 December 2006 are fairly stated.

We conducted our verification on the basis of the monitoring methodology AMS.I.D. Version 05, *and the monitoring plan contained in the registered PDD of the project. The verification included:*

- *Collection of evidence supporting the reported data.*
- *checking whether the provisions of the monitoring methodology AMS.I.D.* Version 05 *and the monitoring plan in the PDD were consistently and appropriately applied.*

We have verified whether the information included in the revised monitoring report for the project (dated 07 August 2007) is correct and that the emissions reductions achieved have been determined correctly.

Certification Statement

In our opinion, the GHG emission reductions stated in the revised monitoring report of 07 August 2007 for the "Hapugastenne and Hulu Ganga Small Hydropower Projects" for the period from 01 January 2006 – 31 December 2006 are fairly stated.

The GHG emission reductions were calculated correctly on the basis of the approved monitoring methodology (AMS.I.D. Version 05*) and the monitoring plan contained in the PDD. Hence, Det Norske Veritas Certification AS is able to certify that the reported emission reductions from the project during the period 01 January 2006 – 31 December 2006 amount to 43,661* ***(Forty three thousand and six hundred sixty one)*** *tonnes of CO_2 equivalent.*

Colombo, 30 June 2007

Buddika Hemashantha
GHG Auditor

Oslo, 30 June 2007

Einar Telnes
Director

6 REFERENCES

Category 1 Documents:

Documents provided by the Project Participants that relate directly to the GHG components of the project. These have been used as direct sources of evidence for the periodic verification conclusions, and are usually further checked through interviews with key personnel.

/1/ Eco Power (Private) Limited (EPL): Initial *Monitoring Report – Hulu Ganga and Hapugastenne PDD*, Dated. 11 April 2007, for the period 1 January 2006 to 31 December 2006 and the revised monitoring report dated 07 August 2007.

/2/ Eco Power (Private) Limited (EPL): Invoices raised for electricity generated for each month for each project verified and certified by Ceylon Electricity Board (CEB).

/3/ Project Design Document of the *Hapugastenne and Hulu Ganga Small Hydropower Projects*.

/4/ SGS: *Annex 4 Validation Protocol UK.AU4 CDM.VAL0023 HH*, Project No. CDM.VAL0023.

/5/ Ceylon Electricity Board (CEB): *HV meter test reports*, Dated. June 13 2006.

Category 2 Documents:

Background documents related to the design and/or methodologies employed in the design or other reference documents. Where applicable, Category 2 documents have been used to cross-check project assumptions and confirm the validity of information given in the Category 1 documents and in verification interviews.

/6/ International Emission Trading Association (IETA) & the World Bank's Prototype Carbon Fund (PCF): *Validation and Verification Manual*. http://www.vvmanual.info

/7/ Appendix B of the simplified modalities and procedures for small-scale CDM project activities: *Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories*. Version 05: 25 February 2005

Persons interviewed:

Persons interviewed during the initial verification, or persons contributed with other information that are not included in the documents listed above.

/8/ Dr. Romesh Dias Bandarnaike, Chief Executive Officer, Eco Power (Private) Limited.

/9/ Mr. Lionel, Operation Manager, Eco Power (Private) Limited.

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APPENDIX A

PERIODIC VERIFICATION CHECKLIST

Table 1: Data Management System/Controls

The project operator's data management system/controls are assessed to identify reporting risks and to assess the data management system's/control's ability to mitigate reporting risks. The GHG data management system/controls are assessed against the expectations detailed in the table. A score is assigned as follows:

- Full - all best-practice expectations are implemented.
- Partial - a proportion of the best practice expectations is implemented
- Limited - this should be given if little or none of the system component is in place.

Expectations for GHG data management system/controls	Score	Verifiers Comments (including *Forward Action Requests*)
A. Defined organisational structure, responsibilities and competencies		
A.1. Position and roles *Position and role of each person in the GHG data management process is clearly defined and implemented, from raw data generation to submission of the final data. Accountability of senior management must also be demonstrated.*	Full	It was defined in the management system documentation and well understood by the personnel.
A.2. Responsibilities *Specific monitoring and reporting tasks and responsibilities are included in job descriptions or special instructions for employees.*	Full	Specific monitoring and reporting tasks are described in the relevant documented procedures.
A.3. *Competencies needed* *Competencies needed for each aspect of the GHG determination process are analysed. Personnel competencies are assessed and training programme implemented as required.*	Full	Competencies of the personnel in charge of monitoring and calculation process are deemed sufficient.

Expectations for GHG data management system/controls	Score	Verifiers Comments (including *Forward Action Requests*)
B. Conformance with monitoring plan		
B.1. Reporting procedures *Reporting procedures should reflect the monitoring plan content. Where deviations from the monitoring plan occur, the impact of this on the data is estimated and the reasons justified.*	Full	No deviation from the monitoring plan has been found.
B.2. Necessary Changes *Necessary changes to the monitoring plan are identified and changes are integrated in local procedures as necessary.*	Full	No changes were identified to the monitoring plan.
C. Application of GHG determination methods		
C.1. Methods used *There are documented description of the methods used to determine GHG emissions and justification for the chosen methods. If applicable, procedures for capturing emissions from non-routine or exceptional events are in place and implemented.*	Full	Integral part of the methods used to determine GHG emissions are documented properly. Electricity output was properly monitored and calculated in line with the procedure.
C.2. Information/process flow *An information/process flow diagram, describing the entire process from raw data to reported totals is developed.*	Full	An information/process flow are defined and understood by the concerned personnel.
C.3. Data transfer *Where data is transferred between or within systems/spreadsheets, the method of transfer (automatic/manual) is highlighted - automatic links/updates are implemented where possible. All assumptions and the references to original data sources are documented.*	Partially , ,	Three mistakes were identified. Electricity output mentioned in the monitoring report for June 2006 of Hapugastenne Phase I is not compatible with the CEB invoice for same month. There are two payments for the drain system development for the community development of Hapugastenne phase I and II but these are not drain system development. It is identified during site visit these two payments are for concreting of an existing road.

Expectations for GHG data management system/controls	Score	Verifiers Comments (including *Forward Action Requests*)
C.4. Data trails *Requirements for documented data trails are defined and implemented and all documentation are physically available.*	Full	All necessary raw/intermediate data is maintained properly. Non-routine event has been recorded and maintained properly.
D. Identification and maintenance of key process parameters		
D.1. Identification of key parameters *The key physical process parameters that are critical for the determination of GHG emissions (e.g. meters, sampling methods) are identified.*	Full	The key physical parameters are identified.
D.2. Calibration/maintenance *Appropriate calibration/maintenance requirements are determined.*	Full	Necessary calibration and/or maintenance for the measurement equipment have been conducted according to the documented procedures for Hapugastenne Phase I and II, Hulu Ganga Phase I and II.
E. GHG Calculations		
E.1. Use of estimates and default data *Where estimates or default data are used, these are validated and periodically evaluated to ensure their ongoing appropriateness and accuracy, particularly following changes to circumstances, equipment etc. The validation and periodic evaluation of this is documented.*	Full	Ok
E.2. Guidance on checks and reviews *Guidance is provided on when, where and how checks and reviews are to be carried out, and what evidence needs to be documented. This includes spot checks by a second person not performing the calculations over manual data transfers, changes in assumptions and the overall reliability of the calculation processes.*	Full	No calculation and reporting error has been encountered thus checking and reviewing system deem effective.

Expectations for GHG data management system/controls	Score	Verifiers Comments (including *Forward Action Requests*)
E.3. Internal verification *Internal verifications include the GHG data management systems, to ensure consistent application of calculation methods.*	Full	The data necessary for calculating GHG emissions and the calculation results have been archived properly. It is fully understood among the relevant personnel.
E.4. Internal validation *Data reported from internal departments should be validated visibly (by signature or electronically) by an employee who is able to assess the accuracy and completeness of the data. Supporting information on the data limitations, problems should also be included in the data trail.*	Full	Data used for calculation don't include any mistake and the validation is deemed sufficient.
E.5. Data protection measures *Data protection measures for databases/spreadsheets should be in place (access restrictions and editor rights).*	Full	Data protection and back-up procedures are defined and maintained properly.
E.6. IT systems *IT systems used for GHG monitoring and reporting should be tested and documented.*	Full	IT system is used to monitor and report the data.

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