VALIDATION OPINION FOR REVISION OF REGISTERED MONITORING PLAN

Celulosa Arauco y Constitución S.A.

Nueva Aldea Biomass

Power Plant Phase 2

UNFCCC Ref. No. 0346

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[X]	Proposed revision includes revisions proposed by the PP/DOE	**Distribution/Document Control**
	Proposed revision only includes the request by the CDM EB	
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Validation Team:		
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Abbreviations

CAR	Corrective Action Request
CDEC-SIC	(Spanish) Centro de Despacho económico de Carga, it is the operative unit of the SIC grid of Chile. This entity is responsible for the dispatch and operation of the different power plants connected to the SIC grid of Chile."
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CL	Clarification Request
CNE	Comisión Nacional de Energía (Energy National Comission) Government agency
CER	Certified Emission Reduction
COP/MOP	Conference of the parties/meeting of the parties
CO2e	Carbon Dioxide Equivalent
DCS	Data Control System
DNA	Designated National Authority
DOE	Designated Operational Entities
ESP	Electrostatic Precipitator
FAR	Fordward Action Request
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
MP	Monitoring Plan
NCV	Net Calorific Value
PDD	Project Design Document
PP	Project Participant
RMP	Revised Monitoring Plan
SIC	Central grid of Chile (Sistema Interconectado Central)
TG	Turbo generator
UNFCCC	United Nations Framework Convention on Climate Change

Table of Content

1. Validation Opinion

Paragraph 57 of the modalities and procedures for the CDM allows project participants to revise monitoring plans in order to improve accuracy and/or completeness of information, subject to the revision being validated by a Designated Operational Entity.

SGS United Kingdom Ltd has been contracted by *Celulosa Arauco y Constitución S.A* to perform such a validation of the revision of monitoring plan according to the procedure detailed in Annex 28 to EB 49 meeting report; the registered monitoring plan is part of the PDD of registered CDM project Nueva Aldea Biomass Power Plant Phase 2 UN ref. 0346. The purpose of a validation is to have an independent third party assessment of the revision of monitoring plan. In particular, the level of accuracy and/or completeness in the proposed revision of the monitoring plan, and the conformity with approved monitoring methodology applicable to the project activity.

By applying the proposed revision of monitoring plan:

1.- $EG_{project\ plant,y}$ the net quantity of electricity generated in the project plant during the year *y* in MWh is used instead of the gross quantity. In this revised monitoring plan, $EG_{project\ plant,y}$, is the result of the gross quantity of electricity generated by the project minus the total auxiliary electricity consumption required for the operation of the power plant, these parameters ($ELP_{J,gross,y}$ and $EL_{PJ,aux,y}$)[1] were added to increase the completeness of the monitoring plan complying with the applicable methodology.

2.- As part of this revision of the monitoring plan, the calculation of the $\varepsilon_{el,other\ plant(s)}$ ($MWh_{el}/MWh_{biomass}$) net efficiency of the power plant that would use the biomass in the absence of the project activity was verified and deemed correct, this parameter is not considered part of the monitoring plan because it is considered as per definition, an ex ante parameter but this report contain information that explain how this parameter was validated.

In addition, the following two Quality Control (QC) and Quality Assurance (QA) Procedures were updated to follow the methodology ACM0006 version 2 (Section D.3):

3.- BFi,y Quantity of biomass type i used as fuel in the project plant during the year y in a volume or mass unit (tDS). It will be crosschecked using an annual energy balance and checking the recirculation flows instead of using the pulp production index QA/QC procedure.

4.- The consistency of EGproject plant,y net electricity generated by the project plant will be cross checked using an efficiency index (electricity generation divided by the quantity of biomass fired) comparable to previous years instead of using pulp production index.

5.- In order to increase the completeness of the monitoring plan information, It was also added further information in the table D.2.1.1., section: “comments” of the parameters including a description of the monitoring systems, accuracy, calibration frequency and monitoring and recording frequency in accordance EB 41 Annex 12 Guidelines Project Design Document (CDM-PDD) Section B.7.1.

6.- The section D.2 was updated in order to provide a clear justification of the choice of the methodology and its applicability to this project activity and a line diagram of the project activity was added as Annex 4 in order to inform the meters installation.

This revision improves the accuracy of information provided and consistency in the registered PDD and the methodology ACM0006 version 2.

Furthermore, we confirm that:

(a) the proposed revision points have been described, and an assessment has been provided to substantiate the reasons for each of the proposed revision points of the registered monitoring plan, using objective evidence;

(b) the proposed revision of the monitoring plan ensures that the level of accuracy or completeness in the monitoring and verification process is not reduced as a result of the revisions;

[1] The notation of the methodology ACM0006 version 11.1 page 65 was used to name these two parameters.

(c) the proposed revision of the monitoring plan is in accordance with the approved monitoring methodology applicable to the project activity whilst ensuring the conservativeness of the emission reductions calculation.

(d) the findings of the previous verification reports, have been taken into account.

Signed on Behalf of the Validation Body by Authorized Signatory

Signature: 

Name: Siddharth Yadav

Date: 31-01-2012

2. Introduction

2.1 Objective

Paragraph 57 of the modalities and procedures for the CDM allows project participants to revise monitoring plans in order to improve accuracy and/or completeness of information, subject to the revision being validated by a Designated Operational Entity.

SGS United Kingdom Ltd has been contracted by *Celulosa Arauco y Constitución S.A.* to perform such a validation of the revision of monitoring plan according to the procedure detailed in Annex 28 to EB 49 meeting report; the registered monitoring plan is part of the PDD of registered CDM project Nueva Aldea Biomass Power Plant Phase 2 UN ref. 0346. The purpose of a validation is to have an independent third party assessment of the revision of monitoring plan. In particular, the level of accuracy or completeness in the proposed revision of the monitoring plan, and the conformity with the approved monitoring methodology applicable to the project activity.

The Validation was performed in accordance with the UNFCCC criteria for the Clean Development Mechanism (CDM) and the host country criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

SGS reviewed the project design documentation (revised monitoring plan), using a risk based approach and conducted follow-up interviews.

2.2 Scope

The scope of the validation is defined as an independent and objective review of revision of monitoring plan. The information in these documents is reviewed against the Kyoto Protocol requirements, the UNFCCC rules and associated interpretations.

The validation is not meant to provide any consulting towards the Client/the project. However, SGS may issue requests for clarifications and/or corrective actions which may provide input for improvement of the project design.

2.3 GHG Project Description

Refer to *http://cdm.unfccc.int/Projects/DB/DNV-CUK1143329749.99/view*, the project web page. There is no change in the project activity description. The project was registered on 2nd June 2006 under UNFCCC ref. no. 0346.

3. Methodology

3.1 Review of CDM-PDD and Additional Documentation

The validation is performed primarily as a document review of the publicly available project documents. The assessment is performed by trained assessors using a validation protocol.

3.2 Use of the Validation Protocol

The validation protocol used for the assessment is partly based on the templates of the CDM Validation and Verification Manual version 01.2:

- it organises, details and clarifies the requirements the project is expected to meet; and
- it documents both how a particular requirement has been validated and the result of the validation.

The validation protocol consists of several tables. The different columns in these tables are described below.

Checklist Question	Ref ID	Means of Verification (MoV)	Comment	Draft and/or Final Conclusion
The various requirements are linked to checklist questions the project should meet.	Lists any references and sources used in the validation process. Full details are provided in the table at the bottom of the checklist.	Explains how conformance with the checklist question is investigated. Examples of means of verification are document review (DR) or interview (I). N/A means not applicable.	The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is further used to explain the conclusions reached.	This is either acceptable based on evidence provided (Y/OK), or a Corrective Action Request (CAR) due to non-compliance with the checklist question (See below). A Clarification request (CL) is raised if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

The validation protocol is attached with the report as Annex 1.

3.3 Findings

As an outcome of the validation process, the team can raise different types of findings

In general, where insufficient or inaccurate information is available and clarification or new information is required the Assessor shall raise a **Clarification Request (CL)** specifying what additional information is required.

Where a non-conformance arises the Assessor shall raise a **Corrective Action Request (CAR).** A CAR is issued, where:

I. Non-conformities with the monitoring plan or methodology are found in monitoring and reporting, or if the evidence provided to prove conformity is insufficient;

II. Mistakes have been made in applying assumptions, data or calculations of emission reductions which will impair the estimate of emission reductions;

III. Issues identified in a FAR during validation to be verified during verification have not been resolved by the project participants.

A Forward Action Request (FAR) is raised during verification for actions if the monitoring and reporting require attention and/or adjustment for the next verification period.

The validation process may be halted until this information has been made available to the assessors' satisfaction. Failure to address a CL/FAR may result in a CAR. Information or clarifications provided as a result of a CL/FAR may also lead to a CAR.

Corrective Action Requests, Clarification Requests and Forward Action Requests are raised in the draft validation protocol and detailed in a separate form (Findings Overview). In this form, the Project Developer is given the opportunity to address and "close" outstanding CARs and respond to CLs and FARs. The detailed Finding Overview is attached with this document as Annex 2.

3.4 Internal Quality Control

Following the completion of the assessment process and a recommendation by the Assessment team, all documentation will be forwarded to a Technical Reviewer. The task of the Technical Reviewer is to check that all procedures have been followed and all conclusions are justified. The Technical Reviewer will either accept or reject the recommendation made by the assessment team.

4. Validation Findings

4.1 Application of Monitoring Methodology and Monitoring Plan

Type of Revision

The revision of monitoring plan is a result of a recommendation proposed by the DOE to increase the completeness of the monitoring plan in accordance to the methodology ACM0006 version 2.

The revision points are the following:

4.1.1 $EG_{project\ plant,y}$ the net quantity of electricity generated in the project plant during the year (MWh) will be used instead of the gross quantity.

In this revised monitoring plan, as $EG_{project\ plant,y}$, is the result of the gross quantity of electricity generated by the project minus the total auxiliary electricity consumption required for the operation of the power plant, these parameters ($ELP_{J,gross,y}$ and $EL_{PJ,aux,y}$)[ii] were added to increase the completeness of the monitoring plan.

4.1.2 $\varepsilon_{el,other\ plant(s)}$ the net energy efficiency of electricity generation in (the) other power plant(s) that would use the biomass fired in the project plant in the absence of the project activity ($MWh_{el}/MWh_{biomass}$).

The $\varepsilon_{el,other\ plant(s)}$ is not a parameter that need to be included in the revised monitoring plan because it is a fixed parameter but as part of the validation of this revised monitoring plan, its calculation was verified: $\varepsilon_{el,other\ plant(s)}$ the net energy efficiency of electricity generation in (the) other power plant(s) that would use the biomass fired in the project plant in the absence of the project activity, expressed in $MWh_{el}/MWh_{biomass}$ will be used (10.839%) instead of the gross value (12.31%). This value (10.839%) will remain fixed during the crediting period in accordance to the methodology ACM0006 version 2.

It shall be mentioned that the $\varepsilon_{el,other\ plant(s)}$ was not a parameter that was validated as part of the registered PDD because this project was validated and registered on June 2nd, 2006 not using equation 13 but directly measuring the surplus of electricity delivered to the grid (incremental to baseline generation) as it can be seen in the registered PDD (see page 3 and sections D.2.1.2 to D.2.4) and validation report (see CL1 in page A29)).

The value 12.31% was previously validated as part of the RMP that can be accessed at the project website but as part of the verification assessment of the present revised monitoring plan, it was found that 10.839% is the correct value because it consider the auxiliary consumption indicated in the PDD and the NCV obtained from the feasibility report of the project. Further details about the verification of this parameter can be found in the page 13 of this report.

In addition, the following Quality Control (QC) and Quality Assurance (QA) Procedures were updated to follow the methodology (Section D.3):

4.1.3 BF_{iy} the quantity of biomass type i used as fuel in the project plant during the year y in a volume or mass unit.

It will be crosschecked using an annual energy balance and also as the black liquor is continuously being recirculated in the pipeline, the amount of black liquor burned in the recovery boiler is cross checked (stock changes) by comparing the sum of the measurements of flow meters measuring the black liquor entering to the recovery boiler with the measurement of black liquor (not burned) returning to the pipeline. This QA/QC procedure will be used, in accordance with the methodology ACM0006 version 2, instead of the pulp production index QA/QC procedure established before.

[ii] The notation of the methodology ACM0006 version 11.1 page 65 was used to name these two parameters.

4.1.4 $EG_{project\ plant,y}$ The net quantity of electricity generated in the project plant during the year y (MWh).
The consistency of $EG_{project\ plant,y}$ net electricity generated by the project plant will be cross checked using an efficiency index (electricity generation divided by the quantity of biomass fired) comparable to previous years instead of using pulp production index because it is more related to the electricity generation and it is required by the methodology ACM0006 version 2.

4.1.5 Monitoring information on Table D.2.1.1 Comments section.
In order to increase the completeness of the monitoring plan information, It was also added further information in the section for comments of the parameters
More details about the monitoring and data processing (measuring and recording frequency, meters accuracy) were added to the parameters involved following the guidance of EB 41 Annex 12 Guidelines Project Design Document (CDM-PDD) Section B.7.

4.1.6 The section D2 of the monitoring plan was modified and a line diagram was added as Annex 4
The section D2. of the monitoring plan "*Justification of the choice of the methodology and why it is applicable to the project activity"* was updated in accordance to the changes made in the rest of the document providing information about the applicability of the methodology to this project activity and an line diagram, indicating the meters that are part of the monitoring is added as Annex 4.

The proposed revision of the monitoring plan ensures that the level of accuracy and completeness in the monitoring and verification process is not reduced as a result of the revisions (details below).

4.1.1 $EG_{project\ plant,y}$ the net quantity of electricity generated in the project plant during the year (MWh) will be used instead of the gross quantity.

The third request for issuance got the following request for review:
The revised monitoring plan approved by CDM EB requires the "EG_Y", the Net quantity of electricity generated in the project plant during year y to be measured continuously. Page 8 of the monitoring report states ""since the project plant consumes the same amount of electricity as the reference plant (e.g. there is not additional electric power consumption associated to the implementation of the project activity), the net electricity generated in the project plant is the same as the total electricity generated in the project plant"". The DOE is further requested to clarify how it verified this approach in accordance with ACM0006 ver 2 and that "EG_Y," is being monitored in accordance with the revised monitoring plan which requires continuous measurement of net quantity of electricity generated in the project plant during y.

The assessment team analyzed the review received for this project:

The revised monitoring plan approved by CDM EB[/3a/] does not include the "EG_Y" as a monitoring parameter. In accordance to the ACM0006 version 2, EGy is calculated by using equation 13 that refers *EGy* as "the net quantity of increased electricity generation as a result of the project activity (incremental to baseline generation) during the year *y* in MWh".
Before the review requested by CDM EB the PP reported $EG_{project\ plant,y}$ in motoring report of the third monitoring period as "the Net quantity of electricity generated in the project plant during year y". However PP referred to gross electricity generation of the project plant. Furthermore, PP used equation 13 to calculate EGy using gross electricity generation and the gross energy efficiency of electricity generation (12.31%)[/99/] in (the) other power plant(s) that would use the biomass fired in the project plant in the absence of the project activity, expressed in $MW_{hel}/MWh_{biomass}$ determining an *incremental EGy* resulting in:

1. First monitoring period: 01 Apr 2007 - 30 Sep 2007 : 40,786 tCO_2e issued[/5ba/]
2. Second monitoring period: 01 Oct 07 - 30 Sep 08 : 144,769 tCO_2e issued[/5da/]
3. Third monitoring period: 01 Oct 2008 - 31 Dec 2009 : 182,889 tCO_2e requested[/5fa/]

Following the procedure that is validated in the present report,(using $EG_{project\ plant,y}$ the net quantity of electricity generated in the project plant and $\varepsilon_{el,other\ plant(s}$ the net energy efficiency of electricity generation in (the) other

power plant(s) that would use the biomass fired in the project plant in the absence of the project activity ($MW_{he}l/MWh_{biomass}$) according to equation 13, the emission reductions obtained are:

1. First monitoring period: 01 Apr 2007 - 30 Sep 2007 : 39,875 tCO_2e a 2.23% less[/5bb/]
2. Second monitoring period: 01 Oct 07 - 30 Sep 08 : 133,222 tCO_2e a 7.98% less[/5db/]
3. Third monitoring period: 01 Oct 2008 - 31 Dec 2009 : 172,461 tCO_2e a 5.70% less[/5fb/]

According to the results presented above, the net emission reductions calculated considering net terms of equation 13 of ACM0006 (Version 2), turned out to be lower than the net emission reductions calculated considering total (gross) terms of equation 13 throughout all the (past) monitored periods and this amount will be adjusted in the next issuance.

With this, the PP ensures the appropriateness of the method used for emission reduction calculation purpose, which corresponds to use net terms of equation 13 of ACM0006 version 2.

The approach of calculating net quantity of increased electricity generation (*EGy)* as a result of the project activity (incremental to baseline generation) using gross terms of equation 13 was based on the statement mentioned in the monitoring report page 8 "*since the project plant consumes the same amount of electricity as the reference plant (e.g. there is not additional electric power consumption associated to the implementation of the project activity)"*. However, it was further verified that this statement is not in accordance to the PDD[/1/] page 10 and 11 which informs different values: the estimated auxiliary electricity consumption was 8.8 (MW) and 9.1 (MW) for the baseline and the project activity, respectively.

The PP provided the following information regarding the auxiliary electricity consumption of the baseline and project plant scenario which was deemed appropriate by the assessment team:

1. Email from the consultant[/100/] that developed the information of the PDD[/1/] page 10 and 11. In this email the expert listed the auxiliary equipment and their corresponding electricity consumption of the baseline plant ("Baseline rev_2011-08-17-fix"). With this information, the auxiliary electricity consumption of the baseline plant informed in the PDD[/1/] was validated as 8.8 (MW).
2. The list[/101/] of auxiliary equipment provided by the consultant, was compared with the line diagram verified on site[/6/] and with the list of auxiliary equipment informed by the PP[/98/.] As a result, the list of auxiliary equipment, informed by the PP[/98/], is found to be consistent with the list of auxiliary equipment provided by the consultant email[/100/] and information verified in the line diagram[/6/].
3. The calibration certificates of the meters involved in the auxiliary consumption were provided and found in place[/88 to 97/].
4. The continuous auxiliary consumption data recorded were provided[/98/].
5. The name plate data of the auxiliary equipment installed in the project activity[/104, 105/]

Gross Electricity generated:
In total there are fifteen (15) meters involved in the two buses of the generators[/6/]. Two (2) of them measure the gross electricity generated by the two turbo generators while the rest of the meters that measure the consumption of energy of the different areas of the facility are used in a balance on each bus to cross check the consistency of the measurement of the gross electricity generated by the turbo generators. It must be noted that all meters (15) were factory calibrated in 2005 and have a calibration frequency of seven years[/24a/].

Auxiliary electricity consumption:
The five (5) energy meters that measure the auxiliary electricity consumption of the real plant were installed since the commissioning date of the plant. These were confirmed by the auditor team on a site visit to the pulp mill. The corresponding auxiliary electricity consumption has been measuring by five (5) energy meters[/6/].

The accuracy of the meters is 0.5% according to the manufacturer's technical data sheet[/24b/]
Gross electricity generation and auxiliary electricity consumption data is monitored online (every 15 seconds) by the DCS[/106/]. Then the data is downloaded by the IP system and then registered automatically to an Excel spreadsheet. It must be noted that the data handling process is carried out in an automatized way with no evidence of manual record or data calculation.

The Gross Electricity generated and Auxiliary electricity consumption data is recorded on a daily base and then it is aggregated monthly. The Net quantity of electricity generated ($EG_{project\ plant,y}$) in the project plant

resulted from subtracting the auxiliary electricity consumption (measured) in the project plant to the total gross electricity generated in the project plant (measured).
CAR 6 was raised requesting to review and update section D.2.1 (Table) of the revised monitoring plan adding further information regarding the monitoring of the gross energy generated and the auxiliary consumption that are used to calculate the net energy generated by the project power plant.

Since net energy generated by the project is determined from the difference between the monitored amount of gross electricity generation ($EL_{PJ,gross,y}$) and the amount of electricity consumed by auxiliary equipment ($EL_{PJ,aux,y}$) measured by Project Participant, these parameters ($EL_{PJ,gross,y}$ and $EL_{PJ,aux,y}$) were added to increase the completeness of the monitoring plan. **CAR 6 was closed**

As it is established in the (QA/QC) procedure of this revised monitoring plan, the consistency of metered net quantity of electricity generated ($EG_{project\ plant,y}$), is cross-checked with energy mass balance and the comparison with the ratio of the electricity generated and biomass fired.

This revision of monitoring plan involves changes in the section or table D.2.1.3., but also includes changes in the QA/QC section.

It can be concluded that the proposed revision of the monitoring plan using net terms of equation 13 instead of using total (gross) terms of equation 13 ensures that the level of accuracy and completeness in the monitoring and verification process is improved and followed according to ACM0006 (Version2).

4.1.2 $\varepsilon_{el,other\ plant(s}$ the net energy efficiency of electricity generation in (the) other power plant(s) that would use the biomass fired in the project plant in the absence of the project activity, expressed in $MW_{he}l/MWh_{biomass}$ will be used instead of the total (gross) value.

Data used by the PP in the calculation of the $\varepsilon_{el,other\ plant(s)}$ /102/ was reviewed by the DOE.

The efficiency was determined dividing Net electric power generation (GWh/yr) by the biomass combusted (tDS/yr) times the NCV value of the biomass (GJ/tDS):

Parameter	unit	value
Net electric power generation (A)	(GWh/yr)	586.0
Biomass combusted (B)	(tDS/yr)	1,710,390
NCV of biomass (C)	(GJ/tDS)	11.38
$\varepsilon_{el,other\ plant(s)} = A/((B*C)/3600)$	%	10.839

The biomass combusted was obtained from the PDD page 10 (Annualized figure)
The NCV value was obtained from the Feasibility Report of the project/106/.
The net electric power generation (GWh/yr) is the difference between the following values obtained from the PDD page 10:.

Parameter	unit	value	calculation
Total electric power generation	(GWh/yr)	663	76*8760/1000
Auxiliary power consumption	(GWh/yr)	77	8.8*8760/1000

First, the installed capacity of auxiliary electricity consumption in the baseline (8.8 MW) corresponds to the value informed in the registered PDD page 10/1/ and was verified against the data source/100/.

The total electric generation is the result of the power generation capacity (PDD page 10) 76MW after the calculation indicated in the table above.

The revised calculation/102/ is found correct, in accordance to the methodology ACM0006 version 2 equation 13. The result of net energy efficiency obtained/102/ ,equal to 10.839% was compared to (gross) efficiency values obtained for other facilities similar to Nueva Aldea Phase 2 pulp mill (pulp mill producing electricity): 8.38%, 9.33% and 10.48%/103/. The net energy efficiency obtained for the baseline plant is still more

conservative (higher), according to equation 13 of ACM0006 Version 2, than each of the gross efficiencies obtained for the other plants. Equation 13 is presented as follow:

$$EG_y = EG_{project\ plant,y} - \varepsilon_{el,other\ plant(s)} \cdot \sum_i BF_{i,y} \cdot NCV_i \qquad (13)$$

The information was deemed appropriate thus accepted, the calculation of the $\varepsilon_{el,other\ plant(s}$ is not a parameter that needs to be considered as part of the project´s monitoring but it is part of the changes in the emission reduction calculation that is validated in this report to fulfill the procedure described in the VVM version 1.2 section 216.

In addition the following (QA/QC) procedures were updated to follow the methodology (Section D.3):

4.1.3 BF_{iy} the quantity of biomass type i used as fuel in the project plant during the year y in a volume or mass unit.

Page 14 of the revised monitoring plan mentions that the energy balance will be based on purchased quantities **CL3 was raised** in order to confirm if there are invoices related to the black liquor, which is the only biomass that the project uses and belong to the same pulp mill. This **CL3 was closed** after receiving the updated RMP without this type of checking against invoices (this was a simple mistake because as the black liquor is generated by the same enterprise of the power plant, there are no invoices).

The consistency of BF_{iy} biomass flow is crosschecked using an annual energy balance and it is also checked with the named stock changes method understood as checking the difference between the data recorded by the meters that are located along the black liquor flow pipeline (total flow send to the boiler, flow being feed to the boiler and returned flow)[7] instead of using pulp production index, since it is more related to the electricity generation and follow the requirement of the methodology ACM0006 version 2 page 50.

4.1.4 The consistency of $EG_{project\ plant,y}$ net electricity generated by the project plant is cross checked using an efficiency index (electricity generation divided by the quantity of biomass fired) comparable to previous years, instead of using a pulp production index since it is more related to the electricity generation and follows ACM0006 version 2 page 51. The electricity generated can not be cross checked against receipts from sales as the methodology also points out on page 51 because of the project activity definition, it generate electricity to satisfy the demand of the pulp mill (the baseline scenario or baseline generation) and the surplus of electricity is sold to the grid. This surplus is EGy the net quantity of increased electricity generation as a result of the project activity (incremental to baseline generation) during the year *y* in MWh which is determined for emission reduction calculations using equation 13 as indicated by ACM0006 version 2 and the CDM EB decision[4b] not with a direct measurement of the electricity being sold to the grid which can be related to invoices.

4.1.5 Monitoring information on Table D.2.1.1 Comment section

Information regarding the monitoring system was also added for the parameter $BF_{i,y}$ Quantity of biomass type i used as fuel in the project plant during the year y in a volume or mass unit (tDS) (table D.2.1.1) as well as with the rest of the parameters. This change reflects more precisely how each parameter is obtained and also provides information about the meter accuracy and calibration frequency

CAR 2 was raised because the revised monitoring plan mentions that $BF_{i,y}$ Quantity of biomass type i used as fuel in the project plant during the year y in a volume or mass unit (tDS) is *measured* however in order to provide more clarity and consistency with the monitoring plan executed the PP was requested to revise the section D.2.1.1.

CAR 2 was closed after receiving the RMP that explain in the table D.2.1.1 section: "*comments*" how the data is monitored and aggregated complying with methodology ACM0006 version 2.

This variable is monitored using dedicated flow meters for measuring continuously the black liquor flow (l/s) in combination with refractometers to measure the average concentration of solids, and a transmitter to measure temperature (°C). To determine $BF_{i,y}$ Quantity of biomass type i used as fuel in the project plant during the year y in mass unit (tDS), the total wet flow is multiplied by the average concentration measured with the refractometers. The measurement of $BF_{i,y}$ is registered online and fully integrated every 5 seconds by the Distributed Control System (DCS) and aggregated as daily and monthly for emission reduction calculation, in this case recorded daily/18/.

It must be noted that the measurement procedure described above is the normal practice for measuring black liquor flows in the Pulp and Paper industry worldwide.

The following parameters, related to the black liquor, (%) dry solids, temperature and flow are measured continuously every 5 seconds using dedicated meters. With these values the $BF_{i,y}$ Quantity of biomass type i used as fuel in the project plant during the year y in a volume or mass unit (tDS) is calculated also every 5 seconds by the automatic system and recorded daily/18/.

The location of the meters was verified on site/7/ and found appropriate:
There are four Magnetic flow meters ABB model SE41F installed which are composed of a flow tube and a transmitter ABB SM4000, these meters were factory calibrated in 2005 and do not need further calibration as it was informed by the manufacturer/8a/. These flow meters have an accuracy of +/-0.5% according to the manufacturer calibration certificate/8b to 8g/.

The temperature meter was calibrated by the manufacturer in 2005 showing a difference with the span lower than 0.0007%/10b/. This meter shall be calibrated every five years according to the frequency determined by the manufacturer/12/.

The refract meters that measure the %dry solids were calibrated by the manufacturer on 07/06/2005/13/. It was confirmed with the manufacturer that it is recommended to verify the sensor every two years/17/. The refract meters have an accuracy of +/- 0.1%DS/13/

Data is monitored automatically by the Distributed Control System (DCS) every 5 seconds (black liquor flow, TSS, and temperature) the data is downloaded by the IP system and inserted automatically in an Excel spreadsheet. There is no manual record or manual calculation. The amount of black liquor is calculated automatically by the DCS system as it is explained in the RMP which was verified on site checking the DCS functions.

Biomass flows are crosschecked through a flow balance between the quantity measured by the total flow meter and the exit flow meter/18/. The difference which is the amount of black liquor re-circulated was found consistent and also an energy mass balance calculation is done that assures the reported values.
The accuracy is acceptable and the quality control measures of checking (energy balance and flow balance is also found appropriate).

CL 5 was raised requesting to update section D.2.1 (Table) of the revised monitoring plan in accordance to the monitoring and recording frequency being done by the project activity.

Regarding the NCV_i Net calorific values of biomass type i per mass or volume of biomass (GJ/tDS). It is determined once a year by a specialized laboratory, this RMP adds information about the responsible area of the pp in charge of collecting the data.

$COEF_{CO2,i}$ CO_2 emission factor of the fossil fuel type i used in the project plant. It is a IPCC default factor. The RMP modified the content of the column: “comments” specifying that it refers to the emission factor related to the fossil fuels co fired in the power boiler and explaining that it is calculated using the EB41 Annex 11 Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion version 2 Option B.

The table D.2.1.1 also now specify the monitoring of the amount $FF_{project\ plant,i,y}$ On-site fossil fuel consumption of fuel type i for co-firing in the project plant. The Total quantities of fossil fuel per type used in the recovery boiler are constantly monitored at the power plant. Emissions from fossil fuel quantities (diesel and natural gas) associated to additional power generation were considered project emissions and deducted from the baseline emissions of the project activity. The fossil fuel associated with additional power generation was determined following the indications of section E.1. (pages 44 and 45) of the registered PDD. The RMP also informs correctly the accuracy and calibration frequency of the meters: There are 4 meters installed to measure the diesel consumed (2 meters for each burner) and two meters to measure the natural gas

consumed, the indicated frequency of calibration every 5 years is correct as per manufacturer recommendation[58] as well as the accuracy of +/- 0.1% for liquids and +/- 0.5% for gases[58].

The section related to the EF_y CO_2 emission factor of the grid. Now consider the responsible entity of generating this data annually. This parameter is calculated for each year using information provided by the grid administrator. The revision was found correct.
CL5 was closed.

4.1.6 Section D2 of the monitoring plan was modified and information was added to Annex 4.
CL 4 was raised requesting to review and update section D2 of the revised monitoring plan *Justification of the choice of the methodology and why it is applicable to the project activity* in accordance to the changes made in the rest of the document.
This **CL 4 was closed** after verifying the changes done in this section that explains the baseline scenario and the applicability of the methodology ACM0006 version 2.

A line diagram was added in the Annex 4 showing the meters that the monitoring involve, this diagram correspond to the meters installation verified during site visit.

The proposed revision of the monitoring plan is in accordance with the approved monitoring methodology applicable to the project activity (details below).

This proposed revision improves the accuracy and completeness of the monitoring plan because the changes consider using the net terms ($EG_{project\ plant,y}$ and $\varepsilon_{el,other\ plant(s)}$) of equation 13 of ACM0006 (Version 2), this proposed revision is done to validate how those two parameters are obtained, but also this revision update the monitoring information and (QA/QC) procedures defined for $BF_{i,y}$ and $EG_{project\ plant,y}$ in order to follow the methodology.

4.2 Findings of Previous Verification Reports

No FAR has been raised in the previous first and second verifications.
The first monitoring report was issued without observations.

The second monitoring period was issued after answering the following request for review
The DOE is requested to clarify how it verified:
(i) That the choice of using simple adjusted Operating Margin (OM) is in accordance with the applied methodology ACM0002, which specifies dispatch data analysis as the first methodological choice for OM calculation.
(ii) The appropriateness of calculation of CERs for the year 2008 using grid emission factor calculated based on only nine months data for the year 2008.
(iii) The natural gas consumption in the project as the emission reduction spreadsheet does not include any values.

As this project was validated not following equation 13, a revised monitoring plan approved the by CDM EB on October 10th 2008:
http://cdm.unfccc.int/Projects/DB/DNV-CUK1143329749.99/MonitoringPlanRevisions/01/RevisedMonitoringPlan

That revised monitoring plan was submitted to take into account the parameters needed to use the equation 13 of the methodology ACM0006 version 2 because initially the project was registered not using equation 13 of the methodology ACM0006 version 2, it was registered directly measuring the *EGy* net quantity of increased electricity generation delivered to the grid as a result of the project activity (incremental to baseline generation) during the year *y* in MWh.

Now with this validation opinion of the attached second revision of the monitoring plan makes the monitoring more accurate and follows ACM0006 version 2 definitions related to equation 13.

The project involves a recovery boiler that burns black liquor, a by-product of the pulp process, a boiler water and steam distribution system, two 70 MW turbo generators and electrical systems. The actual operation of the project comply with registered PDD, there are no changes in the project that was registered as it was verified on site.

5. List of Persons Interviewed

Date of site visit	Name	Position	Short description of subject discussed
Sept 30th 2011	Christian Patrickson	Development manager	NCV Value, calculation of efficiency, auxiliary Consumption
Sept 30th 2011	Christian Rodríguez	CDM chief of Arauco Bioenergía	NCV Value, calculation of efficiency, auxiliary Consumption
August 1st 2011	Carla Seguel	Development Engineer of Arauco Bioenergía	Auxiliary consumption, unilinear diagram
August 1st 2011	Pamela Castillo	Studies Engineer Nueva Aldea Phase 2	Auxiliary consumption

6. Document References

Category 1 Documents (documents provided by the Client that relate directly to the GHG components of the project.

/1/	Nueva Aldea Biomass Power Plant Phase 2, version 3, 05 January 2006. (PDD registered Project n° 0346)
/1b/	CDM Validation and Verification Manual version 1.2
/2/	DNV Validation report - Nueva Aldea Biomass Power Plant Phase 2
/3a/	Celulosa Arauco y Constitución S. A., Monitoring plan revised (10/10/2008). Nueva Aldea Biomass Power Plant Phase 2, registered n° 0346
/3b/	SGS Validation opinion of the revised monitoring plan
/3c/	UNFCCC CDM RIT mail dated 16 October 2008 approving the first revised monitoring plan
/3da/	Celulosa Arauco y Constitución S. A., Monitoring plan revised (07/10/2011). Nueva Aldea Biomass Power Plant Phase 2, registered n° 0346 and SGS Second version of the revised monitoring plan
/3db/	Celulosa Arauco y Constitución S. A., Monitoring plan revised (19/10/2011). Nueva Aldea Biomass Power Plant Phase 2, registered n° 0346 and SGS Second version of the revised monitoring plan (track changes and clean versions).
/3e/	UNFCCC CDM secretariat Request for review - Request for issuance 0346 Nueva Aldea Biomass Power Plant Phase 2 – mail dated 23rd of May 2011
/4a/	ACM0006 “Consolidated monitoring methodology for grid-connected electricity generation from biomass residues”, version 2. 03/03/2006
/4b/	Board acceptance to the request for deviation - Issuance: Determination of the net electricity displaced from the grid (EGy) by directly measuring the surplus of electric power delivered to the grid, instead of using equation 13 of the ACM0006 (Version 02)
/4c/	ACM0002 version 4 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”
/4d/	CDM project activity issuance review form, Nueva Aldea Biomass Power Plant Phase 2 (0346) dated 23rd March 2011.
/4e/	EB 49 Annex 28 Procedures for revising monitoring plans in accordance with paragraph 57 of the modalities and procedures for the CDM.

Category 2 Documents (background documents used to check project assumptions and confirm the validity of information given in the Category 1 documents and in validation interviews):

/5a/	SGS verification and certification report of the first monitoring period.
/5ba/	Celulosa Arauco y Constitución S. A., Emission reduction calculation verified of the first monitoring period.
/5bb/	Celulosa Arauco y Constitución S. A., Emission reduction calculation verified of the first monitoring period modified.
/5c/	SGS verification and certification report of the second monitoring period
/5da/	Celulosa Arauco y Constitución S. A., Emission reduction calculation verified of the second monitoring period.
/5db/	Celulosa Arauco y Constitución S. A., Emission reduction calculation verified of the second monitoring period modified.
/5e/	SGS verification and certification report of the third monitoring period
/5fa/	Celulosa Arauco y Constitución S. A., Emission reduction calculation verified of the third monitoring period.
/5fb/	Celulosa Arauco y Constitución S. A., Emission reduction calculation verified of the third monitoring

	period modified.
/6/	Electricity unilinear diagram
/7/	Celulosa Arauco y Constitución S. A., Black liquour flow diagram.
/8a/	IMA Industrial, certificate informing that the electromagnetic flowmeters that measure the black liquor do not require calibration, dated November 11th 2008.
/8b/	ABB certificate of calibration (internal TAG: 552 FT 378) dated August 22nd 2005
/8c/	ABB certificate of calibration (internal TAG: 552 FT 380) dated August 19th 2005
/8d/	ABB certificate of calibration (internal TAG: 552 FT 382) dated August 22nd 2005
/8e/	ABB certificate of calibration (internal TAG: 552 FT 384) dated August 19th 2005
/8f/	ABB certificate of calibration (internal TAG: 552 FT 366) dated August 16th 2005
/8g/	ABB certificate of calibration (internal TAG: 552 FT 368) dated October 15th 2008
/9/	Celulosa Arauco y Constitución S. A., black liquor flow meter annual inspection records
/10a/	Celulosa Arauco y Constitución S. A., TI-365 temperature transmitter data sheet
/10b/	Emerson Process Management, Rosemount Inc., Temperature meter calibration from supplier. 17th April 2005. Emerson.
/11/	Celulosa Arauco y Constitución S. A., Temperature meter verification..
/12/	Emerson Process Management, Rosemount Inc., Temperature meter calibration frequency.
/13/	Kpantent Refract meter calibration from supplier (DE-0370-A and DE-0370-B). 7th June 2005.
/14/	Celulosa Arauco y Constitución S. A., Refract meter verification. 13th November 2007.
/15/	Celulosa Arauco y Constitución S. A., Refract meter verification. 15th January 2009.
/16/	Celulosa Arauco y Constitución S. A., Refract meter verification. 23rd March 2010.
/17/	K-Patents Oy, email informing regarding the calibration of the refractmeters, mail dated on November 11th 2008.
/18/	Celulosa Arauco y Constitución S. A., Monthly and daily data of all the parameters obtained from the system
/19/	Celulosa Arauco y Constitución S. A., energy mass balance
/20/	KCL Laboratory Report NCV Black Liquor 2007. 4th July 2007.
/21/	KCL Laboratory Report NCV Black Liquor 2008. 1st October 2008.
/22/	VTT Expert services Ltd. Laboratory Report NCV Black Liquor 2009
/23/	Celulosa Arauco y Constitución S. A., Energy distribution diagram
/24a/	Power Measurement Supplier letter verification frequency power meter, July 28th 2006, Schneider
/24b/	Power Measurement Meter technical data sheet
/25/	SGS, Photographic evidence of the meter Internal TAG: 568-PML-012 Power Measurement Model: 7330 ION Serie: PB-0512A108-11
/26/	SGS, Photographic evidence of the meter Internal TAG: 568-PML-25, Power Measurement Model: 7330 ION Serie:PB-0502A245 -11
/27/	SGS, Photographic evidence of the meter Internal TAG: 568-PML-11, Power Measurement Model: 7330 ION Serie:PB-0501A546 -11
/28/	SGS, Photographic evidence of the meter Internal TAG: 568-PML-14, Power Measurement Model: 7330 ION Serie:PB-0502A290 -11
/29/	SGS, Photographic evidence of the meter Internal TAG: 568-PML-21, Power Measurement Model: 7330 ION Serie:PB-0501A390 -11
/30/	SGS, Photographic evidence of the meter Internal TAG: 568-PML-22, Power Measurement Model: 7330 ION Serie:PB-0501A418 -11
/31/	SGS, Photographic evidence of the meter Internal TAG: 568-PML-23, Power Measurement Model: 7330 ION Serie:PB-0501A388 -11
/32/	SGS, Photographic evidence of the meter Internal TAG: 568-PML-24, Power Measurement Model: 7330 ION Serie:PB-0501A422 -11
/33/	SGS, Photographic evidence of the meter Internal TAG: 568-PML-26, Power Measurement Model: 7330 ION Serie:PB-0501A389 -11
/34/	SGS, Photographic evidence of the meter Internal TAG: 568-PML-27, Power Measurement Model: 7330 ION Serie:PB-0501A417 -11
/35/	SGS, Photographic evidence of the meter Internal TAG: 568-PML-28, Power Measurement Model: 7330 ION Serie:PB-0501A241 -11
/36/	SGS, Photographic evidence of the meter Internal TAG: 568-PML-29, Power Measurement Model: 7330 ION Serie:PB-0501A393 -11

/37/	SGS, Photographic evidence of the meter Internal TAG: 568-PML-211, Power Measurement Model: 7330 ION Serie:PB-0501A423 -11
/38/	SGS, Photographic evidence of the meter Internal TAG: 568-PML-13, Power Measurement Model: 7330 ION Serie:PB-0707A744 -11
/39/	Internal TAG 568-PML-11 Power measurement Certificate Of Compliance and Calibration Model ION7330 Serial Number PB-0501A546-11 Calibration date January 27th 2005
/40/	Internal TAG 568-PML-12 Power measurement Certificate Of Compliance and Calibration Model ION7330 Serial Number PB-0502A108-11 Calibration date February 8th 2005
/41/	Internal TAG 568-PML-13 Power measurement Certificate Of Compliance and Calibration Model ION7330 Serial Number PB-0707A744-11 Calibration date July 22nd 2007
/42/	Internal TAG 568-PML-14 Power measurement Certificate Of Compliance and Calibration Model ION7330 Serial Number PB-0502A290-11 Calibration date February 15th 2005
/43/	Internal TAG 568-PML-21 Power measurement Certificate Of Compliance and Calibration Model ION7330 Serial Number PB-0501A390-11 Calibration date January 20th 2005
/44/	Internal TAG 568-PML-22 Power measurement Certificate Of Compliance and Calibration Model ION7330 Serial Number PB-0501A418-11 Calibration date January 24th 2005
/45/	Internal TAG 568-PML-23 Power measurement Certificate Of Compliance and Calibration Model ION7330 Serial Number PB-0501A388-11 Calibration date January 20th 2005
/46/	Internal TAG 568-PML-24 Power measurement Certificate Of Compliance and Calibration Model ION7330 Serial Number PB-0501A422-11 Calibration date January 24th 2005
/47/	Internal TAG 568-PML-25 Power measurement Certificate Of Compliance and Calibration Model ION7330 Serial Number PB-0501A421-11 Calibration date January 24th 2005
/48/	Internal TAG 568-PML-25 Power measurement Certificate of Compliance and Calibration Model ION7330 Serial Number PB-0502A245-11 Calibration date February 14th 2005.
/49/	Internal TAG 568-PML-26 Power measurement Certificate of Compliance and Calibration Model ION7330 Serial Number PB-0501A389-11 Calibration date January 20th 2005
/50/	Internal TAG 568-PML-27 Power measurement Certificate of Compliance and Calibration Model ION7330 Serial Number PB-0501A417-11 Calibration date January 24th 2005
/51/	Internal TAG 568-PML-28 Power measurement Certificate of Compliance and Calibration Model ION7330 Serial Number PB-0501A241-11 Calibration date January 21st 2005.
/52/	Internal TAG 568-PML-29 Power measurement Certificate of Compliance and Calibration Model ION7330 Serial Number PB-0501A393-11 Calibration date January 20th 2005.
/53/	Internal TAG 568-PML-211 Power measurement Certificate of Compliance and Calibration Model ION7330 Serial Number PB-0501A423-11 Calibration date January 21st 2005
/54/	Endress Hauser calibration certificate Flow meter internal TAG: 552 FT 671 serial number 75044102000 dated 09/06/2005
/55/	Endress Hauser calibration certificate Flow meter internal TAG: 552 FT 668 serial number 75043E02000 dated 08/06/2005
/56/	Endress Hauser calibration certificate Flow meter internal TAG: 552 FT 663 serial number 75044102000 dated 09/06/2005 (diesel meter start up burners)
/57/	Endress Hauser calibration certificate Flow meter internal TAG: 552 FT 674 serial number 75043E02000 dated 08/06/2005
/58/	Endress Hauser, technical data sheet of flow mass meters
/59/	Celulosa Arauco y Constitución S. A., Electricity meters annual check
/60/	SGS; Photographic evidence of the Flow meter internal TAG: 552 FT 671 serial number 75044202000 (diesel meter (load burners)
/61/	SGS, Photographic evidence of the Flow meter internal TAG: 552 FT 668 serial number 75043E02000 (return diesel meter start up burners)
/62/	SGS, Photographic evidence of the Flow meter internal TAG: 552 FT 663 serial number 75044102000 (diesel meter start up burners)
/63/	SGS, Photographic evidence of the Flow meter internal TAG: 552 FT 674 serial number 75043F02000 (return diesel meter load burners)
/64a/	Celulosa Arauco y Constitución S.A., Annual check of the diesel flow meters: Endress Hauser calibration certificates Flow meter internal TAG 552 FT 663 serial number 75044102000 (Diesel meter start up burners) dated on 19/05/2008 and on 19/01/2009. Endress Hauser calibration certificates Flow meter internal TAG 552 FT 668 serial number

	75043E02000 (Return diesel meter (start up burners) dated on 19/05/2008 and on 19/01/2009. Endress Hauser calibration certificates Flow meter internal TAG 552 FT 671 serial number 75044202000 (Diesel meter (load burners) dated on 19/05/2008 and on 19/01/2009. Endress Hauser calibration certificates Flow meter internal TAG 552 FT 674 serial number 75043F02000 Return diesel meter (load burners) dated on 19/05/2008 and on 19/01/2009.
/64b/	Celulosa Arauco y Constitución S.A., Annual check of the natural gas flow meters
/65/	SGS, Photographic evidence of the Flow meter internal TAG:552FT471 serial number 75044302000 (natural gas meter start up burners)
/66/	SGS, Photographic evidence of the Flow meter internal TAG 552 FT 483 serial number 75044402000 (Natural gas meters (load burners))
/67/	Endress Hauser calibration certificate Flow meter internal TAG 552 FT 471 serial number 75044302000 dated on 07/06/2005 (natural gas meter start up burners)
/68/	Endress Hauser calibration certificate Flow meter internal TAG 552 FT 471 serial number 75044302000 dated on 31/03/2010 (natural gas meter start up burners)
/69/	Endress Hauser calibration certificate Flow meter internal TAG 552 FT 483 serial number 75044402000 dated on 07/06/2005 (Natural gas meters (load burners))
/70/	Endress Hauser calibration certificate Flow meter internal TAG 552 FT 483 serial number 75044402000 dated on 31/03/2010 (Natural gas meters (load burners))
/71/	Endress Hauser certificate related to the calibration frequency of the meters
/72/	Copec, laboratory report, diesel NCV analysis, September 29th 2008
/73/	Copec, laboratory report, diesel NCV analysis, July 28th 2009
/74/	Innergy Soluciones Energética S.A., laboratory report of the characteristics of the natural gas dated September 29th 2008
/75/	Innergy Soluciones Energética S.A., laboratory report of the characteristics of the natural gas dated July 28th 2009
/76/	SGS, Photographic evidence black liquor flow meter F4 552FT384
/77/	SGS, Photographic evidence black liquor flow meter F4 552FT380
/78/	SGS, Photographic evidence black liquor flow meter F4 552FT382
/79/	SGS, Photographic evidence black liquor flow meter F4 552FT378
/80/	SGS, Photographic evidence black liquor refract meter 7R1 552DT370A
/81/	SGS, Photographic evidence black liquor refract meter 7R2 552DT370B
/82/	SGS, Photographic evidence black liquor temperature meter 7T1 552TI365
/83/	Endress Hauser calibration certificate Flow meter internal TAG 552 FT 663 serial number 75044102000 dated on 31/03/2010 (diesel meter start up burners)
/84/	Endress Hauser calibration certificate Flow meter internal TAG 552 FT 668 serial number 75043E02000 dated on 30/03/2010 (Return diesel meter start up burners)
/85/	Endress Hauser calibration certificate Flow meter internal TAG 552 FT 671 serial number 75044202000 dated on 31/03/2010 (diesel meter load burners)
/86/	Endress Hauser calibration certificate Flow meter internal TAG 552 FT 674 serial number 75043F02000 dated on 30/03/2010 (return diesel meter load burners)
/87/	Celulosa Arauco y Constitución S.A., Line diagram of the electricity meters obtained from the DCS
/88/	Internal TAG PL A1-552-03-220 Power measurement Certificate Of Compliance and Calibration Model ION7330 Serial Number PB-0412A453-11 Calibration date January 4th 2005
/89/	SGS, Photographic evidence electricity meter PB-0412A453-11
/90/	Internal TAG PL A1-552-03-235 Power measurement Certificate Of Compliance and Calibration Model ION7330 Serial Number PB-0501A419-11 Calibration date January 24th 2005.
/91/	SGS, Photographic evidence electricity meter PB-0501A419-11
/92/	Internal TAG PL A1-552-03-227 Power measurement Certificate Of Compliance and Calibration Model ION7330 Serial Number PB-0501A006-11 Calibration date January 5th 2005.
/93/	SGS, Photographic evidence electricity meter PB-0501A006-11
/94/	Internal TAG PL A1-552-03-220 Power measurement Certificate Of Compliance and Calibration Model ION7330 Serial Number PB-0501A503-11 Calibration date January 26th 2005.
/95/	SGS, Photographic evidence electricity meter PB-0501A503-11
/96/	Internal TAG PL A1-552-03-236 Power measurement Certificate Of Compliance and Calibration Model ION7330 Serial Number PB-0501A033-11 Calibration date January 5th 2005.

/97/	SGS, Photographic evidence electricity meter PB-0501A033-11
/98/	Celulosa Arauco y constitución S.A., Auxiliary consumption
/99/	Celulosa Arauco y constitución S.A., Calculation of the $\varepsilon_{el,other\ plant(s)}$ first version.
/100/	mail from Johan Nygaard, Technical Director, ÅF AB, Division Industry, Forest Industry dated August 17th 2011 (http://www.afconsult.com). This mail contains the energy balance data that was used in the PDD page 10 for the baseline scenario, including information regarding the power consumption in the baseline.
/101/	ÅF AB, Division Industry*, Baseline rev_2011-08-17_fix Energy balance data used to determine the flow chart of the PDD page 10 of the baseline scenario*
/102/	Celulosa Arauco y constitución S.A., Calculation of the $\varepsilon_{el,other\ plant(s)}$ second version.
/103/	Celulosa Arauco y constitución S.A., Calculation of the $\varepsilon_{el,other\ plant(s)}$ of other plants
/104/	Celulosa Arauco y constitución S.A., cooling system installed
/105/	Celulosa Arauco y constitución S.A., feedwater installed
/106/	Celulosa Arauco y constitución S.A., Nueva Aldea Pulp Mill Project Conceptual Report volume 1 Main Report and Drawings, November 2005.

Annex 1: Validation Protocols

Checklist Question	Reference	MoV*	Comments	Conclusion/ CARs/CLs

Checklist Question	Reference	MoV*	Comments	Conclusion/ CARs/CLs
A.1. General Requirements *(Note that the sections A.1.1- A.1.4 may be completed after the other sections are completed)*				
A.1.1. Is the revision in the monitoring plan based on a decision by the CDM EB	EB49, Annex 29	DR	The revision of the monitoring plan is a result of a recommendation proposed by the DOE to increase the completeness of the monitoring plan in accordance to the methodology ACM0006 version 2. The request for issuance of the third monitoring period (From October 1st 2008 until December 31st 2009) got review because: http://cdm.unfccc.int/Projects/DB/DNV-CUK1143329749.99/iProcess/SGS-UKL1273853130.32_W1/view *The revised monitoring plan approved by CDM EB requires the "EG_Y", the Net quantity of electricity generated in the project plant during year y to be measured continuously. Page 8 of the monitoring report states "since the project plant consumes the same amount of electricity as the reference plant (e.g. there is not additional electric power consumption associated to the implementation of the project activity), the net electricity generated in the project plant is the same as the total electricity generated in the project plant". The DOE is further requested to clarify how it verified this approach in accordance with ACM0006 ver 2 and that "EG_Y," is being monitored in accordance with the revised monitoring plan which requires continuous measurement of net quantity of electricity generated in the project plant during y.* 1.- The revised monitoring plan approved by CDM EB that can be found in the project website does not include the "EG_Y" as a monitoring parameter. In accordance to the ACM0006 version 2, EGy is calculated by using equation 13 that refers *EGy* as "the net quantity of increased electricity generation as a result of the project activity (incremental to baseline generation) during the year *y* in MWh". 2.- Before the review requested by CDM EB the PP reported $EG_{project\ plant,y}$ in monitoring report as "the Net quantity of electricity generated in the project plant during year y". However PP referred to gross electricity generation of the project plant. Furthermore, PP used equation 13 to calculate EGy using gross electricity generation and the gross energy efficiency of electricity generation (12.31%)/99/ in (the) other power plant(s) that would use the biomass fired in the project plant in the absence of the project activity, expressed in $MW_{hel}/MWh_{biomass}$ determining an	ok

Checklist Question	Reference	MoV*	Comments	Conclusion/ CARs/CLs
			incremental EGy 3.- This approach was based on the statement mentioned in the monitoring report page 8 "*since the project plant consumes the same amount of electricity as the reference plant (e.g. there is not additional electric power consumption associated to the implementation of the project activity)".* However, this statement is not in accordance to the PDD page 10 and 11 which informs different values: the estimated auxiliary consumption was 8.8 MW and 9.1MW for the baseline and the project activity respectively. So in order to fulfil the requirements of the methodology, the monitoring plan was revised and it is presented with this validation report to validate: 1.- $EG_{project\ plant,y}$ is the net quantity of electricity generated in the project plant during the year *y* in MWh. *2.-* $\varepsilon_{el,other\ plant(s)}$ the net energy efficiency of electricity generation in (the) other power plant(s) that would use the biomass fired in the project plant in the absence of the project activity, expressed in $MWh_{el}/MWh_{biomass}$. Both parameters are used in equation 13 of ACM0006 version 2: $EG_y = EG_{project\ plant,y} - \varepsilon_{el,other\ plant(s)} \cdot \sum_i BF_{i,y} \cdot NCV_i$ (13)	

Checklist Question	Reference	MoV*	Comments	Conclusion/ CARs/CLs
A.1.2. Is the revision based on a decision by CDM EB but also additional revisions are proposed by the PP/DOE	EB49, Annex 29	DR	The revision is based in a recommendation by the DOE to improve the accuracy and completeness of the monitoring plan: 1.- $EG_{project\ plant,y}$ the net quantity of electricity generated in the project plant during the year *y* in MWh is used instead of the gross quantity. In this revised monitoring plan, $EG_{project\ plant,y}$, is the result of the gross quantity of electricity generated by the project minus the total auxiliary electricity consumption required for the operation of the power plant, these parameters ($ELP_{J,gross,y}$ and $EL_{PJ,aux,y}$)[3] were added to increase the completeness of the monitoring plan complying with the applicable methodology. 2.- As part of this revision of the monitoring plan, the calculation of the $\varepsilon_{el,other\ plant(s)}$ ($MWh_{el}/MWh_{biomass}$)net efficiency of the power plant that would use the biomass in the absence of the project activity was verified and deemed correct, this parameter is not considered part of the monitoring plan because it is considered as per definition, an ex ante parameter but this report contain information that explain how this parameter was validated In addition, the following two Quality Control (QC) and Quality Assurance (QA) Procedures were updated to follow the methodology ACM0006 version 2 (Section D.3): 3.- The biomass flow will be crosschecked using an annual energy balance and comparing the total flow sent to the boiler, the flow measured by the four meters that directly feed the boiler and the meter that measure the flow that is recirculated[7] instead of using pulp production index to follow the requirements of the methodology ACM0006 version 2 page 50 and also because it is more specific or related to the electricity generation. 4.- The consistency of metered net electricity generated by the project plant will be cross checked using an efficiency index (electricity generation divided by the quantity of biomass fired) comparable to previous years instead of using pulp production index because it is related to the electricity generation and follow	*OK*

[3] The notation of the methodology ACM0006 version 11.1 page 65 was used to name these two parameters.

Checklist Question	Reference	MoV*	Comments	Conclusion/ CARs/CLs
			ACM0006 version 2 page 51. 5.- In order to increase the completeness of the monitoring plan information, It was also added further information in the table D.2.1.1., section: “comments” of the parameters including a description of the monitoring systems, accuracy, calibration frequency and monitoring and recording frequency in accordance EB 41 Annex 12 Guidelines Project Design Document (CDM-PDD) Section B.7.1 6.- The section D.2 was updated in order to provide a clear justification of the choice of the methodology and its applicability to this project activity and a line diagram of the project activity was added as Annex 4 in order to inform the meters installation.	

Checklist Question	Reference	MoV*	Comments	Conclusion/ CARs/CLs
A.1.3. Is the need for revision in monitoring plan spotted during the first monitoring period?	EB49, Annex 29 Project page on UNFCCC website	DR	This revision of the monitoring plan was spotted during the third verification of the project. During the first verification it was spotted a revision of the monitoring plan because the project was validated not using equation 13, That revision of the monitoring plan involved a gross baseline efficiency and gross energy generated by the project plant, obtaining an increased electricity generation as a result of the project activity (Incremental to baseline generation) during the year *y* in MWh. The difference with the RMP submitted now is the usage of the net values, not the gross values. This is further discussed below.	*OK*
A.1.4. Is the revised monitoring plan complete and does the revised monitoring plan follow the registered PDD template?	Registered PDD	DR	Yes, the revised monitoring plan follows the registered PDD template. But in order to provide more complete and accurate information about how the monitoring is done in terms of monitoring and recording frequency **CL 5 was raised and closed** after verifying the information added in the comments section of the parameters. **CL4 was raised and closed** to require further information in the section D2 related to the information requested by this title.	**OK** **CL 5 closed** **CL 4 closed**
A.1.5. Has the revised monitoring plan submitted in track change mode for each of the revision point (issue)?ok	Revised monitoring plan	DR	No, The PP sent a word version highlighted only. **CAR 1** was raised asking to please send the RMP in track change mode. **CAR 1 was closed** after receiving the final version of the RMP in track change mode.	**OK** **CAR 1 closed**
A.1.6. is there an objective evidence for each of the proposed revision point (issue)?			The revision points are five and there is proper evidence for each one: 1.- $EG_{project\ plant,y}$ the net quantity of electricity generated in the project plant during the year *y* in MWh will be used instead of the gross quantity. The evidence are the meters installed which were verified on site as well as the monitoring system. 2.- $\varepsilon_{el,other\ plant(s)}$ the average net energy efficiency of electricity generation in (the) other power plant(s) that would use the biomass fired in the project plant in the absence of the project activity, expressed in $MWh_{el}/MWh_{biomass}$ will be used instead of the gross value. In addition the following Quality Control (QC) and Quality Assurance (QA) Procedures were updated to follow the methodology:	OK

Checklist Question	Reference	MoV*	Comments	Conclusion/ CARs/CLs
			3.- The biomass flow will be crosschecked using an annual energy balance and comparison between meters and the amount recirculated instead of using pulp production index. 4.- The consistency of metered net electricity generated by the project plant will be cross checked using an efficiency index (electricity generation divided by the quantity of biomass fired) comparable to previous years instead of using pulp production index. 5.- It was also added more details about the monitoring of the parameters, the information was verified during site visit and desk review and it was found correct (table D.2.1.1). The five changes have clear evidence as it is further explained in the following sections as well as the changes done in section D.2 and Annex 4 are correct.	

Checklist Question	Reference	MoV*	Comments	Conclusion/ CARs/CLs
A.1.7. Does the revised monitoring plan also include the Annex 4?	Registered PDD	DR	The revised monitoring plan include now a line diagram to show the meters location in the Annex 4, in the previous monitoring plan there was no information in the Annex 4 (it refered to section D of the PDD).	OK
A.1.8. Does the revised monitoring plan lead/associate to any kind of change in the project registered design?	Registered PDD & EB48 Annex 66-67	DR	No, the revised monitoring plan does not lead or it is associated to any kind of change in the project design registered.	OK
A.2. Data and Parameters Monitored				
A.2.1. Does the revised monitoring plan in the PDD comply with the approved methodology provided for the collection and archiving of all relevant data necessary for estimation or measuring the emission reductions within the project boundary during the crediting period?	VVM Para. 91a/91d/121 Revised MP Section B.7 EB49, annex 2, para 9	DR	Yes, the revised monitoring plan complies with the approved methodology ACM0006 version 2: The project was registered under scenario 4. The project of Nueva Aldea Biomass Power Plant Phase 2 comprises a renewable energy project activity that involves the installation of a new highly efficient pulp mill inside the Nueva Aldea Industrial Complex that is capable of generating additional electric energy to the grid called SIC compared to the baseline situation which would have been the installation of a new biomass power plant (in the following referred to as "reference plant") at the same site and with the same thermal firing capacity but with a lower electric efficiency than the project plant (e.g. by using a lower-pressure boiler instead of a high-pressure boiler). To generate energy the power plant uses black liquor, an organic by-product of the Kraft pulp production process. The same type and quantity of biomass as in the project plant would have been used in the reference plant. Consequently, the power generated by the project plant would -in the absence of the project activity- been generated (a) in the reference plant and – since power generation is larger in the project plant than in the reference plant – (b) partly in power plants in the grid. The list of parameters required by the selected approved methodology are: 1. BFi,y Quantity of biomass type i used as fuel in the project plant during the year y in a volume or mass unit (tDS) This variable is monitored using dedicated flow meters for measuring continuously the black liquor flow (l/s) in combination with a refractometer to	OK **CAR 2 closed** **CL 3 closed**

Checklist Question	Reference	MoV*	Comments	Conclusion/ CARs/CLs
			measure the average concentration solids, and a transmitter to measure the temperature (℃). To determine BFi,y Quantity of biomass type i used as fuel in the project plant during the year y in mass unit (tDS), the total wet flow is multiplied by the average concentration measured with the refractometers and the density which is function of the temperature which is also monitored with the same frequency . The measurement of BFi,y is registered online calculated and fully integrated each 5 seconds by the Distributed Control System (DCS) and aggregated daily and then monthly for emission reduction calculation, being the data recorded daily/18/. It must be noted that the measurement procedure described above is the normal practice for measuring black liquor flows in the Pulp and Paper industry worldwide. In order to provide further clarity in the revised monitoring plan CAR 2 was raised and closed after receiving the RMP that explain in the table D.2.1.1 section: comments how the data is monitored and aggregated complying with methodology ACM0006 version 2. . **CL3 was raised** because the page 14 of the revised monitoring plan mentioned that the energy balance will be based on purchased quantity which was not found correct. This **CL3 was closed** after receiving the updated RMP without this type of checking against invoices. 2. NCVi Net calorific value of biomass type i per mass or volume of biomass (GJ/tDS). It is determined once a year by a specialized laboratory. 3. $COEF_{CO2,i}$ CO_2 emission factor of the fossil fuel type i used in the project plant. It is calculated following the EB 41 Annex 11. 4. $FF_{project\ plant,i,y}$ On-site fossil fuel consumption of fuel type i for co-firing in the project plant. The Total quantities of fossil fuel per type used in the recovery boiler are monitored continuously at the Power Plant and recorded daily. 5. $EG_{project\ plant,y}$ Net quantity of electricity generated in the project plant during the year y. It is measured continuously by dedicated flow meters that measure the gross energy generated and the auxiliary consumption. 6. EF_y CO_2 emission factor of the grid. It is calculated for each year using information provided by the grid administrator according to the revised monitoring plan as well as CO_2 Build Margin emission factor of the grid, CO_2 Operating Margin emission factor of the grid and the rest of parameters needed to calculate the CO_2 emission factor of the grid.	

Checklist Question	Reference	MoV*	Comments	Conclusion/ CARs/CLs
			The revised monitoring plan contains all these parameters, they are clearly described and are all those that the methodology require for this type of project, the monitoring described complies with the requirements of the methodology ACM0006 version 2: 3. EF_{CH4} Methane emission factor for combustion of biomass in the project plant (kg CH4/MWh) Monitoring of this parameter for project emissions is not required because CH_4 emissions from biomass combustion are not included in the project boundary.as it was mentioned at the beginning of this section A.2.1. The following parameters are not considered because the biomass used is balck liquor and it is produced by the pulp mill. 4. AVDy Average return trip distance between biomass fuel supply sites and the project site (Km). 5. Ny Number of truck trips for the transportation of biomass 6. TLy Average truck load of the trucks used for transportation of biomass. 7. EFkm,CO2 Average CO2 emission factor for transportation of biomass with trucks. 8. FTrans,i,y Fuel consumption of fuel type i used for transportation of biomass The following parameter is not part of the RMP because there is no steam diverted from other boilers to the project plant as it was verified on site. 10a. Quantity of steam diverted from other boilers to the project plant. 10b. Average net efficiency of steam generation in the plant(s) from where steam is diverted to the project plant The following parameters are not used because are not applicable for scenario 4: 12. EGCP,y Net quantity of electricity generated in the captive power plant during the year y. 13.EGtotal,y Total quantity of electricity generated at the project site (including the project plant and any other plants existing at the start of the project activity).15. 15.Qtotal,y Net quantity of heat generated at the project site (including the project plant and any other plants existing at the start of the project activity).	

Checklist Question	Reference	MoV*	Comments	Conclusion/ CARs/CLs
			The following parameter was considered as part of the calculation of the emission factor of the fossil fuel cofired.(parameter 3 of the RMP) 16. NCVi Net calorific value of the fossil fuel types i co-fired in the project plant. The following parameter is not part of the RMP because the validated baseline situation which would have been the installation of a new biomass power plant (in the following referred to as "reference plant") at the same site and with the same thermal firing capacity but with a lower electric efficiency than the project plant (e.g. by using a lower-pressure boiler instead of a high-pressure boiler). 14.$Q_{project\ plant,y}$ Net quantity of heat generated from firing biomass in the project plant. 22. ε_{boiler} Average net energy efficiency of heat generation in the boiler that is operated next to the project plant. Parameter 17 and 18 are considered in the RMP. The following parameters were not considered because are applicable only for scenario 14: 20. εel,project plant,y Average net energy efficiency of electricity generation in the project plant. 21. εth,project plant,y Average net energy efficiency of heat generation in the project plant By means of review of the procedures, interviews with personnel on site, and physical inspection of the proposed CDM project activity, it can be concluded that the monitoring arrangements described in the monitoring plan can be carried out with the monitoring and recording system installed on site, including the data management and quality assurance and quality control procedures, they are sufficient to ensure that the emission reductions resulting from the CDM project activity can be reported ex post and verified. The application of the RMP does not compromise the conservativeness in the monitoring and verification process and of the emission reduction calculations.	

Checklist Question	Reference	MoV*	Comments	Conclusion/ CARs/CLs
A.2.2. Are the changes in the monitoring plan inline to the applied methodology and tool?	ACM006 version 2	DR	Yes, the changes precisely have the intention to follow the ACM0006 version 2 requirements. The changes involved in this RMP are: 1.- $EG_{project\ plant,y}$ the net quantity of electricity generated in the project plant during the year *y* in MWh: it follows the methodology ACM0006 version 2 because net term is considered for this parameter. 2.- $\varepsilon_{el,other\ plant(s)}$ the average net energy efficiency of electricity generation in (the) other power plant(s) that would use the biomass fired in the project plant in the absence of the project activity, expressed in $MWh_{el}/MWh_{biomass}$: it will be used the net term of efficiency instead of the gross value (12.31%): This follows the methodology ACM0006 version 2 because now net term is considered (10.839%) in the baseline scenario, in accordance with the information of the registered PDD. In addition the following Quality Control (QC) and Quality Assurance (QA) Procedures were updated to follow the methodology ACM0006 version 2 page 50 and 51: 3.- The biomass flow will be crosschecked using an annual energy balance and comparing the measurement of the different meters installed in the different stage of the process[7] instead of using pulp production index. The page 14 of the revised monitoring plan also mentions that the energy balance will be based on purchased quantities **CL3 was raised** in order to confirm if there are invoices related to the black liquor, which is the only biomass that the project uses and belong to the same pulp mill. 4.- The consistency of metered net electricity generated by the project plant will be cross checked using an efficiency index (electricity generation divided by the quantity of biomass fired) comparable to previous years instead of using pulp production index. In order to increase the completeness of the RMP, the following changes were also done: 5.- It was also added further information in the table D.2.1.1., section: “comments” of the parameters including a description of the monitoring systems, accuracy, calibration frequency and monitoring and recording frequency in accordance EB 41 Annex 12 Guidelines Project Design Document (CDM-PDD) Section B.7.1	**OK** **CL3 closed**

Checklist Question	Reference	MoV*	Comments	Conclusion/ CARs/CLs
			6.- The section D.2 was updated in order to provide a clear justification of the choice of the methodology and its applicability to this project activity and a line diagram of the project activity was added as Annex 4 in order to inform the meters installation.	

Checklist Question	Reference	MoV*	Comments	Conclusion/ CARs/CLs
A.2.3. Are the changes affecting the ER calculation (directly/indirectly)?	2nd Revised MP	DR	Yes, the two first changes (described above) affect directly the emission reduction calculation because those parameters are used in equation 13 of ACM0006 version 2 to determine the (*EGy)* the net quantity of increased electricity generation as a result of the project activity (incremental to baseline generation) during the year *y* in MWh, which is then used to calculate the (*ERy)* the emissions reductions of the project activity during the year *y* in tons of CO_2, which is only due to the $ER_{electricity,y}$ the emission reductions due to displacement of electricity during the year *y* in tons of CO_2 using equation 8 of ACM0006 version 2. Please see the equations below: Equation 13 of ACM0006 version 2 $EG_y = EG_{project\ plant,y} - \varepsilon_{el,other\ plant(s)} \cdot \sum_i BF_{i,y} \cdot NCV_i$ (13) Equation 8 of ACM0006 version 2 $ER_{electricity,y} = EG_y \cdot EF_{electricity,y}$ (8) Before the review requested by CDM EB the PP reported $EG_{project\ plant,y}$ in monitoring report as "the Net quantity of electricity generated in the project plant during year y". However PP referred to gross electricity generation of the project plant. Furthermore PP used equation 13 to calculate EGy, using the gross electricity generation and the gross efficiency (12.31%)[99] of electricity generation in (the) other power plant(s), that would use the biomass fired in the project plant in the absence of the project activity, expressed in $MW_{hel}/MWh_{biomass}$ determining an *incremental EGy* resulting in: 1. First monitoring period: 01 Apr 2007 - 30 Sep 2007: 40,786 tCO_2e issued 2. Second monitoring period: 01 Oct 2007 - 30 Sep 2008: 144,769 tCO_2e issued 3. Third monitoring period: 01 Oct 2008 - 31 Dec 2009: 182,889 tCO_2e requested Following the procedure that is validated in this report following equation 13, the emission reductions obtained are: 1. First monitoring period: 01 Apr 2007 - 30 Sep 2007: 39,875 tCO_2e a 2.23% less	OK

Checklist Question	Reference	MoV*	Comments	Conclusion/ CARs/CLs
			2. Second monitoring period: 01 Oct 2007 - 30 Sep 2008 : 133,222 tCO_2e a 7.98% less 3. Third monitoring period: 01 Oct 2008 - 31 Dec 2009 : 172,461 tCO_2e a 5.70% less According to the results presented above, the net emission reductions calculated considering net terms of equation 13 of ACM0006 (Version 2), turned out to be lower than the net emission reductions calculated considering total (gross) terms of equation 13 throughout all the (past) monitored periods. With this, the PP ensures that the method can be now used for emission reduction calculation purpose, which corresponds to use net terms of equation 13 of ACM0006 version 2.	

Checklist Question	Reference	MoV*	Comments	Conclusion/ CARs/CLs
A.2.4. Is the information given for each monitoring variable by the presented table sufficient to ensure the verification of a proper implementation of the monitoring plan?	RMP Section B.7	DR	Yes, the RMP section D.2.1.1 provides sufficient information to ensure a proper implementation of the monitoring plan. The RMP include specific information on how the data and parameters that need to be monitored are collected or calculated, the source(s) of data are provided, the measurement methods and frequency is specified, calibration frequency is also reported as well as meters accuracy and the responsible person/entity of each parameter. A description of the QA/QC procedures that should be applied is included. The PDD template of this RMP is not the same template as the last template published by the UNFCCC But in order to provide more complete and accurate information about how the monitoring is done in terms of monitoring and recording frequency **CL 5 was previously raised and closed** after receiving the last version of the RMP that contain further explain how data is monitored and aggregated which is in accordance with the monitoring system verified on site. The list of parameters required by the selected approved methodology are: 1.- $BF_{i,y}$ Quantity of biomass type i used as fuel in the project plant during the year y in a volume or mass unit (tDS). This variable is monitored using dedicated flow meters for measuring continuously the black liquor flow (l/s) in combination with refractometers to measure the average concentration solids, and a transmitter to measure the temperature (℃) that is used to determine the density. To determine $BF_{i,y}$ Quantity of biomass type i used as fuel in the project plant during the year y in mass unit (tDS), the total wet flow is multiplied by the average concentration measured with the refractometers and the density, this is done automatically. The measurement of $BF_{i,y}$ is registered online and fully integrated each 5 seconds by the Distributed Control System (DCS) and aggregated daily/18/ and then monthly for emission reduction calculation. The data is recorded daily/18/. It must be noted that the measurement procedure described above is the normal practice for measuring black liquor flows in the Pulp and Paper industry worldwide. $BF_{i,y}$ Quantity of biomass type i used as fuel in the project plant during the year y in a volume or mass unit (tDS). It is calculated continuously using dedicated flow meters (%dry solids, temperature, flow) that measure the parameters continuously, each 5 seconds; the value is then calculated in (tDS) each 5 seconds also. Then the value	***OK*** ***CL 5 closed*** ***CAR 6 closed***

Checklist Question	Reference	MoV*	Comments	Conclusion/ CARs/CLs
			is aggregated daily and monthly. In order to cross check the values, an annual energy balance will be done as well a cross check between the measurement of the different meters located in the along the black liquor pipeline (stock change). The location of the meters was verified on site/7/ and found appropriate:There are four Magnetic flow meters ABB model SE41F installed which are composed of a flow tube and a transmitter ABB SM4000, these meters were factory calibrated in 2005 and do not need further calibration as it was informed by the manufacturer/8a/. These flow meters have an accuracy of +/-0.5% according to the manufacturer calibration certificate/8b to 8g/. The temperature meter was calibrated by the manufacturer in 2005 showing a difference with the span lower than 0.0007%/10b/. This meter shall be calibrated each five years according to the frequency determined by the manufacturer/12/. The refract meters that measure the %dry solids were calibrated by the manufacturer on 07/06/2005/13/. It was confirmed with the manufacturer that it is recommended to verify the sensor each two years/17/. The refract meters have an accuracy of +/- 0.1%DS/13/ 2.- NCV_i Net calorific value of biomass type i per mass or volume of biomass (GJ/tDS). It is determined once a year following the frequency required by the methodology ACM0006 version 2 and the monitoring plan mention that it will be determined by a specialized laboratory and the value will be compared with IPCC default value. 3.- $COEF_{CO2,i}$ CO_2 emission factor of the fossil fuel type i used in the project plant. It is calculated using the EB 41 Annex 11. 4.- $FF_{project\ plant,i,y}$ On-site fossil fuel consumption of fuel type i for co-firing in the project plant. The Total quantities of fossil fuel per type used in the recovery boiler are monitored continuously at the Power Plant. As part of the quality controls, the meters will be calibrated in accordance to industry standard. Emissions from fossil fuel quantities (diesel and natural gas) associated to additional power generation were considered project emissions and deducted from the baseline emissions of the project activity. The fossil fuel associated with additional power generation was determined following the indications of section E.1. (pages 44 and 45) of the	

Checklist Question	Reference	MoV*	Comments	Conclusion/ CARs/CLs
			registered PDD. The RMP also inform correctly the accuracy and calibration frequency of the meters: There are 4 meters installed to measure the diesel consumed (2 meters for each burner) and two meters to measure the natural gas consumed, the indicated frequency of calibration each 5 years is correct as per manufacturer recommendation/58/ as well as the accuracy of +/- 0.1% for liquids and +/- 0.5% for gases/58/. 5.- $EG_{project\ plant,y}$ Net quantity of electricity generated in the project plant during the year y. It is measured continuously by dedicated flow meters that measure the gross energy generated and the auxiliary consumption. In order to check the value, an efficiency index will be determined and compared with previous years (electricity generated divided by quantity of biomass fired). There are two (2) meters that measure the Gross energy generated by the two (2) turbo generators and five (5) meters that measure the auxiliary consumption. It was verified on site that all meters measure continuously and record the value each 15 seconds which is automatically sent to the DCS and the daily value is determined archived. The meters that measure the auxiliary consumption were installed at the facility since it was built. In order to increase the completeness of the monitoring **CAR 6 was raised** asking to provide further information in the RMP about the monitoring of the gross and auxiliary consumption. The RMP was revised adding more details about the Gross Electricity generated and the Auxiliary electricity consumption which was deemed correct **CAR 6 was closed.** Gross Electricity generated: In total there are fifteen (15) meters involved in the two buses of the generators/6/. Two (2) of them measure the gross electricity generated by the two turbo generators while the rest of the meters that measure the consumption of energy of the different areas of the facility are used in a balance on each bus to cross check the consistency of the measurement of the gross electricity generated by the turbo generators. It must be noted that all meters (15) were factory calibrated in 2005 and have a calibration frequency of seven years/24a/. Auxiliary electricity consumption:	

Checklist Question	Reference	MoV*	Comments	Conclusion/ CARs/CLs
			The five (5) energy meters that measure the auxiliary electricity consumption of the real plant were installed since the commissioning date of the plant. These were confirmed by the auditor team on a site visit to the pulp mill. The corresponding auxiliary electricity consumption has been measuring by five (5) energy meters/6/. The accuracy of the meters is 0.5% according to the manufacturer's technical data sheet/24b/ Gross electricity generation and auxiliary electricity consumption data is monitored online (each 15 seconds) by the DCS/106/. Then the data is downloaded by the IP system and then registered automatically to an Excel spreadsheet. It must be noted that the data handling process is carry out in an automatized way with no evidence of manual record or data calculation. The Gross Electricity generated and Auxiliary electricity consumption data is recorded on a daily base and then it is aggregated monthly. The Net quantity of electricity generated ($EG_{project\ plant,y}$) in the project plant resulted from subtracting the auxiliary electricity consumption (measured) in the project plant to the total gross electricity generated in the project plant (measured). 6.- EF_y CO_2 emission factor of the grid. It is calculated for each year using information provided by the grid administrator and the methodology ACM0002 version 4 is followed. This parameter can be properly determined following this RMP. The rest of the parameters that are listed in the monitoring methodology are not applicable to this project.	

Checklist Question	Reference	MoV*	Comments	Conclusion/ CARs/CLs
A.2.5. Has there been an issuance with the original monitoring plan of the registered PDD in the past? A.2.6. if so how did the identified gaps effect the ER calculations for the monitoring periods in the past?	Project page on UNFCCC website	DR	There has been two issuances in the past: http://cdm.unfccc.int/Projects/DB/DNV-CUK1143329749.99/view 1. First monitoring period: 01 Apr 2007 - 30 Sep 2007: 40,786 tCO_2e. 2. Second monitoring period: 01 Oct 2007 - 30 Sep 2008: 144,769 tCO_2e. The gaps observed and changed in this second revision of the monitoring plan: 1. Using the net instead of the gross of quantity of electricity generated in the project plant during the year *y* in MWh and 2. Using the net value (10.839%) instead of the gross value (12.31%) of $\varepsilon_{el,other\ plant(s)}$ the net energy efficiency of electricity generation in (the) other power plant(s) that would use the biomass fired in the project plant in the absence of the project activity, expressed in $MWh_{el}/MWh_{biomass}$. These gaps were not taken into account in the past two issuances because the approach to determine the EGy was the difference between the gross values of the two terms of equation 13. Following the procedure that is validated in this report, according to equation 13 (using the net terms of the equation), the emission reductions obtained for the past two issuances are: 1. First monitoring period: 01 Apr 2007 - 30 Sep 2007:39,875tCO_2e, a 2.23% less/5bb/ 2. Second monitoring period: 01 Oct 07 - 30 Sep 08: 133,222 tCO_2e, a 7.98% less/5db/ According to the results presented above, the net emission reductions calculated considering net terms of equation 13 of ACM0006 (Version 2), turned out to be lower than the net emission reductions calculated considering total (gross) terms of equation 13 throughout all the (past) monitored periods. It can be concluded that the method presented in this revision of the monitoring plan follow the applicable methodology, net terms of equation 13. ..	*OK*
A.2.7. Is the information given for each	RMP Section –	DR	Yes, the monitoring presented is enough to deliver high quality data and avoid any	*OK*

Checklist Question	Reference	MoV*	Comments	Conclusion/ CARs/CLs
monitoring variable by the presented table sufficient to ensure the delivery of high quality data free of potential for biases or intended or unintended changes in data records?	B.7		unintended changes in data records. The monitoring is done continuously and data is calculated and or aggregated automatically, the accuracy of the meters is appropriate and the meters calibration frequency is the recommended by the manufacturer. The grid emission factor is calculated following ACM0002 version 4 using information obtained from the grid administrator. Please see below.	
A.2.8. Is the monitoring approach in line with current good practice, i.e. will it deliver data in a reliable and reasonably acceptable accuracy?	RMP Section-B.7	DR	Yes, the monitoring is able to deliver reliable data with acceptable accuracy: 1.- $BF_{i,y}$ Quantity of biomass type i used as fuel in the project plant during the year y in a volume or mass unit. This variable is monitored using dedicated flow meters for measuring continuously the black liquor flow (l/s) in combination with two refractometers to measure the average concentration solids, and a transmitter to measure the temperature (℃). To determine $BF_{i,y}$ Quantity of biomass type i used as fuel in the project plant during the year y in mass unit (tDS), the total wet flow is multiplied by the average concentration measured with the refractometer and the density which is function of the temperature. It is calculated continuously each 5 seconds using the data monitored by dedicated meters (%dry solids, temperature, flow). The location of the meters was verified on site/7/. There are four Magnetic flow meters ABB model SE41F installed which are composed of a flow tube and a transmitter ABB SM4000, these meters were factory calibrated in 2005 and have a calibration frequency of five years. These flow meters have an accuracy of +/-0.5% according to the manufacturer calibration certificate/8b to 8g/. The temperature meter was calibrated by the manufacturer in 2005 showing a difference with the span lower than 0.0007%/10b/. This meter shall be calibrated each five years according to the frequency determined by the manufacturer. The refract meters that measure the %dry solids were calibrated by the manufacturer on 07/06/2005/13/. It was confirmed with the manufacturer that it is recommended to verify the sensor each two years/17/. The refract meters have an accuracy of +/- 0.1%DS/13/ Data is monitored automatically by the DCS each 5 seconds (black liquor flow,	*Ok*

Checklist Question	Reference	MoV*	Comments	Conclusion/ CARs/CLs
			TSS, and temperature) the calculated Data of BFiy is downloaded by the IP system and inserted automatically in an Excel spreadsheet that show the daily accumulated value (kg/d). There is no manual record or manual calculation. Biomass flows can be crosschecked through a flow balance between the quantity measured by the total flow meter and the exit flow meter, the difference is checked with the amount of black liquor re-circulated and it is also done an energy mass balance that assures the reported values. The accuracy is acceptable and the quality control measures of checking (energy balance and flow balance is also found appropriate. 2. $EG_{project\ plant,y}$ Net quantity of electricity generated in the project plant during the year y. In total there are fifteen (15) meters involved in the two buses of the generators. Two (2) meters are used to measure the gross electricity generated by the turbo generators. While the rest of the meters are used in a balance on each bus to cross check the consistency of the measurement of the gross electricity generated by the turbo generators. It must be noted that all meters (15) were factory calibrated in 2005 and have a calibration frequency of seven years. The five (5) energy meters considered to measure the auxiliary electricity consumption of the real plant have been installed since the commissioning date of the plant. These instruments were confirmed by the assessment team on a site visit to the pulp mill. The corresponding auxiliary electricity consumption has been measuring by five (5) energy meters/6/. The accuracy of the meters is 0.5% according to the manufacturer's technical data sheet/24b/ Gross electricity generation and auxiliary electricity consumption data is monitored online (each 15 seconds) by the DCS. Then the data is downloaded by the IP system being transferred automatically to an Excel spreadsheet where it can be seen the daily value (MW). It must be noted that the data handling process is carry out in an automatized way with no evidence of manual recording or data calculation. The data is recorded on a daily base and then it is aggregated monthly. Then the Net quantity of electricity generated ($EG_{project\ plant,y}$) in the project plant resulted from	

Checklist Question	Reference	MoV*	Comments	Conclusion/ CARs/CLs
			subtracting the auxiliary electricity consumption (measured) in the project plant to the total gross electricity generated in the project plant (measured). As it is established in the (QA/QC) procedure of the revised monitoring plan, the consistency of metered net quantity of electricity generated ($EG_{project\ plant,y}$), is cross-check with energy mass balance and the comparison with the ratio of the electricity generated and biomass fired. *3. NCV_i Net calorific value of biomass type i per mass or volume of biomass (GJ/tDS).* It is determined once a year, according to the frequency determined by the methodology ACM0006 version 2 page 41, by a specialized laboratory. It complies with the methodology. 4. *$FF_{project\ plant,i,y}$ On-site fossil fuel consumption of fuel type i for co-firing in the project plant.* The total quantities of fossil fuel per type used in the recovery boiler are constantly monitored at the Power Plant, using two flow meters that measure the natural gas consumption and four meters that measure the diesel consumption. All the meters were calibrated by the manufacturer in 2005 and have a calibration frequency of 5 years. The meters have an accuracy of +/- 0.1% for liquids and +/- 0.5% for gases/58/. Internal checks are performed comparing consumption measured (by flow meters) and inventory data (purchases and stocks). Data analysed internally for cross-checking purposes was also verified and deemed correct/18/ 5. *$COEF_{CO2,i}$ CO_2 emission factor of the fossil fuel type i used in the project plant*. It is a IPCC default factor. *6. EF_y CO_2 emission factor of the grid.* It is calculated for each year using information provided by the grid administrator and the methodology ACM0002 version 4 is followed. This parameter can be properly determined in an accurate way in accordance to the methodology.	

Checklist Question	Reference	MoV*	Comments	Conclusion/ CARs/CLs
A.2.9. Are all formulae used to determine project emission clearly indicated and in compliance with the monitoring methodology.	Revised MP Section -B.7	DR	Yes, all the formulae used to determine project emissions are clearly indicated in this second RMP. The project emissions are only related to the additional quantity of fossil fuel fired in the boiler when the project is delivering energy to the grid as it mentioned in the section D.2.1.2.1 Emissions from fossil fuel consumption in the power plant´s recovery boiler. The equation used in the RMP is identical to equation 6 of ACM0006 version 2 $PEFF_y = \sum_i FF_{project\ plant,i,y} \cdot COEF_{CO2,i}$ The issue of only considering the amount of fuel when the project is delivering electricity to the grid is accepted because the project baseline in accordance to the validation report is the electricity generation to satisfy the demand of the pulp mill[2/.] This project does not generate leakage. The baseline emissions are determined correctly using equation 13 and equation 8 as it was already mentioned in this checklist.	OK
A.3. Quality Control (QC) and Quality Assurance (QA) Procedures				
A.3.1. Is the selection of data undergoing quality control and quality assurance procedures complete?	VVM Para. 121	DR	Yes, as it was already mentioned in the section A.2.4 of this checklist, the data undergo proper quality checks.	OK
A.3.2. in case, a revision is proposed, the impact of the revision should be assessed and it not result in reduced level of accuracy and completeness in the monitoring and verification process	EB49, annex 2, para 9		The proposed revision does not result in a reduced level of accuracy; on the contrary, the objective is strictly fulfilling the methodology ACM0006 version 2 in terms of $EG_{project\ plant,\ y}$ and $\varepsilon_{el,other\ plant(s)}$.	*OK*

Checklist Question	Reference	MoV*	Comments	Conclusion/ CARs/CLs
A.3.3. Are quality control procedures and quality assurance procedures sufficiently described to ensure the delivery of high quality data?	VVM Para 121	DR	Yes, the monitoring system and quality assurance procedures can sufficiently ensure data quality as it was justified in the section A.2.8 of this checklist.	*OK*
A.3.4. Is it ensured that data will be bound to national or internal reference standards?	VVM Para. 86d	DR	Yes, because there is no local data adjustments applied.	*OK*
A.4. Operational and Management Structure				
A.4.1. Is the authority and responsibility of project management clearly described?	PDD Section B.7.2 /Annex 4	DR	Yes, it is properly described in the section D.4 of this second revised monitoring plan as it could be verified during the verification of this RMP.	OK
A.4.2. Is the authority and responsibility for registration, monitoring, measurement and reporting clearly described?	PDD Section B.7.2/Annex 4	DR	Yes, most of the monitoring system is automatic and the responsibilities are properly described in the section D.4 of this second RMP.	OK
A.5. Monitoring Plan (Annex 4)				
A.5.1. Does the monitoring plan completely describe all measures to be implemented for monitoring all parameter required, including measures to be implemented for ensuring data quality?	VVM Para. 122b	DR	Not applicable, there is not Annex 4 But the other sections of this RMP fully describe the entire process, from data collection and quality control being able to ensure data quality	OK
A.5.2. Does the monitoring plan provide information on monitoring equipment and	VVM Para. 122b	DR	The PP provide information regarding the installation or positioning of the electricity[6], black liquor meters[7] which was verified during site visit, the fossil fuel meters as well as the other meters were checked on site.	OK

Checklist Question	Reference	MoV*	Comments	Conclusion/ CARs/CLs
respective positioning in order to safeguard a proper installation?				
A.5.3. Is there any change proposed in the specifications of the monitoring equipment or their positioning or installation then the impact of the change due to revision should be assessed and it not result in reduced level of accuracy and completeness in the monitoring and verification process	EB49, annex 2, para 9		There is no change proposed in the specifications of the monitoring equipment or their positioning in the layout.	OK
A.5.4. Are procedures identified for calibration of monitoring equipment?	VVM Para. 122a-c	DR	Yes, the calibration procedure for each meter part of the monitoring plan was mentioned in the section A.2.8 of this report.	OK
A.5.5. Is there any change proposed in the calibration procedures, if yes then the impact of the change due to revision should not result in reduced level of accuracy and completeness in the monitoring and verification process	EB49, annex 2, para 9		No. there is no change proposed in the calibration procedures.	OK
A.5.6. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	VVM Para. 122a-c	DR	Yes, the monitoring system compile the information in a lotus database, the monitoring of the gross electricity generated and the auxiliary consumption to determine the $EG_{project\ plant,\ y}$ is automatic, the data is monitored each 15 seconds by the DCS system which compile automatically and record the daily data of each meter, then the monthly subtraction gives the monthly value of $EG_{project\ plant,\ y}$. In the case of the $\Sigma BFi,\ y$, this parameter is the result of the calculation using three measurements: temperature, %of dry solids and flow, these parameters are monitored each 5 seconds by the DCS system and the amount of black liquor in tDS is also calculated each 5 seconds, the formula was verified correctly. Then the	OK

Checklist Question	Reference	MoV*	Comments	Conclusion/ CARs/CLs
			daily accumulated value is recorded automatically. The daily values are stored in the sheets called IP 21 as well as the other parameters and saved in the lotus database of the pulp mill. The third parameter monitored is the $FF_{project\ plant,i,y}$ On-site fossil fuel consumption of fuel type i for co-firing in the project plant. The Total quantities of fossil fuel per type used in the recovery boiler are monitored continuously at the Power Plant by dedicated meters, the daily data is automatically aggregated by the DCS and the value is recorded as in the case of the BFiy: The daily values are stored in the sheets called IP 21 as well as the other parameters and saved in the lotus database of the pulp mill. The external data as the NCV laboratory reports is saved also in the lotus database of the pulp mill. The grid emission factor data source can be downloaded from the grid administrator website and calculations are kept at the server of the pp main office.	
A.5.7. Are procedures identified for project performance reviews before data is submitted for verification, internally or externally?	VVM Para. 122a-c	DR	Yes, in accordance to their internal procedure, there are internal checked considered before data submission for verification	OK

Annex 2: Overview of Findings

Findings Overview Summary

	CARs	CLs	FARs
Total Number raised	3	3	0

Date:	*17/10/2011*		Raised by:	*Assessment team*	
Type:	*CAR*	Number:	*01*	Reference:	A.1.5
Lead Assessor Comment:				**Date:** *17/10/2011*	
Please provide the revised monitoring plan in track change mode for each of the revision point and also the clean version					
Project Participant Response:				**Date:** *19/10/2011*	
The revised monitoring plan in track change mode and a clean version is provided by the Project Participant.					
Documentation Provided as Evidence by Project Participant:					
The following evidence is provided by the Project Participant: *NewmonitoringplanNAPh2(updated)V0.doc* *NewmonitoringplanNAPh2(updated)trackchangesV0.doc*					
Information Verified by Lead Assessor:					
3db NewmonitoringplanNAPh2(updated)V0.doc *3db NewmonitoringplanNAPh2(updated)trackchangesV0.doc*					
Reasoning for not Acceptance or Acceptance and Close Out:					
Yes, the revised monitoring plan was provided in clean and in track change mode by the Project Participant. **CAR 1 remain open** until receive the last version in accordance to the findings raised during the assessment of this RMP.					
Acceptance and Close out by Lead Assessor:				**Date:** 22/10/2011	
Documentation Provided as Evidence by Project Participant:					
Revised version of the RMP					
Information Verified by Lead Assessor:					
Revised version of the RMP was received in track changes and clean version					
Reasoning for not Acceptance or Acceptance and Close Out:					
Revised version of the RMP was received in track changes and clean version CAR 1 is closed					
Acceptance and Close out by Lead Assessor:				**Date:** *03/11/2011*	

Date:	*17/10/2011*	Raised by:	*Assessment team*

Type:	*CAR*	Number:	*02*	Reference:	*A.2.1*
Lead Assessor Comment:				**Date:** *17/10/2011*	
The revised monitoring plan mention that $BF_{i,y}$ Quantity of biomass type i used as fuel in the project plant during the year y in a volume or mass unit (tDS) is *measured* however in order to provide more clarity and consistency with the monitoring plan executed please revise the section D.2.1.1					
Project Participant Response:				**Date:** *19/10/2011*	

The quantity of biomass type black liquor used as fuel in the recovery boiler of the pulp mill, is calculated from the measurement of the following parameters: black liquor flows (l/s), (%) of dry solids and density (kg/l), which is a function of the (%) of dry solids and the temperature (°C) of the black liquor.

Proper and dedicated instruments are used to measure continuously the parameters described above. Data is monitored automatically by the DCS from which the mass flow of dry solids (kg/s) of black liquor is obtained, and then these monitored values are collected online and integrated automatically in the Data system of the pulp mill from which can be download to excel.

According to the procedure of control defined in the methodology ACM0006 (Version 02) the biomass flows of black liquor, burned in the recovery boiler, must be cross-check with an annual energy balance and stock changes. Regarding the later, it should be noted that a flow balance is used, as a cross-check method, instead of a stock balance, since Project Participant deals with flows (of black liquor) rather than stocks changes. In this case, the procedure of control (flow balance) associated to the black-liquor is described below:

The project participant carry out a consistency-check of the metered mass flow of black liquor, burned in the recovery boiler, using the value obtained from the difference between the measurement total mass flow of black liquor before burned in the recovery boiler and the measurement of mass flow of black liquor returned to the boiler.

Documentation Provided as Evidence by Project Participant:

No evidence is included by the Project Participant.

Information Verified by Lead Assessor:

Updated revised monitoring plan:
3db NewmonitoringplanNAPh2(updated)V0.doc
3db NewmonitoringplanNAPh2(updated)trackchangesV0.doc

Reasoning for not Acceptance or Acceptance and Close Out:

The way the quantity of biomass type black liquor used as fuel in the recovery boiler of the pulp mill, is calculated is understood, it was verified during site visit. In order to provide a complete monitoring plan please include in the RMP the relevant information of GHG emission reductions in this case the information of the method used to determine the BFiy quantity of black liquor and also it was verified that the QA/QC mention that the quantity will be checked with *stock changes* and this is not consistent with the answer provided above, for instance the comments section of the table D21 only mention flow meters, please provide further information to increase the completeness of the monitoring plan.
CAR 2 remains open

Acceptance and Close out by Lead Assessor:	**Date:** 22/10/2011
Project Participant Response:	**Date: 25/10/2011**

This variable ($BF_{i,y}$) is monitored using proper and dedicated instruments for measuring continuously the following parameters: the black liquor flow (l/s) using flow meters, the (%) of dry solids using a refractometer and the temperature (°C) using a dedicated transmitter. Data monitored is registered automatically in the DCS, and aggregated as appropriate, to calculate emissions reductions.

According to the procedure of control defined in the methodology ACM0006 (Version 02) the biomass flows of black liquor, burned in the recovery boiler, must be cross-check with an annual energy balance and stock changes.

In relation to the former method, an energy balance of the biomass power plant is performed considering the tonnes of dry solids (tDS) of black liquor burned in the recovery boiler, and power generation during the

monitoring period. In relation to the stock balance method, the project participant carry out a consistency-check of the metered mass flow of black liquor (tDS), burned in the recovery boiler, considering the value obtained from the difference between the total mass flow of black liquor (tDS) before entering the recovery boiler and the returned mass flow of black liquor to the boiler.
Documentation Provided as Evidence by Project Participant:
No evidence is included by the Project Participant.
Information Verified by Lead Assessor:
Updated version of the revised monitoring plan where more details were added to the monitoring table that explain how the data is monitored and then aggregated
Reasoning for not Acceptance or Acceptance and Close Out:
The information added to the revised monitoring plan correspond to the monitoring system verified on site
Acceptance and Close out by Lead Assessor: **Date:** *03/11/2011*

Date:	*17/10/2011*		Raised by:	*Assessment team*	
Type:	*CL*	Number:	*03*	Reference:	*A.2.2*
Lead Assessor Comment:			**Date:** *17/10/2011*		
The page 14 of the revised monitoring plan mentions that the energy balance will be based on purchased quantities **CL3 was raised** in order to confirm if there are invoices related to the black liquor, which is the only biomass that the project uses and belong to the same pulp mill.					
Project Participant Response:			**Date:** *19/10/2011*		
In this case, since the biomass flow of black liquor results from on-site operations of the pulp mill, biomass flow measurements are cross-check with an annual energy balance and stock changes only (no purchased quantities), according with the procedure of control defined in the methodology ACM0006 (Version 02).					
Documentation Provided as Evidence by Project Participant:					
No evidence is included by Project Participant.					
Information Verified by Lead Assessor:					
The revised monitoring plan: 3db NewmonitoringplanNAPh2(updated)V0.doc 3db NewmonitoringplanNAPh2(updated)trackchangesV0.doc					
Reasoning for not Acceptance or Acceptance and Close Out:					
CL 3 is closed because as it was verified on site, the black liquor is provided by the same pulp mill that possesses the power plant and it is not bought to another enterprise.					
Acceptance and Close out by Lead Assessor:			**Date:** *22/10/2011*		

Date:	*22/10/2011*	Raised by:	*Assessment team*

Type:	*CL*	Number:	*04*	Reference:	

Lead Assessor Comment:	**Date:** *22/10/2011*
Please review and update the section D2 of the revised monitoring plan *Justification of the choice of the methodology and why it is applicable to the project activity* in accordance to the changes made in the rest of the document.	
Project Participant Response:	**Date:** 25/10/2011

According to the baseline methodology, the Nueva Aldea Power Plant Phase 2 fully complies with the applicability criteria. (See section B.1.1 of this PDD).

CDM project activity

The proposed project activity consists in the construction of a new pulp mill with a high electric efficiency to make it a power exporter to the grid. The higher efficiency is possible due to the installation of a high steam pressure of the recovery boiler and two high-capacity turbo generators. This allows the pulp mill to cogenerate surplus power to the grid, but in this case, without increasing the amount of biomass (black liquor, dry basis) that would be fired in the recovery boiler in a baseline scenario.

Baseline case scenario N°4 is applicable to the CDM project activity

- **"The proposed project activity involves the installation of a new biomass residue power generation plant at a site where no power was generation occurs".** Therefore it is a "power greenfield" project.

- "**In the absence of this project activity, a new biomass residue fired power plant would be installed instead of the project activity at the same site and with the same thermal firing capacity but with a lower efficiency of electricity generation as the project plant".** This is precisely the case with the project activity, since basically due to the higher steam production of the recovery boiler; the pulp mill is capable of generating surplus power to the grid while the baseline plant would only been able to generate the heat and power required by the pulp mill, but not surplus power to the grid.

- **"The same type and quantity of biomass residues as in the project plant would be used in the baseline plant".** The pulp mill has determined capacity and can process a certain amount of black liquor, which is used to produce energy inside the mill. The proposed project activity increases the energy efficiency of the mill and therefore allows it to generate surplus power to the grid but using the same amount of biomass (black liquor, dry basis) that would be used by the baseline pulp mill.

- The power generated by the project plant would in the absence of the project activity be generated:

  (a) In the reference plant. Since pulp mills in Chile tend to be self-sufficient in electricity generation, the baseline plant considered would be a self-sufficient pulp mill in thermal and electricity generation. This is conservative.
  (b) Partly in power plants in the grid. The proposed project activity would generate surplus power to the grid and therefore would displace electricity from the grid.

- **"The heat generated by the project plant would in the absence of the project activity be generated in the reference plant".** This is the norm with Kraft pulp mills in the world and the proposed baseline pulp mill design". Please see section A.4.3 of the PDD.

Documentation Provided as Evidence by Project Participant:
No evidence is included by Project Participant.
Information Verified by Lead Assessor:
Updated revised monitoring plan
Reasoning for not Acceptance or Acceptance and Close Out:
The modified section D added information that is consistent with the rest of the RMP and include a justification of the methodology applicability.

Acceptance and Close out by Lead Assessor:	**Date:** *03/11/2011*

Date:	*22/10/2011*		Raised by:	*Assessment team*		
Type:	*CL*	Number:	*05*		Reference:	
Lead Assessor Comment:				**Date:** *22/10/2011*		
Please review and update the section D.2.1 (Table) of the revised monitoring plan in accordance to the monitoring and recording frequency being done by the project activity						
Project Participant Response:				**Date:** 25/10/2011		

The following parameters of section D.2.1 of the revised monitoring plan are reviewed by the Project participants:

$BF_{i,y}$

This variable is monitored using proper and dedicated instruments for measuring continuously the following parameters: the black liquor flow (l/s) using flow meters, the (%) of dry solids using a refractometer and the temperature (°C) using a transmitter.

Data is monitored continuously and aggregated as appropriate, to calculate emissions reductions.

$FF_{projectplant,i,y}$

The total quantity of fossil fuel per type used in the recovery boiler is continuously monitored at the Power Plant by proper and dedicated instruments.

Data monitored is registered automatically by the DCS, and aggregated as appropriate, to calculate emissions reductions

All instruments will receive proper maintenance and calibration according to the relevant industry standards.

Documentation Provided as Evidence by Project Participant:
No evidence is included by Project Participant.
Information Verified by Lead Assessor:
Updated revised monitoring plan
Reasoning for not Acceptance or Acceptance and Close Out:
The information that was updated in the last version of the RMP explain how these parameters are monitored, the information is according with the monitoring system verified on site and follow the methodology CL5 is closed
Acceptance and Close out by Lead Assessor: **Date:** *03/11/2011*

Date:	*22/10/2011*		Raised by:	*Assessment team*		
Type:	*CAR*	Number:	*06*		Reference:	A.2.4
Lead Assessor Comment:				**Date:** *22/10/2011*		
The revised monitoring plan mention that the net energy generated by the project is metered, but being this parameter calculated, please provide further information regarding the monitoring of the gross energy generated and the auxiliary consumption that are used to calculate the net energy generated by the project power plant.						
Project Participant Response:				**Date:** 25/10/2011		

The net quantity of electricity of increased electricity generation as a result of the project activity (EGy) (MWh) is determined, according to equation 13 of the ACM0006 (version 02), a s the difference between the net electricity generated in the real plant ($EG_{project\ plant}$) and the net electricity that would be generated in the baseline plant using the same quantity of biomass combusted.

Net electricity generated in the project plant ($EG_{project\ plant,y}$)
Since net energy generated by the project is determined from the difference between the monitored amount of gross electricity generation ($EL_{PJ,gross,y}$) and the amount of electricity consumed by auxiliary equipment

($EL_{PJ,aux,y}$) measured by Project Participants, these parameters ($EL_{PJ,gross,y}$ and $EL_{PJ,aux,y}$) are added to increase the completeness of the monitoring plan.

$EL_{PJ,gross,y}$
In case of this parameter, it is measured by Project Participants using calibrated electricity meters. The data is monitored continuously and aggregated as appropriate, to calculate emission reductions.

In total there are fifteen (15) meters involved in the two bus bars of the turbo generators. Two (2) of meters are used to measure the gross electricity generated by the turbo generators while the rest of them are used in a balance on each bus bar to cross check the consistency of the measurement of the gross electricity generated by the turbo generators.

$EL_{PJ,aux,y}$
In case of the total auxiliary electricity consumption, required for the operation of the power plant, is measured using calibrated electricity meters. The data is monitored continuously and aggregated as appropriate, to calculate the emission reductions.

A total of five (5) energy meters of type ION 7330 (5-1; 5-2A; 5-2B; 6-1; 6-2A), were selected by Project Participants to monitor the electricity consumed by auxiliary equipment. These meters are in accordance to the requirements stated in the monitoring plan of the ACM0006 (version02). It should be noted that these meters were installed and are operating since the commissioning date of the real plant. (Refer to excel sheet "Energy meters and electricity consumption V2".

(QA/QC) procedure
As it is established in the (QA/QC) procedure of the revised monitoring plan, the consistency of metered net quantity of electricity generated ($EG_{project\ plant,y}$), is cross-check, according to ACM0006 (version 02), using an efficiency index (electricity generation divided by the quantity of biomass fired) comparable to previous years. As an alternative cross-check,, Project Participants will use an annual energy balance.

Documentation Provided as Evidence by Project Participant:	
Evidence provided by Project Participant: *Energy meters and electricity consumptionV2.xls*	
Information Verified by Lead Assessor:	
Updated revised monitoring plan	
Reasoning for not Acceptance or Acceptance and Close Out:	
The monitoring of the parameters involved in the calculation of EGproject plant is clear now in the revised monitoring plan and the QA/QC were also changed in accordance to the methodology.	
Acceptance and Close out by Lead Assessor:	**Date:** *03/11/2011*

Annex 3: Statement of Competence

Statement of Competence

Name: Carolina Campos

Status

-	Lead Assessor	x	-	Expert	
-	Assessor	x	-	Financial Expert	
-	Local Assessor	Chili	-	Technical Reviewer	

Scopes of Expertise

1. **Energy Industries (renewable / non-renewable)**
Technical Area(s*):*
2. **Energy Distribution**
Technical Area(s*):*
3. **Energy Demand**
Technical Area(s*):*
4. **Manufacturing**
Technical Area(s*):*
5. **Chemical Industry**
Technical Area(s*):*
6. **Construction**
Technical Area(s*):*
7. **Transport**
Technical Area(s*):*
8. **Mining/Mineral Production**
Technical Area(s*):*
9. **Metal Production**
Technical Area(s*):*
10. **Fugitive Emissions from Fuels (solid, oil and gas)**
Technical Area(s*):*
11. **Fugitive Emissions from Production and Consumption of Halocarbons and Sulphur Hexafluoride**
Technical Area(s*):*
12. **Solvent Use**
Technical Area(s*):*
13. **Waste Handling and Disposal**
Technical Area(s*):*
14. **Afforestation and Reforestation**
Technical Area(s*):*
15. **Agriculture**
Technical Area(s*):*

Approved Member of Staff by: Siddharth Yadav Date: 12/11/2010

Statement of Competence

Name: Sandeep Kurmi

Status

-	Lead Assessor	x	-	Expert	x
-	Assessor	x	-	Financial Expert	
-	Local Assessor	India	-	Technical Reviewer	

Scopes of Expertise

1. Energy Industries (renewable / non-renewable)	**x**
Technical Area(s): TA 1.1 Thermal energy generation from fossil fuels and biomass including thermal electricity from solar.	
2. Energy Distribution	
Technical Area(s):	
3. Energy Demand	**x**
Technical Area(s): TA 3.1 Energy Demand	
4. Manufacturing	**x**
Technical Area(s): TA 4.n Other then 4.1-4.4	
5. Chemical Industry	
Technical Area(s):	
6. Construction	
Technical Area(s):	
7. Transport	
Technical Area(s):	
8. Mining/Mineral Production	
Technical Area(s):	
9. Metal Production	
Technical Area(s):	
10. Fugitive Emissions from Fuels (solid, oil and gas)	
Technical Area(s):	
11. Fugitive Emissions from Production and Consumption of Halocarbons and Sulphur Hexafluoride	
Technical Area(s):	
12. Solvent Use	
Technical Area(s):	
13. Waste Handling and Disposal	
Technical Area(s):	
14. Afforestation and Reforestation	
Technical Area(s):	
15. Agriculture	
Technical Area(s):	

Approved Member of Staff by: Siddharth Yadav Date: 14/01/2011

Statement of Competence

Name: Diego Ortiz

Status

-	Lead Assessor		-	Expert	x
-	Assessor		-	Financial Expert	
-	Local Assessor	Ecuador/Chile	-	Technical Reviewer	

Scopes of Expertise

1. Energy Industries (renewable / non-renewable)	**x**

Technical Area(s*): TA 1.2 Energy generation from renewable energy sources*

2. Energy Distribution
Technical Area(s*):*

3. Energy Demand
Technical Area(s*):*

4. Manufacturing
Technical Area(s*):*

5. Chemical Industry
Technical Area(s*):*

6. Construction
Technical Area(s*):*

7. Transport
Technical Area(s*):*

8. Mining/Mineral Production
Technical Area(s*):*

9. Metal Production
Technical Area(s*):*

10. Fugitive Emissions from Fuels (solid, oil and gas)
Technical Area(s*):*

11. Fugitive Emissions from Production and Consumption of Halocarbons and Sulphur Hexafluoride
Technical Area(s*):*

12. Solvent Use
Technical Area(s*):*

13. Waste Handling and Disposal
Technical Area(s*):*

14. Afforestation and Reforestation
Technical Area(s*):*

15. Agriculture
Technical Area(s*):*

Approved Member of Staff by: Siddharth Yadav Date: 29/03/2011

Statement of Competence

Name: Simon Zhao

Status

-	Lead Assessor	x	-	Expert	x
-	Assessor	x	-	Financial Expert	
-	Local Assessor	China	-	Technical Reviewer	x

Scopes of Expertise

5. Energy Industries (renewable / non-renewable)	**x**
Technical Area(s): TA 1.2 Energy generation from renewable energy sources	
6. Energy Distribution	
Technical Area(s):	
7. Energy Demand	
Technical Area(s):	
8. Manufacturing	
Technical Area(s):	
16. Chemical Industry	
Technical Area(s):	
17. Construction	
Technical Area(s):	
18. Transport	
Technical Area(s):	
19. Mining/Mineral Production	
Technical Area(s):	
20. Metal Production	
Technical Area(s):	
21. Fugitive Emissions from Fuels (solid, oil and gas)	
Technical Area(s):	
22. Fugitive Emissions from Production and Consumption of Halocarbons and Sulphur Hexafluoride	
Technical Area(s):	
23. Solvent Use	
Technical Area(s):	
24. Waste Handling and Disposal	
Technical Area(s):	
25. Afforestation and Reforestation	
Technical Area(s):	
26. Agriculture	
Technical Area(s):	

Approved Member of Staff by: Siddharth Yadav Date: 30/06/2011

Statement of Competence

Name: Nitin Babber

Status

-	Lead Assessor	x	-	Expert	x
-	Assessor	x	-	Financial Expert	
-	Local Assessor	india	-	Technical Reviewer	

Scopes of Expertise

1. Energy Industries (renewable / non-renewable)	**x**
Technical Area(s): TA 1.1 Thermal energy generation from fossil fuels and biomass including thermal electricity from solar.	
2. Energy Distribution	
Technical Area(s):	
3. Energy Demand	**x**
Technical Area(s): TA 3.1Energy Demand	
4. Manufacturing	**x**
Technical Area(s): TA 4.4 Refinary (oil and gas) TA 4.n Air compression TA 4.n Fuel switch	
5. Chemical Industry	
Technical Area(s):	
6. Construction	
Technical Area(s):	
7. Transport	
Technical Area(s):	
8. Mining/Mineral Production	
Technical Area(s):	
9. Metal Production	
Technical Area(s):	
10. Fugitive Emissions from Fuels (solid, oil and gas)	**x**
Technical Area(s):TA 10.2 Oil and Gas industry, coal mine methane recovery and use	
11. Fugitive Emissions from Production and Consumption of Halocarbons and Sulphur Hexafluoride	
Technical Area(s):	
12. Solvent Use	
Technical Area(s):	
13. Waste Handling and Disposal	
Technical Area(s):	
14. Afforestation and Reforestation	
Technical Area(s):	
15. Agriculture	
Technical Area(s):	

Approved Member of Staff by: Siddharth Yadav Date: 20/06/2011