
VALIDATION OPINION FOR REVISION OF REGISTERED MONITORING PLAN

**Celulosa Arauco y Constitución
Trupan Biomass Power Plant in Chile
UNFCCC Ref. No. 0259**

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| Date of Issue: 19/08/2008 | | Project Number: CDM.VER0121 | |
| Project Title: Trupan Biomass Power Plant in Chile | | | |
| Organisation: SGS United Kingdom Limited | | Client: Celulosa Arauco y Constitución S.A. | |
| Subject: Validation opinion for revision of Registered Monitoring Plan | | | |
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| Revision Number: | Date: | Number of Pages: | <input checked="" type="checkbox"/> No Distribution (without permission from the Client or responsible organisational unit) <input type="checkbox"/> Limited Distribution <input type="checkbox"/> Unrestricted Distribution |
| 0 | 23/06/2008 | 10 | |
| 1 | 19/08/2008 | 11 | |
| 2 | | | |

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1. Validation Opinion

Paragraph 57 of the modalities and procedures for the CDM allow 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 34 to EB 26 meeting report, of registered CDM project Trupan Biomass Power Plant UNFCCC reference number 0259. The purpose of this validation is to have an independent third party assessment of the revision of registered monitoring plan. In particular, the level of accuracy or completeness in the proposed revision of the monitoring plan, and the conformity with approved monitoring methodology applicable to the project activity.

This revision of monitoring plan was requested by the EB 38 page 14 para 63 (g) "Trupan Biomass Power Plant in Chile" (0259) after submission of the request for issuance of the second monitoring period. By applying the proposed revision of monitoring plan, the measurement of net quantity of heat generated in the cogeneration project plant (Q_y) will be included in accordance with equation 24 of scenario 3 ACM0001 version 01, using an appropriate boiler efficiency that would be used in the absence of the project activity, because it was not mentioned in the registered monitoring plan but required by methodology. The description of the formulas and in consequence the parameters included in the registered monitoring plan used to determine the baseline emissions due to natural decay or burning of anthropogenic sources of biomass during the year y in tons of CO₂ equivalents were not matching with the methodology. Hence in the revised monitoring plan the description of the parameters (Q_y) and (ϵ_{boiler}) are included as it is described in the methodology ACM0006 version 01. The other monitoring parameters in the original monitoring plan remain unchanged. This revision improves the achievement of the approved methodology.

In response to the EB38 page 14 (g), new calculations were verified by SGS according to equation 24 ACM0006 version 1 to request the issuance of the second monitoring period of the project. The request for issuance for the third monitoring period will be submitted after receiving an approval of this request for revision of the monitoring plan.

Furthermore, we confirm that:

- (a) 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;
- (b) the proposed revision of the monitoring plan is in accordance with the approved monitoring methodology applicable to the project activity
- (c) This is the second verification for the said project activity.

Signed on Behalf of the Validation Body by Authorized Signatory



Signature:

Name: Siddharth Yadav

Date: 22/08/2008

2. Introduction

2.1 Objective

Paragraph 57 of the modalities and procedures for the CDM allow 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 34 to EB 26 meeting report, the original monitoring plan is part of the Revised Monitoring Plan during third verification of registered CDM project: Trupan Biomass Power Plant in Chile UNFCCC reference number 0259. The purpose of this validation is to have an independent third party assessment of the revision of registered 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 host country criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

SGS reviewed of the project design documentation, 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 the project design document, the project's baseline study and monitoring plan and other relevant documents. The information in these documents is reviewed against Kyoto Protocol requirements, UNFCCC rules and associated interpretations. SGS has employed a risk-based approach in the validation, focusing on the identification of significant risks for project implementation and the generation of CERs.

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

2.3 GHG Project Description

The project was registered on 06 June 2006 with reference number 0259. The first verification was conducted pertaining to the monitoring period starting 01 Jan 2005 to 30 Sep 2006 applying the registered monitoring plan, the second verification pertaining to the monitoring period 01 Oct 2006 to 30 Sep 2007 was requested according to EB38 page 14 para 63 (g) using equation 24 and the request for issuance of the third monitoring period, which monitoring report version 1 would be uploaded in October first week, will be issued after the confirmation from the EB to this revision.

2.4 The Names and Roles of the Validation Team Members

| Name | Role | Affiliate |
|-----------------|---------------|------------|
| Carolina Campos | Lead Assessor | SGS Chile |
| Aurea Nardelli | expert | SGS Brazil |

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.

A site visit is usually required to verify assumptions in the baseline.

3.2 Use of the Validation Protocol

The validation protocol used for the assessment is partly based on the templates of the IETA / World Bank Validation and Verification Manual and partly on the experience of SGS with the validation of CDM projects. It serves the following purposes:

- 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), or a Corrective Action Request (CAR) due to non-compliance with the checklist question (See below). New Information Request (NIR) is used when the validation team has identified a need for further clarification. |

The completed validation protocol for this project is attached as Annex (no annex is added to this report) to this report

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 **New Information Request (NIR)** 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. mistakes have been made with a direct influence on project results;
- II. validation protocol requirements have not been met; or
- III. there is a risk that the project would not be accepted as a CDM project or that emission reductions will not be verified.

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

Observations may be raised which are for the benefit of future projects and future verification or validation actors. These have no impact upon the completion of the validation or verification activity.

Corrective Action Requests and New Information Requests are raised in the draft validation protocol and detailed in a separate form (No Annex is attached to this report). In this form, the Project Developer is given the opportunity to “close” outstanding CARs and respond to NIRs and Observations.

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 Participation Requirements

As per <http://cdm.unfccc.int/UserManagement/FileStorage/J725M48BOQUYX8H4LCH7CN9F3JODV1> validation report dated 29 May 2006 available on UNFCCC website <http://cdm.unfccc.int/Projects/DB/DNV-CUK1138289069.87/view> No Change.

4.2 Project Design

As per <http://cdm.unfccc.int/UserManagement/FileStorage/J725M48BOQUYX8H4LCH7CN9F3JODV1> validation report dated 29 May 2006 available on UNFCCC website <http://cdm.unfccc.int/Projects/DB/DNV-CUK1138289069.87/view> No Change.

4.3 Eligibility as a Small Scale Project

As per <http://cdm.unfccc.int/UserManagement/FileStorage/J725M48BOQUYX8H4LCH7CN9F3JODV1> validation report dated 29 May 2006 available on UNFCCC website <http://cdm.unfccc.int/Projects/DB/DNV-CUK1138289069.87/view> No Change.

4.4 Baseline Selection and Additionality

As per <http://cdm.unfccc.int/UserManagement/FileStorage/J725M48BOQUYX8H4LCH7CN9F3JODV1> validation report dated 29 May 2006 available on UNFCCC website <http://cdm.unfccc.int/Projects/DB/DNV-CUK1138289069.87/view> No Change.

4.5 Application of Baseline Methodology and Calculation of Emission Factors

As per <http://cdm.unfccc.int/UserManagement/FileStorage/J725M48BOQUYX8H4LCH7CN9F3JODV1> validation report dated 29 May 2006 available on UNFCCC website <http://cdm.unfccc.int/Projects/DB/DNV-CUK1138289069.87/view>; there is a change in the application of Baseline Methodology

The project comprises a renewable energy project activity that involves the installation of a new cogeneration plant capacity using wood residues at a site where no power generation would have occurred. The project was validated against scenario 3. Under this scenario, the industrial complex would consume a fraction of the electricity generated by the project plant where the power plant is located, and the rest would be supplied to the grid. In the absence of the project activity, a fraction of the total biomass currently used would be used only for heat generation in boilers at the project site and the rest would be dumped in piles to natural decay or burned in an uncontrolled manner. As a result, without any power generation, the industrial facility would have to consume power from the grid and there would be no surplus power available to the grid. The "additional biomass" is the biomass related to the implementation of the CDM project activity. It is the biomass amount that is burned in the Trupan power boiler to produce electricity. In the baseline scenario, this biomass amount would have been burned in the open air or left to decay according to the page 11 of the validation report and page 43 and 44 of the registered PDD.

According to the ACM0006 (Version 01), the additional biomass amount related to power generation in scenario 3 should have been calculated using equation No.24 of the methodology ACM0006 version 01. This was not the case with the Trupan project activity, in which this biomass amount was calculated using a "biomass power generation factor". This factor was calculated from the energy / mass balances of the project and reference Trupan power plant. It is described in pages 43 and 44 of the registered PDD.

The EB requested a review after submission of the second request for issuance of the second monitoring period because the project was not addressing the equation 24 of the methodology. The concern of all three requests states: *The baseline emission (due to uncontrolled burning of biomass) has been calculated using "additional biomass" rather than from the quantity of biomass used as fuel in the project plant and net quantity of heat generated in the plant and boiler efficiency as prescribed by Equation 24 of ACM0006 (Version 01) for Scenario 3 applied by the project activity. Further, the project emission (methane emissions from combustion of biomass) also considers only the quantity of the "additional biomass". Clarification is required on how the DOE has verified that the calculations of emission reductions, including the used of biomass power generation factor fixed for the entire crediting period, have been conducted in accordance with the methodology.*

The EB 38 page 14 para 63 (g) answered: *"Trupan Biomass Power Plant Phase 1" (0259) if the project participant and the DOE (SGS) submit a revised monitoring report and a revised verification report which recalculate the baseline emission due to uncontrolled burning of biomass in accordance with Equation 24 of Scenario 3 ACM0006 version 01, using an appropriate boiler efficiency that would be used in the absence of the project activity. The Board further noted that the monitoring plan should be revised to include the measurement of net quantity of heat generated in the cogeneration project plant (Q_y) in accordance with Equation 24 of ACM0006 version 01 prior to the next request for issuance.*

The parameters involved in equation 24 were verified after the EB38 answer and the second verification report included the revision of the ERs calculation. These parameters are used to determine the baseline emissions (*BE_{Biomass}*) due to natural decay or burning of anthropogenic sources of biomass during the year *y* in tons of CO₂e,

GWP_{CH4}: the Global Warming Potential for methane valid for the relevant commitment period,

NCV_i: the net calorific value of the biomass type *i* in terajoules (TJ) per mass or volume of biomass,

EF_{burning, CH4,i}: is the CH₄ emission factor for uncontrolled burning of the biomass type *i* in tons CH₄ per TJ.

ε_{boiler}: the energy efficiency of the boiler that would be used in the absence of the project activity,

BF_{i,y}: the quantity of biomass type *i* used as fuel in the project plant during the year *y* in a volume or mass unit,

Q_y: the net quantity of heat generated in the cogeneration project plant during the year *y* in GJ,

To determine the net quantity of heat generated, the monthly flows of steam (ton/month) that were delivered to each process inside the complex are multiplied by the difference of the enthalpy of the steam delivered to each process and the enthalpy of the feedwater condition. Each enthalpy value is determined based on the specific thermodynamic conditions of the corresponding steam flow (pressure and temperature). The total amount of heat is then determined by adding the heat flows of each of the identified processes (9). The steam flows and the total heat quantity is determined monthly. The total amount of heat (GJ/month) is divided by the boiler efficiency *ε_{boiler}* (%) and by the net calorific value of the biomass *NCV_i* (TJ/ton) to get the biomass used for heat generation which is then subtracted to the total quantity of biomass used as a fuel in the project plant *BF_{i,y}*. the value obtained of biomass attributable to the project activity of power generation (BDt/month) is multiplied by the CH₄ emission factor for uncontrolled burning of the biomass (*EF_{burning, CH4}*) which is already transformed to the unit tCO₂/ton biomass using the *GWP_{CH4}* (the Global Warming Potential for methane).

It was verified that the energy efficiency of the boiler that would be used in the absence of the project activity was calculated by the project proponent obtaining an 85% (ref 6). To perform this calculation it was used the data of a real low-pressure boiler installed in one of the facilities owned by the project proponent in the same region that use the same type of biomass.

The calculation was verified and found in place, in accordance with the ASME PTC 4.1 a known industry standard and it was based in empiric data like moisture content of the biomass, chemical composition, steam flows pressure and temperature. It was also verified the consulting company (AF Celpap) expert's opinion it mentioned that the typical level of biomass boiler efficiency is about 85% with a biomass dryness of 40 to 45%, moisture which is the efficiency value verified.

The correction requested by the EB 38 also determines the project emission because they are based in the quantity of biomass attributable to the project activity of power generation.

The correction requested by the EB 38 also determines the project emission because they are based in the quantity of biomass attributable to the project activity of power generation.

The parameters related to equation 24 were included to the attached revision of monitoring plan (ref 1)

4.6 Application of Monitoring Methodology and Monitoring Plan

The project activity is using ACM0006 version 01. The need for revision of registered monitoring plan is because the description of the formulas and in consequence the parameters included in the registered monitoring plan used to determine the baseline emissions due to natural decay or burning of anthropogenic sources of biomass during the year y in tons of CO₂ equivalents were not matching with the methodology. Hence in the revised monitoring plan the description of the parameters (Q_y) and (ϵ_{boiler}) are included as it is described in the methodology ACM0006 version 01. Rest of the monitoring plan remains the same as mentioned in the revised monitoring plan.

4.7 Choice of the Crediting Period

As per <http://cdm.unfccc.int/UserManagement/FileStorage/J725M48BOQUYX8H4LCH7CN9F3JODV1> validation report dated 29 May 2006 available on UNFCCC website <http://cdm.unfccc.int/Projects/DB/DNV-CUK1138289069.87/view> No Change.

4.8 Environmental Impacts

As per <http://cdm.unfccc.int/UserManagement/FileStorage/J725M48BOQUYX8H4LCH7CN9F3JODV1> validation report dated 29 May 2006 available on UNFCCC website <http://cdm.unfccc.int/Projects/DB/DNV-CUK1138289069.87/view> No Change.

4.9 Local Stakeholder Comments

As per <http://cdm.unfccc.int/UserManagement/FileStorage/J725M48BOQUYX8H4LCH7CN9F3JODV1> validation report dated 29 May 2006 available on UNFCCC website <http://cdm.unfccc.int/Projects/DB/DNV-CUK1138289069.87/view> No Change.

5. List of Persons Interviewed

| Date | Name | Position | Short Description of Subject Discussed |
|------------|--|---|---|
| 15/05/2008 | Mr. Christian Patrickson Mr. Cristian Mosella | Development Manager Development engineer | Monitoring practice adopted at plant site and requirement under methodology ACM0006 version 01 equation 24. |

6. Document References

Category 1 Documents (documents provided by the Client that relate directly to the GHG components of the project, (i.e. the CDM Project Design Document, confirmation by the host Party on contribution to sustainable development and written approval of voluntary participation from the designated national authority):

- /1/ Revised Monitoring plan dated 23rd June 2008
- /2/ Registered PDD Version No 4 dated on 24 May 2006.
- /3/ Approved methodology ACM0006 version 01
- /4/ Validation report dated on 29 May 2006
- /5/ EB 38 report page 14 para 63 (g) <http://cdm.unfccc.int/EB/038/eb38rep.pdf>.
- /6/ the energy efficiency calculation of the boiler that would be used in the absence of the project activity

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