VALIDATION REPORT

JALLES MACHADO BAGASSE COGENERATION PROJECT (JMBCP)

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VALIDATION REPORT

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Summary:
Det Norske Veritas Certification Ltd. (DNV) has performed a validation of the "Jalles Machado Bagasse Cogeneration Project (JMBCP)" (hereafter called "the project") in Brazil on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures and the subsequent decisions by the CDM Executive Board.
The validation consisted of the following three phases: i) a desk review of the project design and the baseline and monitoring plan; ii) follow-up interviews with project stakeholders and iii) the resolution of outstanding issues and the issuance of the final validation report and opinion. This validation report summarizes the findings of the validation.
In summary, it is DNV's opinion that the "Jalles Machado Bagasse Cogeneration Project (JMBCP)" as described in the revised PDD of August 2005, meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the baseline and monitoring methodology AM0015. Hence, DNV will request the registration of the "Jalles Machado Bagasse Cogeneration Project (JMBCP)" as a CDM project activity. Prior to the submission of this validation report to the CDM Executive Board, DNV will have to receive the written approval of the DNA of Brazil and the Netherlands, including confirmation by the DNA of Brazil that the project assists in achieving sustainable development.

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Abbreviations

AGMA	Agência Goiana de Meio Ambiente (Environmental Agency of Goiás)
ANEEL	Agência Nacional de Energia Elétrica (Brazilian National Electricity Agency)
BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CPFL	Companhia Paulista de Força e Luz (Regional Electricity Company)
CER	Certified Emission Reduction
CH_4	Methane
CL	Clarification request
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
DNV	Det Norske Veritas
DNA	Designated National Authority
ELETROBRÁS	Brazilian Public Electric Company
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
JMBCP	Jalles Machado Bagasse Cogeneration Project
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
MP	Monitoring Plan
MVP	Monitoring and Verification Plan
N_2O	Nitrous oxide
NGO	Non-governmental Organisation
ODA	Official Development Assistance
OM	Operating margin
ONS	Brazilian national electricity system operator
PDD	Project Design Document
PROINFA	Programme of Incentives to the Alternative Sources of Electric Energy
RSA	Simplified Environmental Report
SMA	Secretaria de Estado do Meio Ambiente, dos Recursos Hídricos e da Habitação
S-SE-CO	South/ Southeast/Midwest (one of two regional grids in Brazil)
UNFCCC	United Nations Framework Convention on Climate Change

1 INTRODUCTION

Jalles Machado S.A. and Econergy Brasil Ltda have commissioned Det Norske Veritas Certification Ltd. (DNV) to validate the Jalles Machado Bagasse Cogeneration Project, in Goianésia Municipality; Goiás State, Brazil.

This report summarises the findings of the validation of the project, performed on the basis of UNFCCC and host Party criteria for CDM projects, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The validation team consisted of the following personnel:

Mr. Luis Filipe Tavares	DNV Rio de Janeiro	Team leader
Ms. Cintia Dias	DNV Rio de Janeiro	CDM auditor
Mr. Vicente San Valero	DNV Rio de Janeiro	CDM auditor
Mr. Michael Lehmann	DNV Oslo	Energy sector expert/Technical reviewer

1.1 Validation Objective

The purpose of a validation is to have an independent third party assess the project design. In particular, the project's baseline, the monitoring plan, and the project's compliance with relevant UNFCCC and host Party criteria are validated in order to confirm that the project design as documented is sound and reasonable and meets the identified criteria. Validation is a requirement for all CDM projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of certified emission reductions (CERs).

1.2 Scope

The validation scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against Kyoto Protocol criteria for the CDM, the CDM rules and modalities as agreed in the Marrakech Accords and relevant decisions by the CDM Executive Board. The validation team has employed, based on the recommendations in the Validation and Verification Manual /5/ a risk-based approach, 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 project participants. However, stated requests for clarifications and corrective actions may provide input for improvement of the project design.

1.3 Jalles Machado Bagasse Cogeneration Project

The "Jalles Machado Bagasse Cogeneration Project (JMBCP)" includes the increase of the bagasse cogeneration capacity and the improvement of the energy efficiency at the Jalles Machado sugar mill located at Goianésia, Goiás State. The project allows Jalles Machado to supply electricity to the grid and to use part of the electric energy to supply new electric irrigation pumps. The project has already been implemented and started operation in 23 April 2001. With the implementation of this project, the mill is able to sell the surplus electricity to the S-SE-CO grid, avoiding the dispatch of the same amount of energy produced by fossil-fuelled thermal plants to that grid. Emission reductions are claimed from displacing grid electricity with electricity generated by the sugarcane mill and supplied to the grid and from replacing diesel

irrigation pumps with electric irrigation pumps. The estimated amount of GHG emission reductions from the project is 72 056 tCO_2e during the first crediting period (7 years), resulting in estimated average annual emission reductions of 10 293 tCO_2e.

2 METHODOLOGY

The validation consisted of the following three phases:

I a desk review of the project design documents;
II follow-up interviews with project stakeholders;
III the resolution of outstanding issues and the issuance of the final validation report and opinion.

In order to ensure transparency, a validation protocol was customised for the project, according to the Validation and Verification Manual /5/. The protocol shows, in a transparent manner, criteria (requirements), means of verification and the results from validating the identified criteria. The validation protocol serves the following purposes:

- It organises, details and clarifies the requirements a CDM project is expected to meet;
- It ensures a transparent validation process where the validator will document how a particular requirement has been validated and the result of the validation.

The validation protocol consists of three tables. The different columns in these tables are described in Figure 1.

The completed validation protocol for the "Jalles Machado Bagasse Cogeneration Project (JMBCP)" is enclosed in Appendix A to this report.

Findings established during the validation can either be seen as a non-fulfilment of validation protocol criteria or where a risk to the fulfilment of project objectives is identified. Corrective Action Requests (CAR) are 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 certified.

The term Clarification may be used where additional information is needed to fully clarify an issue.

Validation Protocol Table 1: Mandatory Requirements for CDM Project Activities			
Requirement	***Reference***	***Conclusion***	***Cross reference***
The requirements the project must meet.	*Gives reference to the legislation or agreement where the requirement is found.*	*This is either acceptable based on evidence provided (**OK**), a **Corrective Action Request (CAR)** of risk or non-compliance with stated requirements or a request for **Clarification (CL)** where further clarifications are needed.*	*Used to refer to the relevant checklist questions in Table 2 to show how the specific requirement is validated. This is to ensure a transparent Validation process.*

Validation Protocol Table 2: Requirement Checklist				
Checklist Question	***Reference***	***Means of verification (MoV)***	***Comment***	***Draft and/or Final Conclusion***
The various requirements in Table 1 are linked to checklist questions the project should meet. The checklist is organised in seven different sections. Each section is then further sub-divided. The lowest level constitutes a checklist question.	*Gives reference to documents where the answer to the checklist question or item is found.*	*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 (**OK**), or a **Corrective Action Request (CAR)** due to non-compliance with the checklist question (See below).A request for **Clarification (CL)** is used when the validation team has identified a need for further clarification.*

Validation Protocol Table 3: Resolution of Corrective Action Requests and Requests for Clarification			
Report corrective action requests and requests for clarifications	***Ref. to Table 2***	***Summary of project participants' response***	***Final conclusion***
If the conclusions from the draft Validation are either a Corrective Action Request or a Clarification Request, these should be listed in this section.	*Reference to the checklist question number in Table 2 where the Corrective Action Request or Clarification Request is explained.*	*The responses given by the project participants during the communications with the validation team should be summarised in this section.*	*This section should summarise the validation team's responses and final conclusions. The conclusions should also be included in Table 2, under "Final Conclusion".*

Figure 1 Validation protocol tables

2.1 Review of Documents

The initial Project Design Document /1/ submitted by Jalles Machado and Econergy in May 2003 was reviewed. However, this documentation was formatted according to version 1 of the CDM-PDD and was based on the proposed baseline and monitoring methodology NM0001. In January 2005 a new version of the PDD /2/ was submitted to DNV correctly applying the approved methodology AM0015 and formatted according to version 2 of the CDM-PDD. A further revised version of the PDD /3/ was submitted in August 2005 to address DNV's initial validation findings and was reviewed by DNV. In addition, spreadsheets containing detailed calculations for the combined margin emission coefficient /4/, which is applied by the project, were reviewed.

Other documents, such as the Environmental Licences and licence requirements as well as the letters sent to local stakeholders, were reviewed during the follow up interviews in order to ensure the accuracy of the provided information.

2.2 Follow-up Interviews

On 17 June 2003, DNV performed interviews with Econergy and Jalles Machado during a site visit at the Jalles Machado sugar mill at Goianésia, Goiás State, to confirm and to resolve issues identified in the document review.

The main topics of the interviews were:

- Environment impacts control (vinasse, air pollution),
- Environment licenses conditioning compliance,
- Bagasse use to electric cogeneration considerations,
- Justification for increase of irrigation area and number of irrigation pumps.

2.3 Resolution of Clarification and Corrective Action Requests

The objective of this phase of the validation was to resolve the requests for corrective actions and clarification and any other outstanding issues, which needed to be clarified for DNV's positive conclusion on the project design. The *Corrective Action Requests* and requests for *Clarification* raised by DNV were resolved during communications between the project participants and DNV.

To guarantee the transparency of the validation process, the concerns raised and responses given are documented in the validation protocol in Appendix A.

3 VALIDATION FINDINGS

The findings of the validation are stated in the following sections. The validation criteria (requirements), the means of verification and the results from validating the identified criteria are documented in more detail in the validation protocol in Appendix A.

The final validation findings relate to the project design as documented and described in the PDD of August 2005.

3.1 Participation Requirements

The project participants are Jalles Machado S.A. and Econergy Brasil Ltda of Brazil and Corporación Andina de Fomento (CAF) - Netherlands Clean Development Facility (NCDF) (Netherlands), a trustee to the Dutch government to buy emission reductions from CDM projects in Latin America. The participating Parties - Brazil as the host Party and the Netherlands as Annex I Party - meet all relevant participation requirements.

3.2 Project Design

The project is a grid-connected renewable energy project activity, displacing grid electricity with electricity generated from renewable sources (bagasse) and thus resulting in the reduction of emissions of greenhouse gases in the energy sector. The project aims is to increase the efficiency and capacity of the prevailing bagasse based energy generation, by refurbishing low pressure boilers into high pressure boilers and by installing an additional 33 MW generation capacity through three phases. The first phase (2001) consisted in an installation of one 5 MW (G2) back pressure turbo-generator and deactivation of a 1.2 MW backpressure turbo generator. The second phase (2002) included the refurbishment of a 21 bar boiler into a 42 bar boiler, increasing the efficiency of the steam generation. The third phase (2003) consisted in an installation of a 28 MW (G3) back pressure turbo-generator and the refurbishment of the other 21 bar boiler left, turning it into a new 42 bar boiler. The project design engineering reflects good practice through the use of steam Rankine technology for steam rising and power generation.

The second component of the project consists in installing new electric irrigations pumps, replacing 25 diesel fuelled irrigators, and the construction of an electric transmission grid on the cane plantation. Normal practice in the Brazilian sugar cane industry is to install irrigations pumps powered by diesel, due to the absence of the necessary electric transmission grid.

A renewable seven years crediting period is selected, starting on 23 April 2001. The starting date of the project activity is April 2001. The expected operational lifetime of the project is 25 years.

The project is expected to bring social (employment), environmental (fauna and flora preservation) and economic benefits, thus contributing to sustainable development objectives of the Brazilian Government.

The validation did not reveal any information that indicates that the project can be seen as a diversion of ODA funding towards Brazil.

3.3 Project Baseline and Additionality

The project applies the approved baseline methodology AM0015 - "*Bagasse-based cogeneration connected to an electricity grid*" /6/. This methodology is applicable to "Jalles Machado Bagasse Cogeneration Project (JMBCP)" as this project consists of a renewable energy generation unit that supplies electricity to the S-SE-CO interconnected grid of Brazil.

In accordance with AM0015, the additionality of the project is demonstrated through the "Tool for the demonstration and assessment of additionality", which includes the following steps:

Step 0 -Preliminary screening based on the starting date of the project activity: The starting date of the project, i.e. April 2001, falls between 1 January 2000 and the date of the registration of the first CDM project activity (November 2004). Evidence for the project's starting date of April 2001 was presented. Sufficient evidence was also presented that Jalles Machado Sugar Mill seriously considered the CDM in the decision to proceed with the project.

Step 1 - Identification of alternatives to the project activity consistent with current laws and regulations: The possible baseline scenarios are: a) Business as usual which means producing energy and steam for self consumption with low efficiency and irrigation with diesel pumps and b) investing in modifications of boilers and installing a new electricity generator which allows Jalles Machado to supply excess electricity to the grid and to install electric irrigation pumps. Both scenarios are in compliance with all applicable legal and regulatory requirements.

Step 2 - Investment analysis: Not applicable (Only Step 3 is selected)

Step 3. *Barrier analysis:* Technological barriers, institutional and political barriers, economic and investment barriers and cultural barriers are presented in the PDD*:*

a) *Technological barriers*. The Rankine cycle technology is well known in Brazil and can not be considered a technological barrier, although sugar cane units mainly operate with low-efficiency. However, there is a technological barrier because the project needs to supply energy at a certain quality to the grid which requires better cogeneration technology than generally applied by sugarcane mills.

b) *Institutional and political barriers*. DNV could confirm that the regulatory environment for the electricity sector changes a lot and often in Brazil, resulting in uncertainty for renewable energy generation. Although the project has a future expansion that will enter the PROINFA, this project does not qualify for PROINFA, the Brazilian Programme of Incentives for Alternative Sources of Electric Energy, because it started operation before 2006.

c) *Economic barriers*. DNV confirmed as an economic and investment barrier the fact that the revenues of the selling of energy represent around 3% of the core business revenues, i.e. production of sugar and alcohol, thus constituting a very minor part of the project developer's total income. Moreover, it is demonstrated the project is not financially attractive in absence of CER revenues. It is also demonstrated that the implementation of electric irrigation pumps instead of diesel irrigation pumps faces economic barriers, since fuel cost savings are low compared to the construction costs for the necessary transmission lines.

d) *Cultural barriers*. DNV was able to confirm that the sugarcane production is different from energy production and that electricity revenues only constitute a very minor part of the project developer's total income. Hence, there are cultural barriers for sugarcane mills

to invest in increased cogeneration capacity in order to supply excess electricity to the grid.

Jalles Machado S.A. entered the PROINFA program for further 12 MW of electricity generation capacity installed at Jalles Machado sugar mill. However, this further expansion of the electricity cogeneration capacity is not part of this proposed CDM project activity.

Step 4 - Common practice analysis: DNV was able to confirm that the efficient production of energy and heat by sugarcane mills is not common practice in Brazil. Usually the sugarcane mills produce energy inefficiently and do not supply excess electricity to the grid. Regarding irrigation, the use of diesel irrigation pumps is common practise in the Brazilian sugarcane industry.

Step 5 - Impact of CDM registration: The sale of CER's will provide the necessary incentive for the project to overcome the presented barriers.

Given the above and in particular the technological, institutional, economic and cultural barriers the project faces, it is sufficiently demonstrated that the project is not a likely baseline scenario.

For the displacement of grid electricity, the baseline scenario is that electricity would in the absence of the project activity have been generated by the operation of grid-connected power plants and by the addition of new generation sources. In accordance with AM0015, an electricity baseline emission factor is calculated as a combined margin, consisting of the combination of operating margin (OM) and build margin (BM) factors (see section 3.5).

Regarding irrigation pumps, the baseline scenario is that diesel irrigation pumps would have been installed to meet increased irrigation demands in absence of the project activity. DNV was able to confirm that the expansion of the sugarcane fields would also happen in absence of the proposed project activity. Hence, it is appropriate to claim emission reductions due to the use of electric irrigation pumps instead of diesel irrigation pumps, which are normal practice in the sugar industry.

Although emission reductions from displacing diesel irrigation pumps are not explicitly addressed by AM0015, the methodology allows for accounting of any net changes in CO_2 emissions from fossil fuels due to the project activity. Based on the technical specifications (0,1813 L/HP.h) provided by one of the main diesel engine supplier in Brazil, an emission factor of 0.0005 tCO_2 per horse power (HP) and operating hour of a diesel irrigation pump has been determined, using conservative assumptions where applicable. Emission offsets will be determined by multiplying measured operating hours with this emission factor.

3.4 Monitoring Plan

The project correctly applies the approved monitoring methodology AM0015 - "*Bagasse-based cogeneration connected to an electricity grid*" /7/.

The methodology considers monitoring emissions reductions generated from cogeneration projects using sugarcane bagasse. The monitoring plan for emissions reductions occurring within the project boundary is mainly based on the energy sold to CPFL (electricity utility company) and reliability is assured through two-party verification. The electricity baseline emission factor is determined *ex-ante* and will only be updated at renewal of the crediting period.

To determine emission reductions due to the displacement of diesel, the operating hours of electric irrigation pumps will be monitored and multiplied with the *ex-ante* determined baseline emission factor for diesel irrigation pump.

Details of the data to be collected, the frequency of data recording, its certainty, and format and storage location are described. The recording frequency of the data seems appropriate for the project.

Algorithms and formulae used have also been clearly established.

Jalles Machado is responsible for the project management, monitoring and reporting project activities as well as for organising and training of the staff in the appropriate monitoring, measurement and reporting techniques.

The monitoring plan is straightforward and no specific procedures beyond the established on the QA/QC checked will be necessary. These processes will also be assured by an ISO 9001:00 certification of Jalles Machado S.A., concluding that the established measures reflect good monitoring and reporting practices.

3.5 Calculation of GHG Emissions

Baseline emissions due to displacement of electricity are calculated by multiplying the electricity baseline emissions factor with the electricity exported of the project activity to the S-SE-CO grid. The project is not expected to result in GHG emissions due to the use of a renewable energy source (bagasse) for electricity generation.

The combined margin emission coefficient for the S-SE-CO grid is determined *ex-ante* in accordance with AM0015. The calculations were based on electricity generation data provided by the Brazilian Electricity Agency (ANEEL) and the National Electricity System Operator (ONS) for the electricity generated in the South-Southeast-Midwest (S-SE-CO) grid in the years 2001-2003. Average plant efficiencies for different power plant types established in the IEA study on the Brazilian grid /9/ and IPCC carbon emission factors for specific fuels were applied to calculate plant specific emission coefficients. The simple-adjusted operating margin (OM) emission coefficient is calculated to be 0.404 tCO_2e/MWh (applying an average λ of 0.519) and build margin (BM) emission coefficient of 0.094 tCO_2e/MWh, resulting in a combined margin emission coefficient of 0.249 tCO_2e/MWh (weighted average of the build and operating margin). The emission coefficient calculations were transparently presented in spreadsheets /4/ submitted to and verified by DNV.

Even though the S-SE-CO grid is connected with the North-Northeast grid, the energy flow between these grids is heavily limited by the transmission lines capacity. It is hence appropriate to consider the S-SE-CO grid for the purpose of determining the BM and OM emission coefficient and consider imports from the North-Northeast grid at 0 tCO_2/MWh in accordance with AM0015.

Generation data for the years 2001-2003 are the most recent statistics available and 2004 data was not publicly available at the time of submitting the PDD for validation. It is recognised that in the absence of actual fuel consumption data, the calculated plant specific emission coefficients are sensitive to the assumed plant efficiency for each plant. Nonetheless, the applied average plant efficiencies for different power plant types established in the IEA study on the Brazilian grid /9/ is deemed to represent the best data that is currently available.

The ONS dataset does not include power plants that are locally dispatched. However, it is justified to only include plants dispatched by ONS although they only represent about 80% of the total installed capacity. Data for the remaining plants is not publicly available. Also, these plants operate either based on power purchase agreements which are not under control of the dispatch authority, or they are located in non-interconnected systems to which ONS has no access. Hence, these plants are not likely to be affected by a CDM project and the power plants dispatched by ONS are thus representative for the operating margin.

The build margin emission coefficient calculated for only power plants dispatched by ONS is 0.0937 tCO_2e/MWh and thus more conservative than the emission coefficient calculated based on IEA data (0.421 tCO_2e/MWh) or the combination of IEA and ONS data (0.205 tCO_2e/MWh).

The λ was calculated by interpolating daily dispatch data for thermal power plants and daily dispatch data for hydropower plants. The λ calculations were transparently presented in spreadsheets /4/ submitted to and verified by DNV. The selected approach for calculating λ is in accordance with AM0015.

3.6 Environmental Impacts

Jalles Machado has received all relevant environmental licenses (Installation and Operation) which were issued by state environmental agency (AGMA – Agência Goiana de Meio Ambiente) after all possible impacts were analyzed by the State Secretary of Environment (SMA – Secretaria de Estado do Meio Ambiente, dos Recursos Hídricos e da Habitação) and documented in a report called "Simplified Environmental Report" (RAS – Relatório Ambiental Simplificado).

Compliance with licence conditions were verified during the follow-up interviews and considered adequate.

A pre-audit for EMS ISO 14001 certification has been carried out, but ISO 14001 certification was not yet concluded. For the purpose of EMS certification, Jalles Machado established an environment policy and implemented several initiatives such as protection of wild life (American Rhea, Guara wolf, jaguar etc.), environment education of employers as well as their relatives and schools.

3.7 Comments by Local Stakeholders

Local stakeholders were invited initially trough public discussion during the environmental license issuing process. No comments were received.

Local stakeholders, such as the Municipal Government, the state and municipal agencies, the Brazilian forum of NGOs, neighbouring communities and the office of the attorney general, were invited to comment on the project, in accordance with the requirements of Resolution 1 of the Brazilian DNA. The letters sent to the local stakeholders were verified during the follow up interviews. Three positive comments were received and were taken into account appropriately.

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

DNV Certification published the PDD of January 2005 on the DNV Climate Change web site (http://www.dnv.com/certification/ClimateChange) and stakeholders were, through the UNFCCC CDM web site, invited to provide comments within a 30 days period from 31 January 2005 to 02 March 2005.

One comment was received in this period. The comment (in unedited form) and how DNV has taken due account of the comment received is given below.

Comment by: Axel Michaelowa, Hamburg Institute of International Economics (HWWA)
Inserted on: 2005-02-24
Subject: Outdated baseline emission factors

Comment: The baseline emission factors are from an outdated (three-year old) IEA study and should be updated with more recent data

How DNV has considered the comment received in its validation:

In the PDD of January 2005, the combined margin emission coefficient was determined based on an International Energy Agency (IEA) study on the Brazilian electricity grid carried out in 2002 (using data from 2000) /9/. The IEA study was based on installed capacity of plants built up to 2004 and assumptions regarding the plant efficiency and load factor. However, the IEA study did not calculate the combined margin as required by AM0015 and DNV requested the project participants to recalculate the combined margin emission coefficient. The project participants were thus requested to submit a revised PDD with the operating margin and build margin emission coefficient calculated according to AM0015 and based on the most recent statistics available. In the revised PDD of August 2005, the combined margin was recalculated for the S-SE-CO grid and it was determined *ex-ante* in accordance with AM0015, based on actual electricity generation data provided by the National Electricity System Operator (ONS) for the years 2001- 2003 in the South-Southeast-Midwest (S-SE-CO) grid (see CAR 1 and CAR 2 in Table 3 of the validation protocol and the section 3.4 “Calculations of GHG Emissions”).

5 VALIDATION OPINION

Det Norske Veritas Certification Ltd. (DNV) has performed a validation of the "Jalles Machado Bagasse Cogeneration Project (JMBCP)" at Goianésia Municipality, Goiás State, Brazil, (hereafter called "the project"). The validation was performed on the basis of UNFCCC criteria for CDM project activities and relevant Brazilian criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The project participants are Jalles Machado S.A. and Econergy Brasil Ltda of Brazil and Corporación Andina de Fomento (CAF) - Netherlands Clean Development Facility (NCDF), a trustee to the Dutch government to buy emission reductions from CDM Projects in Latin America. The participating Parties - Brazil as host Party and the Netherlands as Annex I Party - meet all relevant participation requirements.

The project is a bagasse-based cogeneration power generation activity displacing grid electricity. By installing additional 33 MW bagasse cogeneration capacity at the Jalles Machado sugar mill, the project will be able to supply excess electricity to the regional grid. Moreover, the project will displace diesel irrigation pumps with electric pumps at sugar canes field of Jalles Machado.

By promoting renewable energy, the project is in line with the current sustainable development priorities of Brazil.

The project applies the approved baseline and monitoring methodology AM0015, i.e. "Bagasse-based cogeneration connected to an electricity grid". The baseline methodology has been applied correctly and the assumptions made for the selected baseline scenario are sound. It is sufficiently demonstrated that the project is not a likely baseline scenario and that emission reductions attributable to the project are additional to any that would occur in the absence of the project activity.

A combined margin emission coefficient of 0.249 tCO_2e/MWh is calculated in accordance with AM0015, i.e. the average of the approximate operating margin and the build margin. The determination of this combined margin emission coefficient is based on actual electricity generation data provided by the National Electricity System Operator (ONS) for the years 2001-2003 for the South-Southeast-Midwest grid.

The monitoring methodology has been applied correctly. The monitoring plan sufficiently specifies the monitoring requirements of the main project indicators.

By displacing fossil fuel-based electricity with electricity generated from a renewable source and by avoiding fossil fuel consumption by diesel irrigation pumps, the project results in reductions of CO_2 emissions that are real, measurable and give long-term benefits to the mitigation of climate change. Given that the project is implemented as designed, the project is likely to achieve the estimated amount of emission reductions.

Local stakeholder comments were invited according to the Brazilian DNA Resolution 1. Three comments were received and all were taken into account appropriately by Jalles Machado.

In summary, it is DNV's opinion that the "Jalles Machado Bagasse Cogeneration Project (JMBCP)" as described in the revised and resubmitted project design document of August 2005, meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria

and correctly applies the baseline and monitoring methodology for AM0015. Hence, DNV will request the registration of the "Jalles Machado Bagasse Cogeneration Project (JMBCP)" as CDM project activity.

Prior to the submission of this validation report to the CDM Executive Board, DNV will have to receive the written approval of the DNA of Brazil and the Netherlands, including confirmation by the DNA of Brazil that the project assists in achieving sustainable development.

REFERENCES

Documents provided by the project proponent that relate directly to the project:

/1/ Econergy: Project Design Document for the "Jalles Machado Bagasse Cogeneration Project (JMBCP)". Version 1 (May 2003);

/2/ Econergy: Project Design Document for the "Jalles Machado Bagasse Cogeneration Project (JMBCP)". Version 2 (January 2005);

/3/ Econergy: Project Design Document for the "Jalles Machado Bagasse Cogeneration Project (JMBCP)". Version 3 (August 2005);

/4/ Econergy: Spreadsheet for Calculation of Combined Margin (ONS Emission Factor SSECO 2001-2003 v 2005-06-22.xls)

Background documents related to the design and/or methodologies employed in the design or other reference documents:

/5/ International Emission Trading Association (IETA) & the World Bank's Prototype Carbon Fund (PCF): *Validation and Verification Manual*. http://www.vvmanual.info

/6/ Approved Baseline Methodology AM0015: "*Bagasse-based cogeneration connected to an electricity grid"*. Version 01 of 22 September 2004.

/7/ Approved Monitoring Methodology AM0015: "*Bagasse-based cogeneration connected to an electricity grid"*. Version 01 of 22 September 2004.

/8/ CDM EB: *Tool for the demonstration and assessment of additionality*, EB 16 Report, Annex 1.

/9/ Bosi, M., A. Laurence, P. Maldonado, R. Schaeffer, A. F. Simoes, H. Winkler and J.-M. Lukamba: *Road testing baselines for greenhouse gas mitigation projects in the electric power sector*. OECD and IEA information paper, October 2002.

Persons interviewed during the validation, or persons contributed with other information that are not included in the documents listed above:

/10/ Marcelo S Diniz Junqueira – Econergy Brasil

/11/ Carlos Grieco – Econergy Brasil

/12/ Segundo Braoios Martinez – Jalles Machado

/13/ Rogerio Augusto Soares – Jalles Machado

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APPENDIX A

CDM VALIDATION PROTOCOL

JALLES MACHADO BAGASSE COGENERATION PROJECT

Table 1 Mandatory Requirements for Clean Development Mechanism (CDM) Project Activities

Requirement	Reference	Conclusion	Cross Reference / Comment
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3	Kyoto Protocol Art.12.2	OK	Table 2, Section E.4.1 The PDD identifies the Netherlands as participating Annex I Party through Corporación Andina de Fomento (CAF) - Netherlands Clean Development Facility (NCDF) as a trustee to the Dutch government to buy emission reductions from CDM Projects in Latin America.
2. The projec shall assist non-Annex I Parties in achieving sustainable development and the project shall have obtained confirmation by the host country that the project assists in achieving sustainable development	Kyoto Protocol Art. 12.2, Marrakesh Accords, CDM Modalities §40a	-	Table 2, Section A.3 Prior to the submission of this validation report to the CDM Executive Board, DNV will have to receive the written confirmation by the DNA of Brazil that the project assists in achieving sustainable development
3. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC	Kyoto Protocol Art.12.2.	OK	Table 2, Section E.4
4. The project shall have the written approval of voluntary participation from the designated national authorities (DNA) of each party involved	Kyoto Protocol Art. 12.5a, Marrakesh Accords, CDM Modalities §40a	-	Prior to the submission of this validation report to the CDM Executive Board, DNV will have to receive the written approval of voluntary participation from the DNA of the participating Parties
5. The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change	Kyoto Protocol Art. 12.5b	OK	Table 2, Section E

Requirement	Reference	Conclusion	Cross Reference / Comment
6. Reduction in GHG emissions shall be additional to any that would occur in absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity	Kyoto Protocol Art. 12.5c, Marrakesh Accords, CDM Modalities §43	OK	Table 2, Section B.2
7. Potential public funding for the project from Parties in Annex I shall not be a diversion of official development assistance	Marrakech Accords	OK	The validation did not reveal any information that indicates that the project can be seen as a diversion of ODA funding towards Brazil
8. Parties participating in the CDM shall designate a national authority for the CDM	Marrakech Accords, CDM Modalities §29	OK	The Brazilian DNA is the Comissão Interministerial de Mudança Global do Clima. The Dutch DNA is the Ministry of Housing, Spatial Planning and the Environment
9. The host country shall be a Party to the Kyoto Protocol	Marrakech Accords, CDM Modalities §30	OK	Brazil ratified the Kyoto Protocol on 23 August 2002. Netherlands ratified the Kyoto Protocol on 31 May 2002.
10. The participating Annex I Party's assigned amount shall have been calculated and recorded	CDM Modalities and Procedures §31b	OK	The assigned amount of the Netherlands is 92% of the emissions in 1990.
11. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7	CDM Modalities and Procedures §31b	OK	The Netherlands have in place a national registry and reported in April 2005 the latest inventory for the years 1990-2003.

Requirement	Reference	Conclusion	Cross Reference / Comment
12. Comments by local stakeholders shall be invited, a summary of these provided and how due account was taken of any comments received	Marrakech Accords, CDM Modalities §37b	OK	Table 2, Section G
13. Documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts, shall be submitted, and, if those impacts are considered significant by the project participants or the Host Party, an environmental impact assessment in accordance with procedures as required by the Host Party shall be carried out.	Marrakech Accords, CDM Modalities §37c	OK	Table 2, Section F
14. Baseline and monitoring methodology shall be previously approved by the CDM Methodology Panel	Marrakech Accords, CDM Modalities §37e	OK	Table 2, Section B.1.1 and D.1.1
15. Provisions for monitoring, verification and reporting shall be in accordance with the modalities described in the Marrakech Accords and relevant decisions of the COP/MOP	Marrakech Accords, CDM Modalities §37f	OK	Table 2, Section D
16. Parties, stakeholders and UNFCCC accredited NGOs shall have been invited to comment on the validation requirements for minimum 30 days, and the project design document and comments have been made publicly available	Marrakech Accords, CDM Modalities, §40	OK	The PDD was published for public comments in the period of 31January 2005 to 02 March 2005 on www.dnv.com/certification/ClimateChange and comments were invited via the UNFCCC CDM website. One comment was received.
17. A baseline shall be established on a project-specific basis, in a transparent manner and taking into account relevant national and/or sectoral policies and circumstances	Marrakech Accords, CDM Modalities, §45c,d	OK	Table 2, Section B.2
18. The baseline methodology shall exclude to earn CERs for decreases in activity levels outside the project activity or due to force majeure	Marrakech Accords, CDM Modalities, §47	OK	Table 2, Section B.2

Requirement	Reference	Conclusion	Cross Reference / Comment
19. The project design document shall be in conformance with the UNFCCC CDM-PDD format	Marrakech Accords, CDM Modalities, Appendix B, EB Decisions	OK	PDD is in accordance with CDM-PDD (version 02 of 1 July 2004).

Table 2 Requirements Checklist

Checklist question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
A. General Description of Project Activity *The project design is assessed.*					
A.1. Project Boundaries *Project Boundaries are the limits and borders defining the GHG emission reduction project.*					
A.1.1. Are the project's spatial (geographical) boundaries clearly defined?	/1//3/	DR	The projected is located in Goianésia Municipality; Goiás State, Brazil		OK
A.1.2. Are the project's system (components and facilities used to mitigate GHGs) boundaries clearly defined?	/1//3/	DR	The project system's boundary is limited by the Jalles cogeneration facilities for activities related to the cogeneration, and it is also limited to the subsystem Brazilian South-Southeast and Midwest grid which Jalles is connected for activities related to the renewable energy displacement. The project will also use electric pumps that use energy produced by Jalles itself as substitutes for the diesel engine pumps for irrigation of sugar cane fields.		OK
A.2. Technology to be employed *Validation of project technology focuses on the project engineering, choice of technology and competence/ maintenance needs. The validator should ensure that environmentally safe and sound technology and know-how is used.*					
A.2.1. Does the project design engineering reflect	/1//3/	DR	The project design engineering reflects		OK

Checklist question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
current good practices?			good practice through the use of Rankine technology for steam rising and power generation. The use of electric pumps for irrigation of cane fields is also a good practice, which is not commonly used in the sugar and alcohol industry.		
A.2.2. Does the project use state of the art technology or would the technology result in a significantly better performance than any commonly used technologies in the host country?	/1//3/	DR	The technology used is the standard steam Rankine cycle technology adopted worldwide and available in Brazil. The project also involves the expansion of the steam generating capacities of the sugar mill cogeneration system.		OK
A.2.3. Is the project technology likely to be substituted by other or more efficient technologies within the project period?	/1//3/	DR	The project is unlikely to be replaced by other more efficient technologies, at least within the first 7 year crediting period.		OK
A.2.4. Does the project require extensive initial training and maintenance efforts in order to work as presumed during the project period?	/1//3/	DR	The project will require minimal additional training for project maintenance since the retrofit is only a modification of the currently used system. Moreover, support from the manufacturer is also assured.		OK
A.2.5. Does the project make provisions for meeting training and maintenance needs?	/1//3/	I	The project documentation does not detail provisions for training and maintenance. This seems to be reasonable given the reasons indicated in A.2.4.		OK
A.3. Contribution to Sustainable Development *The project's contribution to sustainable development is assessed.*					
A.3.1. Is the project in line with relevant legislation	/1//3/	DR	Yes, the project is authorized by ANEEL		OK

Checklist question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
and plans in the host country?			and the environment licences were issued and verified during follow up interviews.		
A.3.2. Is the project in line with host-country specific CDM requirements?	/1//3/	DR	Comments by local stakeholders were invited in accordance with Resolution 1.		OK
A.3.3. Is the project in line with sustainable development policies of the host country?	/1//3/	DR	The project is in line with current sustainable development priorities in Brazil.		OK
A.3.4. Will the project create other environmental or social benefits than GHG emission reductions?	/1//3/	I	The project is expected to bring social (employment), environmental (fauna and flora preservation) and economic benefits, thus contributing to the sustainable development objectives of the Brazilian Government.		OK
B. Project Baseline *The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.*					
B.1. Baseline Methodology *It is assessed whether the project applies an appropriate baseline methodology.*					
B.1.1. Is the baseline methodology previously approved by the CDM Methodology Panel?	/1//3/	DR	The project applies the baseline methodology AM0015 - Bagasse based cogeneration connected to an electric grid.		OK
B.1.2. Is the baseline methodology the one deemed most applicable for this project and is the appropriateness justified?	/1//3/	DR	Yes, the project fulfils the condition under which AM0015 is applicable. The projects uses a) only the bagasse from the same facility where the project activity is implemented, b) the project is not foreseen		OK

Checklist question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			to be implemented by the public sector, c) the project will not increase the bagasse production and d) the bagasse to be used will not be stored for more than one year.		
B.2. Baseline Determination *The choice of baseline will be validated with focus on whether the baseline is a likely scenario, whether the project itself is not a likely baseline scenario, and whether the baseline is complete and transparent.*					
B.2.1. Is the application of the methodology and the discussion and determination of the chosen baseline transparent?	/1//3/	DR	The baseline for cogeneration considers the operation margin calculated as the Simple Adjusted Operation Margin, according to ONS information. According to the default calculation for Combined Margin, considering W_{OM} = W_{BM}=0.5 weight for each, emission coefficient would be 0.274 tCO2e/MWh. However the project applied a weight of W_{OM}=1.0 and W_{BM}=0. This alternative weight option was proposed to the EB but has not been approved..	~~CAR 1~~	OK
B.2.2. Has the baseline been determined using conservative assumptions where possible?	/1//3/	DR/I	The project uses data from ONS for the 120 generation units dispatched centrally by ONS and does not include power plants that are locally dispatched. Nonetheless, the methodology AM0015 considers "project electricity system is defined by the spatial extent of the power plants that can be dispatched without significant transmission	~~CAR 2~~	OK

Checklist question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			constraints". Hence DNV request calculations according to this methodology or a justification for the choice of S-SE-CO regional Brazilian grid and for the conservativeness of the approach used.		
B.2.3. Has the baseline been established on a project-specific basis?	/1//3/	DR	See B.2.1	~~CAR 1~~	OK
B.2.4. Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	/1//3/	DR	All the national and/or sectoral policies implemented during the initial phase were considered. The project entered the PROINFA program signing a PPA for 12 MW of its energy for 20 years with Eletrobrás. DNV requests more information about this contract and conditions.	~~CAR 3~~	OK
B.2.5. Is the baseline determination compatible with the available data?	/1//3/	DR	The initial determination of the combined margin emission factor is based on an OECD and IEA Information Paper. (Road-testing baselines for GHG Mitigation projects in the Electric Power Sector - Roberto Shaeffer et al). However, significant modifications on the electricity market happened after the issuance of this study. The project participants are requested to submit a revised PDD with the operating margin and build margin emission coefficient calculated according to AM0015 and based on the most recent statistics available and justification for the choice of S/SE/CO regional Brazilian grid and for the conservativeness of the approach used	~~CAR 2~~	OK

Checklist question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
B.2.6. Does the selected baseline represent the most likely scenario among other possible and/or discussed scenarios?	/1//3/	DR	See B.2.1. The baseline scenario for irrigations pumps needs clarifications. Table 2 in the PDD shows that the irrigated area is more than doubled in 2007 compared to 2000 and that the existing 25 diesel irrigators are not replaced, but that irrigation capacity is extended by installing electric irrigators. It remains to be clarified whether the doubling of the irrigation area and irrigation capacity is a result of the project activity, (due to increased demand for bagasse). If so, it is not appropriate to claim emissions reductions from claiming displacement of fossil fuels for irrigators which are implemented as part of the project and which are not likely to be implemented in the baseline scenario.	~~CAR 2~~ ~~CL 1~~	OK
B.2.7. Is it demonstrated/justified that the project activity itself is not a likely baseline scenario (e.g. through (a) a flow-chart or series of questions that lead to a narrowing of potential baseline options, (b) a qualitative or quantitative assessment of different potential options and an indication of why the non-project option is more likely, (c) a qualitative or quantitative assessment of one or more barriers facing the proposed project activity or (d) an indication that the project type is not common practice in the proposed area of	/1//3/	DR	In accordance with AM0015, the additionality of Jalles Machado Bagasse Cogeneration Project is demonstrated through the "Tool for the demonstration and assessment of additionality", which includes the following steps: Step 0 -Preliminary screening based on the starting date of the project activity: The starting date of the project, i.e. April 2001, falls between 1 January 2000 and the date of the registration of the first CDM project activity (November 2004). Evidence for the	~~CAR 3~~	OK

Checklist question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
implementation, and not required by a Party's legislation/regulations)?			project's starting date of April 2001 was presented. Sufficient evidence was also presented that Jalles Machado Sugar Mill seriously considered the CDM in the decision to proceed with the project. Step 1 - Identification of alternatives to the project activity consistent with current laws and regulations: The possible baseline scenarios are: a) Business as usual which means producing energy and steam for self consumption with low efficiency and b) investing in modifications of boilers and installing a new electricity generator. Both scenarios are in compliance with all applicable legal and regulatory requirements. Step 2 - Investment analysis: Not applicable (Only Step 3 is selected) Step 3. Barrier analysis: Technological barriers, institutional and political barriers, economic and investment barriers and cultural barriers are presented in the PDD: a) Technological barriers. The Rankine cycle technology is well known in Brazil and can not be considered a technological barrier, although sugar cane units mainly operate with low-efficiency. However, there is a technological barrier because the project needs to supply energy at a certain quality to the grid which requires		

Checklist question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			better cogeneration technology than generally applied by sugarcane mills. b) Institutional and political barriers. DNV could confirm that the regulatory environment for the electricity sector changes a lot and often in Brazil, resulting in uncertainty for renewable energy generation. Although the project has a future expansion that will enter the PROINFA, this project does not qualify for PROINFA, the Brazilian Programme of Incentives for Alternative Sources of Electric Energy, because it started operation before 2006. c) Economic barriers. DNV confirmed as an economic and investment barrier the fact that the revenues of the selling of energy represent around 3% of the core business revenues, i.e. production of sugar and alcohol, thus constituting a very minor part of the project developer's total income. Moreover, It is demonstrated the project is not financially attractive in absence of CER revenues. d) Cultural barriers. DNV was able to confirm that the sugarcane production is different from energy production and that electricity revenues only constitute a very minor part of the project developer's total income. Hence, there are cultural barriers for sugarcane mills to invest in increased		

Checklist question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			cogeneration capacity in order to supply excess electricity to the grid. Given the above technological, institutional, economic and cultural barriers, it is sufficiently demonstrated that the project is not a likely baseline scenario. Jalles Machado S.A. entered the PROINFA program for further 12 MW of electricity generation capacity installed at Jalles Machado sugar mill. However, this further expansion of the electricity cogeneration capacity is not part of this proposed CDM project activity. Step 4 - Common practice analysis: DNV was able to confirm that the efficient production of energy and heat by sugarcane mills is not common practice in Brazil. Usually the sugarcane mills produce energy inefficiently and do not supply excess electricity to the grid. Step 5 - Impact of CDM registration: The sale of CER's will provide the necessary incentive for the project to overcome the presented barriers.		
B.2.8. Have the major risks to the baseline been identified?	/1//3/	DR	The major risk would be related to the PROINFA renewable power sources program, where the Brazilian government will set prices to be paid for renewable power. Jalles Machado entered the PROINFA program. DNV requests more	~~CAR 3~~	OK

Checklist question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			information about conditions of the PPA.		
B.2.9. Is all literature and sources clearly referenced?	/1//3/	DR	Yes		OK
C. Duration of the Project/ Crediting Period *It is assessed whether the temporary boundaries of the project are clearly defined.*					
C.1.1. Are the project's starting date and operational lifetime clearly defined and reasonable?	/1//3/	DR	Yes, the project start date is 23/04/2001 and has an expected lifetime of 25 years.		OK
C.1.2. Is the assumed crediting time clearly defined and reasonable (renewable crediting period of max. two x 7 years or fixed crediting period of max. 10 years)?	/1//3/	DR	A 7 year crediting period starting 23/04/2001 with the potential of being renewed twice is selected.		OK
D. Monitoring Plan *The monitoring plan review aims to establish whether all relevant project aspects deemed necessary to monitor and report reliable emission reductions are properly addressed ((Blue text contains requirements to be assessed for optional review of monitoring methodology prior to submission and approval by CDM EB).*					
D.1. Monitoring Methodology *It is assessed whether the project applies an appropriate baseline methodology.*					
D.1.1. Is the monitoring methodology previously approved by the CDM Methodology Panel?	/1//3//6/	DR	The project applies the monitoring methodology AM0015 "Bagasse-based cogeneration connected to an electricity grid".		OK

Checklist question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
D.1.2. Is the monitoring methodology applicable for this project and is the appropriateness justified?	/1//3/	DR	The monitoring for electric power exported and hours of electric irrigation operations is adequate. The fossil fuel consumption at the facilities affected by the project (i.e. the irrigators) should be monitored prior and after the project is implemented in order to establish the amount of fossil fuel displaced by the project. However, the project proposes to monitor the operating hours of the new electric irrigators to establish the amount of fossil fuel displaced. It remains to be clarified whether this alternative approach is appropriate.	~~CL 2~~	OK
D.1.3. Does the monitoring methodology reflect good monitoring and reporting practices?	/1//3/	DR	Yes, the electric power measurements are assured by both parties involved. The time by which the data is kept is established accordingly to internal procedures.		OK
D.1.4. Is the discussion and selection of the monitoring methodology transparent?	/1//3/	DR	Yes		OK
D.2. Monitoring of Project Emissions *It is established whether the monitoring plan provides for reliable and complete project emission data over time.*					
D.2.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas emissions within the project boundary during the crediting period?	/1//3/	DR	The monitoring for electric power exported and hours of electric irrigation operations is adequate. The fuel consumption avoided by electric pumps is identified. However, although the	~~CL 2~~	OK

Checklist question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			operating hours of electric irrigation is mentioned, it is not included in the monitoring plan. Furthermore, it needs to be clarified how fuel displaced (ΔCfuel) is determined from monitored operating hours.		
D.2.2. Are the choices of project GHG indicators reasonable?	/1//3/	DR	Yes, with the exception of the above issue (See D.2.1).	~~CL 2~~	OK
D.2.3. Will it be possible to monitor / measure the specified project GHG indicators?	/1//3/	DR	Yes, with the exception of the above issue (See D.2.1)	~~CL 2~~	OK
D.2.4. Will the indicators give opportunity for real measurements of achieved emission reductions?	/1//3/	DR	Yes, with the exception of the above issue (See D.2.1)	~~CL 2~~	OK
D.2.5. Will the indicators enable comparison of project data and performance over time?	/1//3/	DR	Yes, with the exception of the above issue (See D.2.1)	~~CL 2~~	OK
D.3. Monitoring of Leakage *It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.*					
D.3.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	/1//3/	DR	According to the chosen methodology, the only potential source of leakage is from organizations that used to buy bagasse from the sugar mill prior to the cogeneration project's implementation. Without this bagasse supply, these organizations might burn a fossil fuel in its place. Jalles Machado did not use to sell bagasse prior to project implementation. Therefore, no monitoring of leakage is necessary.		OK
D.3.2. Have relevant indicators for GHG leakage	/1//3/	DR	See D.3.1		OK

Checklist question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
been included?					
D.3.3. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	/1//3/	DR	See D.3.1		OK
D.3.4. Will it be possible to monitor the specified GHG leakage indicators?	/1//3/	DR	See D.3.1		OK
D.4. Monitoring of Baseline Emissions *It is established whether the monitoring plan provides for reliable and complete project emission data over time.*					
D.4.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining baseline emissions during the crediting period?	/1//3/	DR	The CO_2 emission factor of the grid is based on ONS information for the years 2001 to 2003, as these are the most updated data available. This coefficient is fixed ex-ante and hence no data needs to be monitored in this regard.		OK
D.4.2. Is the choice of baseline indicators, in particular for baseline emissions, reasonable?	/1//3/	DR	See D.4.1		OK
D.4.3. Will it be possible to monitor the specified baseline indicators?	/1//3/	DR	See D.4.1		OK
D.5. Monitoring of Sustainable Development Indicators/ Environmental Impacts *It is checked that choices of indicators are reasonable and complete to monitor sustainable performance over time.*					
D.5.1. Does the monitoring plan provide the collection and archiving of relevant data concerning environmental, social and economic impacts?	/1//3/	DR/I	AM0015 and Resolution 1 of the Brazilian DNA do not require the monitoring of social or environmental indicators.		OK

Checklist question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
D.6. Project Management Planning *It is checked that project implementation is properly prepared for and that critical arrangements are addressed.*					
D.6.1. Is the authority and responsibility of project management clearly described?	/1//3/	DR	Yes, The Quality System Certification according ISO 9001:00 of Jalles Machado assures procedures for authority and responsibility.		OK
D.6.2. Is the authority and responsibility for registration, monitoring, measurement and reporting clearly described?	/1//3/	DR	See D.6.1		OK
D.6.3. Are procedures identified for training of monitoring personnel?	/1//3/	DR	See D.6.1		OK
D.6.4. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1//3/	DR/I	Emergency preparedness procedure was not mentioned, although the environment conditioning for irrigation system is effective.	~~CL 3~~	OK
D.6.5. Are procedures identified for calibration of monitoring equipment?	/1//3/	DR/I	Yes, see D.6.1.		OK
D.6.6. Are procedures identified for maintenance of monitoring equipment and installations?	/1//3/	DR/I	Yes, see D.6.1		OK
D.6.7. Are procedures identified for monitoring, measurements and reporting?	/1//3/	DR/I	Yes, the routine for measurements and reporting is assured by two part verification.		OK
D.6.8. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	/1//3/	DR/I	Yes; however, the operation time of irrigation pumps is not mentioned nor for how long the data is kept. It should be kept for the crediting period plus two years.	~~CL 2~~	OK
D.6.9. Are procedures identified for dealing with possible monitoring data adjustments and	/1//3/	DR	Yes, see D.6.1		OK

Checklist question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
uncertainties?					
D.6.10. Are procedures identified for review of reported results/data?	/1//3/	DR	Yes, considering the Quality Assurance Certification.		OK
D.6.11. Are procedures identified for internal audits of GHG project compliance with operational requirements where applicable?	/1//3/	DR/I	Yes, see D.6.1		OK
D.6.12. Are procedures identified for project performance reviews before data is submitted for verification, internally or externally?	/1//3/	DR/I	Yes, according structure for monitoring and ISO 9001 certification.		OK
D.6.13. Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting?	/1//3/	DR/I	Yes, see D.6.1		OK
E. Calculation of GHG Emissions by Source *It is assessed whether all material GHG emission sources are addressed and how sensitivities and data uncertainties have been addressed to arrive at conservative estimates of projected emission reductions.*					
E.1.Predicted Project GHG Emissions *The validation of predicted project GHG emissions focuses on transparency and completeness of calculations.*					
E.1.1. Are all aspects related to direct and indirect GHG emissions captured in the project design?	/1//3/	DR	Project emissions are considered zero in line with the AM0015 and IPCC guidelines which stipulate that biomass combustion is assumed to equal its re-growth.		OK

Checklist question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
E.2. Leakage *It is assessed whether there leakage effects, i.e. change of emissions which occurs outside the project boundary and which are measurable and attributable to the project, have been properly assessed.*					
E.2.1. Are potential leakage effects beyond the chosen project boundaries properly identified?	/1//3/	DR	The only potential source of leakage is from organizations that used to buy bagasse from the sugar mill prior to the cogeneration project's implementation. Jalles Machado did not use to sell bagasse prior to project implementation. Therefore, no leakage is expected.		OK
E.3. Baseline Emissions *The validation of predicted baseline GHG emissions focuses on transparency and completeness of calculations.*					
E.3.1. Have the most relevant and likely operational characteristics and baseline indicators been chosen as reference for baseline emissions?	/1//3/	DR	See B.2.1	~~CAR 1~~	OK
E.3.2. Are the baseline boundaries clearly defined and do they sufficiently cover sources and sinks for baseline emissions?	/1//3/	DR	See B.2.2	~~CAR 2~~	OK
E.3.3. Are the GHG calculations documented in a complete and transparent manner?	/1//3/	DR	See E.3.1	~~CAR 1~~	OK
E.3.4. Have conservative assumptions been used when calculating baseline emissions?	/1//3/	DR	See E.3.2	~~CAR 2~~	OK
E.3.5. Are uncertainties in the GHG emission estimates properly addressed in the documentation?	/1//3/	DR	See E.3.1	~~CAR 1~~	OK

Checklist question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
E.3.6. Have the project baseline(s) and the project emissions been determined using the same appropriate methodology and conservative assumptions?	/1//3/	DR	For project baseline, see E.3.1. For project emissions, see E.1.1.	~~CAR 1~~	OK
E.4. Emission Reductions Validation of baseline GHG emissions will focus on methodology transparency and completeness in emission estimations.					
E.4.1. Will the project result in fewer GHG emissions than the baseline scenario?	/1//3/	DR	The project is expected to abate CO_2 emissions to the extent of 72 056 tCO_2e over the 7 year crediting period.		OK
F. Environmental Impacts *Documentation on the analysis of the environmental impacts will be assessed, and if deemed significant, an EIA should be provided to the validator.*					
F.1.1. Has an analysis of the environmental impacts of the project activity been sufficiently described?	/1//3/	DR	The environmental impacts were analysed as part of the environment operation licence process and the conditions issued by State Environment Agency (AGMA) and according to the Simplified Environment Report (RAS). The requirements were verified and considered satisfactory.		OK
F.1.2. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved?	/1//3/	DR	Yes, see F.1.1		OK
F.1.3. Will the project create any adverse environmental effects?	/1//3/	DR/I	No significant environmental impacts are expected to be created. Given the nature of		OK

Checklist question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			the project design this is reasonable		
F.1.4. Are transboundary environmental impacts considered in the analysis?	/1//3/	DR/I	Not foreseen		OK
F.1.5. Have identified environmental impacts been addressed in the project design?	/1//3/	DR	Project design did not identified/addressed any environmental impact, which seems reasonable due to the nature of the project.		OK
F.1.6. Does the project comply with environmental legislation in the host country?	/1//3/	DR	Yes, see F.1.1		OK
G. Stakeholder Comments *The validator should ensure that a stakeholder comments have been invited and that due account has been taken of any comments received.*					
G.1.1. Have relevant stakeholders been consulted?	/1//3/	DR	Jalles Machado published in two newspapers the requirement for the Environment Operation Licence and has not received any comments. Complementarily Jalles invited the local stakeholders to provide comments, according to the Resolution 1 of the Brazilian DNA.		OK
G.1.2. Have appropriate media been used to invite comments by local stakeholders?	/1//3/	DR	Letters have been sent to local stakeholders in line with Resolution 1. These letters were verified during follow up interviews.		OK
G.1.3. If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	/1//3/	DR	See G.1.1		OK

Checklist question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
G.1.4. Is a summary of the stakeholder comments received provided?	/1//3/	DR	Three comments were received and were taken in account by Jalles Machado appropriately.		OK
G.1.5. Has due account been taken of any stakeholder comments received?	/1//3/	DR	See G.1.4		OK

Table 3 Resolution of Corrective Action and Clarification Requests

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
CAR 1 The baseline for cogeneration considers the operation margin calculated as the Simple Adjusted Operation Margin, according the ONS information. According to the default calculation for Combined Margin, considering W_{OM} = W_{BM}=0.5 weight for each, emission coefficient would be 0.274 tCO_2e/MWh. However the project applied a weight of W_{OM}=1.0 and W_{BM}=0. This alternative weight option was proposed to the EB, but has not been approved.	B.2.1 B.2.3 B.2.6 E.3.1 E.3.3 E.3.5 E.3.6	The PDD was revised to use a weight factor of W_{OM} = W_{BM}=0.5.	OK. The revised baseline emission calculations are according to the baseline methodology AM00015 considering W_{OM} = W_{BM} = 0.5. This CAR is therefore closed.
CAR 2 The determination of the combined margin emission factor is based on an OECD and IEA Information Paper. (Road-testing baselines for GHG Mitigation projects in the Electric Power Sector - Roberto Shaeffer et al). However, significant modifications on the electricity market happened after the issuance of this study. The project participants are requested to submit a revised PDD with the operating margin and build margin emission coefficient calculated according to AM0015 and based on the most recent statistics available and justification for the choice of S/SE/CO regional Brazilian grid and for the conservativeness of the approach used.	B.2.2 B.2.5 B.2.6 E.3.2 E.3.4	Project developers have solved this problem using data that is real and available through the national dispatch center, ONS. This data is from the period 2001-2003, being the most recent available by the time of PDD submission. The PDD has been revised in its sections E.4 and Annex 3, where the pertinent explanations for this source use are given.	OK. The revised baseline emission calculations are according to the baseline methodology AM00015. It is recognised that in the absence of actual fuel consumption data, the calculated plant specific emission coefficients are sensitive to the assumed plant efficiency for each plant. Nonetheless, the applied average plant efficiencies for different power plant types established in the IEA study on the Brazilian grid is deemed to represent the best data that is currently available. This CAR is therefore closed.

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
CAR 2 (continued) The project uses data from ONS for the 120 generation units dispatched centrally by ONS and does not include power plants that are locally dispatched. Nonetheless, the methodology AM0015 considers "project electricity system is defined by the spatial extent of the power plants that can be dispatched without significant transmission constraints". Hence DNV request calculations according to this methodology or a justification for the choice of S-SE-CO regional Brazilian grid and for the conservativeness of figures used.		The requested justification has been provided in the revised PDD.	It is justified to only include plants dispatched by ONS although they only represent about 80% of the total installed capacity. Data for the remaining plants is not publicly available. Also, these plants operate either based on power purchase agreements which are not under control of the dispatch authority, or they are located in non-interconnected systems to which ONS has no access. Hence, these plants are not likely to be affected by a CDM project and the power plants dispatched by ONS are thus representative for the operating margin. The build margin emission coefficient is correctly calculated considering the 20% capacity additions of the most recently installed plants dispatched by ONS. Even though the S-SE-CO grid is connected with the North-Northeast grid, the energy flow between these grids is heavily limited by the transmission lines capacity. It is hence appropriate to consider the S-SE-CO grid for the purpose of determining the BM and OM emission coefficient and consider imports from the North-Northeast grid at 0 tCO_2/MWh in accordance with AM0015, It is recognised that in the absence of actual fuel consumption data, the calculated plant specific emission coefficients are

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
			sensitive to the assumed plant efficiency for each plant. Nonetheless, the applied average plant efficiencies for different power plant types established in the IEA study on the Brazilian grid is deemed to represent the best data that is currently available. This CAR is therefore closed.
CAR 3 Evidence of (1) the starting date and (2) of the contact between the consultancy (J A Rubiano Consultores) and the mill in order to demonstrate that the incentive of the CDM was seriously considered in the decision to proceed with the project shall be presented. Jalles Machado entered the PROINFA program signing a PPA for 12 MW of its energy for 20 years with Eletrobrás. DNV asks for more information about this contract and conditions.	B.2.4 B.2.7 B.2.8	Attached to this protocol the evidence of the starting date is provided. The report prepared by J A Rubiano Consultores is also attached.	OK, Complementary document could demonstrate that the incentive of the CDM was seriously considered. Complementary explanation on reviewed PDD (version August 2005) explains that the further expansion of the cogeneration capacity (taking part of PROINFA) was not considered as part of this CDM project. This CAR is therefore closed.
CL 1 It remains to be clarified whether the doubling of the irrigation area and irrigation capacity is a result of the project activity, (due to increased demand for bagasse). If so, it is not appropriate to claim emissions reductions from claiming displacement of fossil fuels for irrigators which are implemented as part of the project and which are not likely to be implemented in the baseline scenario.	B.2.6	Clarified in Section A, item A.4.4 and Section B, item B.4 of the revised PDD (Version of January 2005).	Section A.4.4 and B. of the revised PDD (Version of January 2005) provide further substantiation for the assumption that diesel pumps are the BAU technology for irrigation. The validation team acknowledges that the use of diesel pumps is the baseline scenario. However, the PDD revision does not sufficiently address our clarification request (see below).
CL 1 (Rephrased):		The bagasse cogeneration project to supply the electricity delivered to the	The further clarifications provided by the project proponents sufficiently

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
With the implementation of the CDM project (i.e. the Expansion Plan), there is an additional need for irrigation, which will be met by new electric irrigators. However, the 25 diesel generators, which already were in place prior to the implementation of the proposed project, continue to operate and the electric pumps only meet the new irrigation demand, which is a result of the project. However, no additional pumps seem to be necessary in absence of the CDM project activity. Hence, claiming the reduction of emissions from future diesel pumps, which are not implemented in absence of the project (i.e. no expansion), does not seem to be appropriate. The use of electric pumps only results in less project emissions, as the additional irrigation demand created by the project, is meeting by renewable energy, but does not result in additional emission reductions.		grid could be implemented in any sugar mill without the necessity of increasing the production of sugarcane and, thus, bagasse. All the sugar mill already use the bagasse to generate electricity, but using low-efficiency equipment (boilers and turbo-generators), that do not allow generation of surplus energy neither for selling or supplying other equipments, like irrigators. So, it is a wide-spread technique to use diesel fuelled irrigators in sugarcane fields, and when a sugar mill expands the production, irrigation is also expanded, but with diesel fuelled equipments. In Jalles Machado's case, the expansion of the sugarcane fields would happen with or without the cogeneration project, because the price of the sugar and alcohol was increasing in year 2000. Then, the increase of the use of diesel for irrigation was a fact. With the possibility of increasing the efficiency of the cogeneration equipment and having a surplus of electricity to sell, Jalles Machado thought about the possibility of using the energy surplus not only for selling purposes, but to supply new electric irrigators near to the mill and use the old diesel fuelled engines to supply pumps that will irrigate boundary fields, which would have anyway been	address our request for clarification. DNV Certification acknowledges that the expansion of the sugarcane fields would also happen in absence of the proposed project activity. Hence, it is appropriate to claim emission reductions due to the use of electric pumps instead of diesel pumps, which are normal practice in the sugar industry. This CL is therefore closed.

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
		supplied by diesel engines. Therefore, the use of the electricity from the cogeneration project avoids the use of diesel that would have been consumed."	
CL 2 Although the operating hours of electric irrigation is mentioned, it is not included on data collection. Furthermore, it needs to be clarified how fuel displaced (ΔC_{fuel}) is determined from monitored operating hours and for how long the data is kept, according to the methodology it has to be kept for the crediting period plus two years.	D.1.2 D.2.1 - D.2.5 D.6.8	Clarified in item D and E of the revised PDD.	The monitoring plan in section D of the revised PDD has been revised to include the monitoring of operating hours. Section E of the revised PDD now sufficiently clarifies the algorithms used for calculating fuel displaced (ΔC_{fuel}). This CL is therefore closed.
CL 3 Emergency preparedness procedure was not mentioned, although the environment conditioning for irrigation system is effective	D.6.4	Clarified in Section A, item A.2 with the inclusion of a ISO 14000 implementation program explanation.	Section A.2 of the revised PDD provides the requested clarification on emergency preparedness procedures. This CL is therefore closed.

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