



VALIDATION REPORT

“VOTORANTIM’S HYDROPOWER PLANT WITH EXISTING RESERVOIR “PEDRA DO CAVALO” CDM PROJECT” IN BRAZIL

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DET NORSKE VERITAS



VALIDATION REPORT

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Summary:

Det Norske Veritas Certification Ltd. (DNV) has performed a validation of the “Votorantim’s Hydropower Plant with existing reservoir “Pedra do Cavalo” CDM 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, 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.

In summary, it is DNV’s opinion that the “Votorantim’s Hydropower Plant with existing reservoir “Pedra do Cavalo” CDM Project”, as described in the revised PDD of 02 August 2006, meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the baseline and monitoring methodology ACM0002. Hence, DNV will request the registration of the “Votorantim’s Hydropower Plant with existing reservoir “Pedra do Cavalo” CDM Project” 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 voluntary participation from the DNA of Brazil, including the confirmation that the project assists in achieving sustainable development.

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Abbreviations

| | |
|-------------------|---|
| ANEEL | “Agência Nacional de Energia Elétrica” (Brazilian Electric Energy Agency) |
| BM | Build margin |
| BNDES | “Banco Nacional de Desenvolvimento Econômico e Social” (Brazilian Bank for Economic and Social Development) |
| CAR | Corrective Action Request |
| CDM | Clean Development Mechanism |
| CEEE | “Companhia Estadual de Energia Elétrica” (Electric Energy State Co.) |
| CEF | Carbon Emission Factor |
| CER | Certified Emission Reduction |
| CH ₄ | Methane |
| CL | Clarification request |
| CO ₂ | Carbon dioxide |
| CO ₂ e | Carbon dioxide equivalent |
| CRA | “Centro de Recursos Ambientais” (Environmental Resources Center - Bahia State) |
| DNV | Det Norske Veritas |
| DNA | Designated National Authority |
| GHG | Greenhouse gas(es) |
| GWP | Global Warming Potential |
| IPCC | Intergovernmental Panel on Climate Change |
| MP | Monitoring Plan |
| N-NE | North-Northeast (one of the regional interconnected grids in Brazil) |
| N ₂ O | Nitrous oxide |
| NGO | Non-governmental Organisation |
| ODA | Official Development Assistance |
| PDD | Project Design Document |
| PPA | Power Purchase Agreement |
| SELIC | “Sistema Especial de Liquidação e Custódia” (Special System of Liquidation and Safekeeping = Overnight interest rate) |
| SEMARH | “Secretaria de Meio Ambiente e Recursos Hídricos” (Bahia Environmental and Hydro Resources Secretary) |
| UNFCCC | United Nations Framework Convention on Climate Change |



1 INTRODUCTION

Votorantim Cimentos Ltda. and Ecoinvest Carbon Brasil have commissioned Det Norske Veritas Certification Ltd. (DNV) to perform a validation of the “Votorantim’s Hydropower Plant with existing reservoir “Pedra do Cavalo” CDM Project” (UHEPC – Usina Hidrelétrica de Pedra do Cavalo), located at the Paraguaçu river between Governador Mangabeira and Cachoeira Municipalities, Bahia State, Brazil.

This report summarises the findings of the validation of the project, performed based on UNFCCC 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 |
| Mr. Vicente San Valero | DNV Rio de Janeiro | CDM auditor |
| Mrs Cintia Dias | 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 assessing 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 the criteria stated in article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords and relevant decisions by the CDM Executive Board, including the baseline and monitoring methodology ACM0002. 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 Requests* may provide input for improvement of the project design.

1.3 “Votorantim’s Hydropower Plant with existing reservoir “Pedra do Cavalo” CDM Project”

The project activity is a hydropower plant (construction of electric sub-stations, turbines and generators installations) with existing reservoir that has a surface of 186 km². The volume of the reservoir built in 1985 is not increased. For 18 years the reservoir had not been utilized to generate electricity and was used just for water consumption, flood control and irrigation.



The plant has an installed capacity of 160 MW (2×80 MW Francis turbines) and is located at the Paraguaçu river between Governador Mangabeira and Cachoeira Municipalities, Bahia State. It delivers about 530 400 MWh/year (total typical annual power generation) to the North-Northeast interconnected grid, with a yearly average energy output capacity of 56.4 MW. The UHEPC plant is owned by Votorantim Cimentos Ltda. and administered by Votorantim Energia Ltda; both are subsidiaries of Group Votorantim.

Emission reductions are claimed from displacing grid electricity with electricity generated by the hydroelectric power plant and supplied to the grid. The estimated amount of GHG emission reductions from the project are 416 395 tonnes CO₂ equivalents (tCO₂e) during the first renewable 7-year crediting period (with the potential of being renewed twice selected), resulting in estimated average annual emission reductions of 59 485 tCO₂e.

2 METHODOLOGY

The validation consisted of the following three phases:

- i) a desk review of the project design, baseline and monitoring plan;
- 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 customized 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 organizes, 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 “Votorantim’s Hydropower Plant with existing reservoir “Pedra do Cavalo” CDM Project” is enclosed in Appendix A to this report.

Findings established during the validation can be seen as either a non-fulfilment of validation 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) CDM or host Party 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.



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| Validation Protocol Table 1: Mandatory Requirements for CDM Project Activities | | | |
|---|--|---|--|
| Requirement | Reference | Conclusion | Cross reference |
| <i>The requirements the project must meet.</i> | <i>Gives reference to the legislation or agreement where the requirement is found.</i> | <i>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.</i> | <i>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.</i> |

| Validation Protocol Table 2: Requirement Checklist | | | | |
|--|--|---|---|--|
| Checklist Question | Reference | Means of verification (MoV) | Comment | Draft and/or Final Conclusion |
| <i>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.</i> | <i>Gives reference to documents where the answer to the checklist question or item is found.</i> | <i>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.</i> | <i>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.</i> | <i>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.</i> |

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

Figure 1 Validation protocol tables



2.1 Review of Documents

The initial Project Design Document (PDD) /1/ submitted by Votorantim Cimentos Ltda. and Ecoinvest Carbon Brasil on 28 December 2005 was assessed by DNV. Moreover, a revised version of the PDD /2/ dated 02 August 2006 which was submitted to address DNV's initial validation findings was assessed by DNV. In addition, a spreadsheet containing details on the calculation of the grid electricity emission factor /3/ applied by the project was assessed.

Other documents such as the Operational Environmental License renewal /4/ as well as the evidence of 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 May and June 2006, DNV team performed interviews with Ecoinvest Carbon Brasil representatives' /9/ /10/, to confirm and to resolve issues identified in the document review.

- Environment impacts & their control,
- Environment licenses compliance,
- Local Stakeholders consultation process,
- Generation systems,
- Calibration requirements,
- Quality procedures.

2.3 Resolution of Clarification and Corrective Action Requests

The objective of this phase of the validation was to resolve any outstanding issues which needed to be clarified for DNV's positive conclusion on the project design.

The initial validation of the project identified some *Corrective Action Requests* and requests for *Clarification*. These were presented to the project participant through the interview process and in DNV's draft validation report (version 0 of 12 May 2005). The project participant's response to DNV's preliminary findings, which also included the submission of a revised PDD dated 02 August 2006, addressed all preliminary findings to DNV's satisfaction.

To guarantee the transparency of the validation process, the concerns raised are summarised in chapter 3 below and documented in more detail in the validation protocol in Appendix A.



3 PRELIMINARY VALIDATION FINDINGS

The findings of the validation of the “Votorantim’s Hydropower Plant with existing reservoir “Pedra do Cavalo” CDM Project” 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 validation findings relate to the project design as documented and described in the revised project design document dated 02 August 2006.

3.1 Participation Requirements

The project participants are Votorantim Cimentos Ltda. and Ecoinvest Carbon Brasil of Brazil. The host Party Brazil meets all relevant participation requirements. No Annex I Party is yet identified for the project.

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 Brazil, including the confirmation that the project assists in achieving sustainable development.

3.2 Project Design

“Votorantim’s Hydropower Plant with existing reservoir “Pedra do Cavalo” CDM Project” is a renewable electricity generation project activity displacing grid electricity that is partly generated based on fossil fuels, with electricity generated from renewable sources and thus resulting in the reduction of emissions of greenhouse gases in the energy sector.

The electricity generated by this hydroelectric power plant is dispatched to the regional North-Northeast (N-NE) regional Brazilian grid. The electricity generated will be consumed by Votorantim Cimentos Ltda., which is the project owner. The project is thus displacing Votorantim Cimentos Ltda.’s electricity imports from the Brazilian interconnected grid.

The project consists of a hydroelectric power plant using an existing reservoir. The area (186 km²) of the reservoir built in 1985 with the main objective of supplying water to public use is not increased. The project’s turbine system comprises 2 Francis turbines of 80 MW each (units #1 and #2) and 160 MW total installed capacity. The project design engineering reflects current good practice.

A renewable 7-year crediting period is selected (with the potential of being renewed twice), starting from 09 April 2005.

ANEEL’s Dispatches No. 1061, dated 15 December 2004, and No. 139, dated 28 January 2005, authorized units #1 and #2 to start operations on 16 December 2004 and 31 January 2005, respectively.

The starting date of the project was 23 April 2002 with an expected operational lifetime of 35 years. The project’s starting date is evidenced by ANEEL’s Concession Contract (No. 19/2002) dated 23 April 2002.

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The project is expected to bring social (employment), environmental (utilization of an existing reservoir to generate electricity) and economic (municipalities taxes) benefits, thus contributing to sustainable development objectives of the Brazilian Government.

The project does not involve public funding from an Annex I Party and 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 Baseline Determination

The project applies the approved consolidated baseline methodology ACM0002 - “Consolidated baseline methodology for grid-connected electricity generations from renewable sources”. /6/

The methodology ACM0002 is applicable to grid-connected renewable power generation project activities that apply for electricity capacity additions from hydro power plants without increasing the volume of the reservoirs. ACM0002 is thus applicable to the project.

The project system’s boundary is limited to the UHEPC plant area and the electricity system boundary is the N-NE section of the interconnected subsystem of the Brazilian grid, to which the project exports electricity.

In accordance with ACM0002, the baseline scenario is that electricity delivered to the N-NE grid by the project would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources. The baseline emission factor is determined as a combined margin consisting of the combination (weighted average) of operating margin (simple adjusted operating margin) and build margin factors. Both the operating and build margin emission factors will for the first crediting period be updated annually *ex-post* for the year in which actual project generation and associated emissions reductions occur. For subsequent crediting periods they will be calculated *ex-ante*.

3.4 Additionality

The additionality of the project is demonstrated by applying the “*Tool for demonstration and assessment of additionality*” /7/ which includes the following steps:

Step 0 - Preliminary screening based on the starting date of the project activity: The starting date of the CDM project activity, i.e. 23 April 2002, falls between 1 January 2000 and the date of the registration of the first CDM project activity (November 2004).

The crediting period starting date, i.e. 09 April 2005, is evidenced by ANEEL’s Dispatches No. 1061, dated 15 December 2004, and No. 139, dated 28 January 2005, authorizing units #1 and #2 to start operations, respectively, after 16 December 2004 and 31 January 2005.

The projects participants have requested validation before 31 December 2005. The PDD (Version 1 of 28 December 2005) was published on 30 December 2005. The project can thus request retroactive credits if the project is registered by the Executive Board by 31 December 2006 at the latest.

Evidence that the CDM was seriously considered as the factor in the decision to implement the project is evidenced by the Cement Sustainability Initiative - Agenda for Action dated July 2002 (from the World Business Council for Sustainable Development - WBCSD) to which Votorantim Cimentos is signatory and since the beginning of the Initiative (July 1999), the company started to define strategies in order to meet that agenda. Group Votorantim is also

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associated to the Brazilian Enterprise Council for Sustainable Development (CEBDS - Conselho Empresarial Brasileiro para o Desenvolvimento Sustentável), a representative of the WBCSD in Brazil, founded in 1997. An article dated 17 June 2001 mentions some highlights of their annual reunion where discussions about climate change, ecoefficiency, etc, were carried out, confirming some actions before issuing the Agenda for Action of July 2002. Moreover, minutes of a meeting among Votorantim, Ecoinvest and an expert (Prof. J. R. Moreira), dated 23 August 2002, evidences discussions about the renewable sources electrical generation potential (biomass, hydro, etc). In DNV's opinion, sufficient evidence has been provided that one of the objectives of the project was to mitigate climate change.

Step 1 - Identification of alternatives to the project activity consistent with current laws and regulations: The possible baseline scenarios considered are: a) the continuation of the current (previous) situation with the supply of electricity from N-NE Brazilian grid and b) implementation of the project without incentives from CDM. 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: Investment barriers and Barriers due to prevailing practice are presented.

a) Investment barriers: The project presents an IRR of 12.95% without CER revenues and 13.95% considering CER revenues. This IRR is lower than the SELIC¹ rate in effect when the contract with ANEEL was signed and the implementation of the project was decided (18.37 % as of April 2002). The IRR is also lower than the SELIC rate in effect in subsequent years (23.29% in 2003 and 16.25% in 2004). DNV assessed the IRR analysis and the figures provided are considered reliable and justified.

c) Barriers due to prevailing practice: DNV was also able to confirm that the regulatory environment for the electricity sector undergoes frequent changes in Brazil, which causes uncertainties for investors and developers of similar hydropower projects.

Step 4 - Common practice analysis: Only few hydropower projects have recently been implemented by the private sector. Most similar activities produce energy to the grid and they can get more attractive financing conditions through BNDES (Brazilian Bank for Economic and Social Development) that demands a signed PPA. The project does not have a signed PPA because the plant is dedicated to self-production, i.e. the hydro plant supplies all of its energy to Votorantim Cimentos Ltda., which is the project owner. As there is no other source that is easily available to finance private projects on long term conditions, this project activity faces a barrier (access to financing) that similar activities do not face.

Step 5 - Impact of CDM registration: The project participants were able to demonstrate that the sale of CERs will provide the necessary incentives for the project to alleviate the above presented barriers.

Given the above and in particular the investment barriers and barriers due to prevailing practice which the project faces, it is sufficiently demonstrated that the project is not a likely baseline scenario and that emission reductions are thus additional.

¹ SELIC is an electronic book-entry system that controls the custody and registers all operations regarding domestic government securities also known as overnight interest rate.



3.5 Monitoring Plan

The project applies the approved consolidated monitoring methodology ACM0002 - “Consolidated *monitoring methodology for zero-emissions grid-connected electricity generation from renewable sources*” /6/.

The monitoring methodology ACM0002 is applicable to this grid-connected hydro power plant project which does not increase the volume of the existing reservoir.

The monitoring plan for determining emission reductions is based on monitoring the energy generated to the grid, which can be cross-checked with sales/dispatch receipts. The electricity baseline emission factor will for the first crediting period be updated annually *ex-post* for the year in which actual project generation and associated emissions reductions occur. For subsequent crediting periods it will be calculated *ex-ante*.

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 formulas used have also been clearly established.

Votorantim Energia (with cooperation of Votorantim Cimentos Ltda.) 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.

3.6 Calculation of GHG Emissions

Baseline emissions due to displacement of electricity are calculated by multiplying the electricity exported by the project activity to the N-NE baseline grid emission factor, which will be updated annually *ex-post* for the year in which actual project generation and associated emissions reductions occur for the first crediting period. For subsequent crediting periods it will be calculated *ex-ante*. The project is not expected to result in GHG emissions. No potential emission sources of leakage were identified for this project.

The system boundary for the grid electricity system affected by the project is defined as the N-NE subsystem of the Brazilian grid. For the *ex-ante* estimation of the project emission reductions, a combined margin grid emission factor was determined 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 N-NE grid in the years 2002-2004. Data for the years 2002-2004 were the most recent statistics available at the time of PDD submission.

The ONS dataset does not include power plants that dispatch locally. 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 as 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.

For the determination of the operating margin (OM) emission coefficient, average plant efficiencies for different power plant types established in the IEA study on the Brazilian grid /8/ and IPCC carbon emission factors for specific fuels were applied to calculate plant specific emission coefficients. For the calculation of the build margin emission coefficient, the



conservative plant efficiencies recommended by the CDM Executive Board at its 22nd meeting were applied.

The simple-adjusted OM emission coefficient is 0.1840 tCO₂e/MWh (applying an average λ of 0.7299) and the BM emission coefficient 0.0568 tCO₂e/MWh, resulting in a combined margin emission coefficient of 0.1204 tCO₂e/MWh (weighted average of the build and operating margin).

The λ was calculated by interpolating daily dispatch data for thermal power plants and daily dispatch data for hydropower plants based on data provided by ONS for the years 2002 to 2004. The λ calculations were transparently presented in spreadsheets submitted to and assessed by DNV. The selected approach for calculating λ is in accordance with ACM0002.

3.7 Environmental Impacts

Votorantim Cimentos Ltda. has been granted a Precarious Operation Environmental License No. 4688, issued on 07 September 2004 by CRA after all possible environmental impacts were analyzed. Moreover, the Operation Environmental License No. 5068, issued on 07 January 2005, was renewed by CRA on 13 February 2005 (renewal No. 5206 /4/) with validity until 13 February 2009.

No adverse environmental impacts are identified, which seems reasonable given the nature of the project design. Transboundary environmental impacts are not foreseen.

3.8 Comments by Local Stakeholders

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. One comment was received from SEMARH (Bahia Environmental and Hydro Resources Secretary). The comment (Oficio No. 055/2006-GASEC, dated 13 March 2006) says that the project is in accordance with Bahia State priorities to sustainable development.

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

The PDD of 28 December 2005 was made publicly available on DNV's climate change website (www.dnv.com/certification/climatechange) and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 30 December 2005 to 28 January 2006. No comments were received.



5 VALIDATION OPINION

Det Norske Veritas Certification Ltd. (DNV) has performed a validation of the “Votorantim’s Hydropower Plant with existing reservoir “Pedra do Cavalo” CDM Project”, located at the Paraguaçu river between Governador Mangabeira and Cachoeira Municipalities, Bahia State, in Brazil. The validation was performed on the basis of UNFCCC criteria for the Clean Development Mechanism (CDM) and relevant Brazilian criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The review of the project design documentation and the subsequent follow-up interviews have provided DNV with sufficient evidence to determine the fulfilment of stated criteria.

The project participants are Votorantim Cimentos Ltda. and Ecoinvest Carbon Brasil of Brazil. The host Party Brazil meets all relevant participation requirements. No participating Annex I Party is yet identified.

The project is a hydropower plant using an existing reservoir. The electricity generated by this hydroelectric power plant is dispatched to the regional North-Northeast (N-NE) regional Brazilian grid. The electricity generated will be consumed by Votorantim Cimentos Ltda., which is the project owner. The project is thus displacing Votorantim Cimentos Ltda.’s electricity imports from the Brazilian interconnected grid. The total installed capacity of the project is 160 MW.

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

The project applies the approved consolidated baseline methodology ACM0002 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”. 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.

The baseline grid electricity emission factor will be updated annually ex-post for the year in which actual project generation and associated emissions reductions occur (for the first crediting period) and for subsequent crediting periods it will be calculated ex-ante. For the ex-ante estimation of emission reductions, a combined margin emission coefficient of 0.1204 tCO₂e/MWh is calculated in accordance with ACM0002, 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 2002- 2004 for the North-Northeast Brazilian grid.

By displacing fossil fuel-based electricity with the electricity generated from a renewable source, the project will result in emission reductions that are real, measurable and will give long-term benefits to the mitigation of climate change. The emission reductions forecast has been checked and it is likely that the stated amount will be achieved given that the project is implemented as designed.

The monitoring methodology ACM0002 has been applied correctly. The monitoring plan sufficiently specifies the monitoring requirements of the main project indicators.



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Local stakeholder comments were invited according to the Brazilian DNA Resolution 1. One comment was received from SEMARH (Bahia Environmental and Hydro Resources Secretary). The comment says that the project is in accordance with Bahia State priorities to sustainable development. Parties, stakeholders and NGOs were invited to comment on the validation requirements via the UNFCCC web-site. No comments were received.

In summary, it is DNV's opinion that the "Votorantim's Hydropower Plant with existing reservoir "Pedra do Cavalo" CDM Project" as described in the revised project design document of 02 August 2006, meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the baseline and monitoring methodology ACM0002. Hence, DNV will request the registration of the "Votorantim's Hydropower Plant with existing reservoir "Pedra do Cavalo" CDM Project" 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 voluntary participation from the DNA of Brazil, including the confirmation that the project assists in achieving sustainable development.



REFERENCES

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

- /1/ Votorantim Cimentos Ltda. and Ecoinvest Carbon Brasil: *Project Design Document for the “Votorantim’s Hydropower Plant with existing reservoir “Pedra do Cavalo” CDM Project”* – Version 1 of 28 December 2005.
- /2/ Votorantim Cimentos Ltda. and Ecoinvest Carbon Brasil: *Project Design Document for the “Votorantim’s Hydropower Plant with existing reservoir “Pedra do Cavalo” CDM Project”* - Version 5 of 02 August 2006.
- /3/ Spreadsheet of Calculation of Combined Margin (BR NNE 2002-2004 2006.05.23.xls).
- /4/ CRA’s Operation License Renewal No. 5206, dated 13/02/2005.

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/ CDM-EB: *Approved Consolidated Baseline and Monitoring Methodology ACM0002 - “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”*. Version 06 of 19 May 2006.
- /7/ CDM-EB: *Tool for the demonstration and assessment of additionality*. Version 02 of 28 November 2005.
- /8/ 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 who contributed with other information that are not included in the documents listed above:

- /9/ Melissa Sawaya Hirschheimer - Ecoinvest Carbon Brasil
- /10/ Rodrigo Leme - Ecoinvest Carbon Brasil

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APPENDIX A

CDM VALIDATION PROTOCOL

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 | NA | Table 2, Section E.4.1 No Annex I party has yet been identified. |
| 2. The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof | Kyoto Protocol Art. 12.2, CDM Modalities and Procedures §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 approval of voluntary participation from the DNA of Brazil, including the confirmation 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.4.1 |
| 4. The project shall have the written approval of voluntary participation from the designated national authority of each party involved | Kyoto Protocol Art. 12.5a, CDM Modalities and Procedures §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 Brazil, including the confirmation that the project assists in achieving sustainable development. |
| 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 |
| 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 | Kyoto Protocol Art. 12.5c, CDM Modalities and Procedures §43 | OK | Table 2, Section B.2 |

| Requirement | Reference | Conclusion | Cross Reference / Comment |
|---|---|------------|---|
| would have occurred in the absence of the registered CDM project activity | | | |
| 7. In case public funding from Parties included in Annex I is used for the project activity, these Parties shall provide an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of these Parties. | Decision 17/CP.7, CDM Modalities and Procedures Appendix B, § 2 | OK | No public funding is used. 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 | CDM Modalities and Procedures §29 | OK | The Brazilian designated national authority for the CDM is the “Comissão Interministerial de Mudança Global do Clima”. |
| 9. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol | CDM Modalities §30/31a | OK | Brazil has ratified the Kyoto Protocol on 23 August 2002 |
| 10. The participating Annex I Party’s assigned amount shall have been calculated and recorded | CDM Modalities and Procedures §31b | NA | No Annex I party has yet been identified. |
| 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 | NA | No Annex I party has yet been identified. |
| 12. Comments by local stakeholders shall be invited, a summary of these provided and how due account was taken of any comments received | CDM Modalities and Procedures §37b | OK | Table 2, Section G 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. |
| 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 | CDM Modalities and Procedures §37c | OK | Table 2, Section F Votorantim Cimentos Ltda. has been granted a Precarious |

| Requirement | Reference | Conclusion | Cross Reference / Comment |
|--|---|------------|---|
| 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. | | | Operation Environmental License No. 4688, issued on 07 September 2004 by CRA after all possible environmental impacts were analyzed. Moreover, the Operation Environmental License No. 5068, issued on 07 January 2005, was renewed by CRA on 13 February 2005 (renewal No. 5206 /4/) with validity until 13 February 2009. |
| 14. Baseline and monitoring methodology shall be previously approved by the CDM Executive Board | CDM Modalities and Procedures §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 | CDM Modalities and Procedures §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 | CDM Modalities and Procedures §40 | OK | The PDD of 28 December 2005 was published on climatechange.dnv.com for public comments in the period of 30 December 2005 to 28 January 2006 and comments were invited via the UNFCCC CDM website. No comments were 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 | CDM Modalities and Procedures §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 | CDM Modalities and Procedures §47 | OK | Table 2, Section B.2 |
| 19. The project design document shall be in conformance with the UNFCCC CDM-PDD format | CDM Modalities and Procedures Appendix B, EB Decision | 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 <i>The project design is assessed.</i> | | | | | |
| A.1. Project Boundaries <i>Project Boundaries are the limits and borders defining the GHG emission reduction project.</i> | | | | | |
| A.1.1. Are the project’s spatial (geographical) boundaries clearly defined? | /1/ /2/ | DR | The “Votorantim’s Hydropower Plant with existing reservoir “Pedra do Cavalo” CDM Project” (UHEPC – Usina Hidrelétrica Pedra do Cavalo), Brazil, is located at the Paraguaçu river between Governador Mangabeira and Cachoeira Municipalities, Bahia State, Brazil. | | OK |
| A.1.2. Are the project’s system (components and facilities used to mitigate GHGs) boundaries clearly defined? | /1/ /2/ | DR | The project system’s boundary is limited to the UHEPC plant area and the electricity system boundary is the North-Northeast section of the interconnected subsystem of the Brazilian grid, to which “Votorantim’s Hydropower Plant with existing reservoir “Pedra do Cavalo” CDM Project” exports electricity. | | OK |

* MoV = Means of Verification, DR= Document Review, I= Interview

| Checklist Question | Ref. | MoV* | Comments | Draft Concl | Final Concl |
|---|------------|------|---|----------------------|-------------|
| A.2. Technology to be employed <i>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.</i> | | | | | |
| A.2.1. Does the project design engineering reflect current good practices? | /1/ /2/ | DR | Yes, the plant applies current good practices. | | OK |
| 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/ /2/ | DR | Not necessarily, Francis turbine technology is commonly used in run-of-river small hydroelectric plants. | | OK |
| A.2.3. Is the project technology likely to be substituted by other or more efficient technologies within the project period? | /1/ /2/ | DR | The project technology is unlikely to be replaced by other more efficient technologies. | | 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/ /2/ | DR | The project will require minimal additional training for project maintenance. | | OK |
| A.2.5. Does the project make provisions for meeting training and maintenance needs? | /1/ /2/ | DR | The project documentation does not detail provisions for training or maintenance and due to the reasons indicated in A.2.4, this appears reasonable. | | OK |
| A.3. Contribution to Sustainable Development <i>The project’s contribution to sustainable development is assessed.</i> | | | | | |
| A.3.1. Is the project in line with relevant legislation and plans in the host country? | /1/ /2/ | DR | ANEEL’s Dispatches No. 1061, dated 15 December 2004, and No. 139, dated 28 January 2005, authorized units #1 and #2 to start operations, respectively, after 16 | CL-3 CL-1 CL-4 | OK |

* MoV = Means of Verification, DR= Document Review, I= Interview

| Checklist Question | Ref. | MoV* | Comments | Draft Concl | Final Concl |
|---|------------|------|---|-----------------|-------------|
| | | | December 2004 and 31 January 2005. DNV requests clarifications on the reservoir area (rectification) as per ANEEL Resolution 293 dated 06 March 2006. DNV requests documented evidences of the Installation and Operation Environmental Licenses. DNV requests clarifications with regard to the project participant name, “Votorantim Cimento S/A”, mentioned in ANNEX 1. | | |
| A.3.2. Is the project in line with host-country specific CDM requirements? | /1/ /2/ | DR | Local stakeholders should be invited to comment on the project, in accordance with the requirements of Resolution 1 of the Brazilian DNA. | CL-2 | OK |
| A.3.3. Is the project in line with sustainable development policies of the host country? | /1/ /2/ | DR | The project is in line with current sustainable development priorities in Brazil. 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 Brazil, including the confirmation that the project assists in achieving sustainable development. | -- | -- |
| A.3.4. Will the project create other environmental or social benefits than GHG emission reductions? | /1/ /2/ | DR | The project is expected to bring social (employment), environmental (utilization of an existing reservoir to generate electricity) and economic (municipalities taxes) benefits, thus contributing to sustainable development objectives of the Brazilian Government. | | OK |

* MoV = Means of Verification, DR= Document Review, I= Interview

| Checklist Question | Ref. | MoV* | Comments | Draft Concl | Final Concl |
|---|-------------------|------|---|-------------|-------------|
| B. Project Baseline <i>The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.</i> | | | | | |
| B.1. Baseline Methodology <i>It is assessed whether the project applies an appropriate baseline methodology.</i> | | | | | |
| B.1.1. Is the baseline methodology previously approved by the CDM Executive Board? | /1/ /2/ /6/ | DR | Yes. The project applies the approved consolidated baseline methodology ACM0002 - “Consolidated baseline methodology for grid-connected electricity generations from renewable sources”. | | OK |
| B.1.2. Is the baseline methodology the one deemed most applicable for this project and is the appropriateness justified? | /1/ /2/ /6/ | DR | Yes. The methodology ACM0002 is applicable to grid-connected renewable power generation project activities that apply for electricity capacity additions from hydro power plants without increasing the volume of the reservoirs. ACM0002 is thus, applicable to the hydroelectric plant of the project. The interconnected grid is also properly identified (N-NE regional Brazilian grid). | | OK |

| Checklist Question | Ref. | MoV* | Comments | Draft Concl | Final Concl |
|---|----------------------------|-----------|--|---------------------|------------------|
| <p>B.2. Baseline Determination</p> <p><i>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.</i></p> | | | | | |
| <p>B.2.1. Is the application of the methodology and the discussion and determination of the chosen baseline transparent?</p> | <p>/1/ /2/ /3/</p> | <p>DR</p> | <p>The baseline for cogeneration considers the operating margin calculated based on the Simple Adjusted Operating Margin, and ONS data considering 2002 to 2004.</p> <p>The OM has been determined using average plant efficiencies, but that the BM was calculated based on the efficiencies suggested by the EB for best available technology.</p> <p>The simple-adjusted OM emission coefficient is calculated to be 0.1800 tCO₂e/MWh (applying an average λ of 0.0568) and the build margin (BM) emission coefficient is 0.0783 tCO₂e/MWh, resulting in a combined margin emission coefficient of 0.1291 tCO₂e/MWh (weighted average of the build and operating margin). The emission coefficient calculations were transparently presented in spreadsheets submitted to and verified by DNV.</p> <p>The calculation of BM emission coefficient must be updated with regard to the requirements contained in the latest version of ACM0002, i.e. if 20% falls on part capacity of a plant, that plant is fully</p> | <p>CAR-1</p> | <p>OK</p> |

* MoV = Means of Verification, DR= Document Review, I= Interview

| Checklist Question | Ref. | MoV* | Comments | Draft Concl | Final Concl |
|---|--------------------------|------|--|-------------|-------------|
| | | | included in the calculation. Moreover, the OM emission coefficient must be determined as the generation weighted average of the OM emission coefficients determined for the years 2002-2004. | | |
| B.2.2. Has the baseline been determined using conservative assumptions where possible? | /1/ /2/ /3/ /8/ | DR | <p>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 North-Northeast (N-NE) grid in the years 2002-2004. Data for the years 2002-2004 were the most recent statistics available at the time of PDD submission.</p> <p>For the determination of the operating margin (OM) emission coefficient, average plant efficiencies for different power plant types established in the IEA study on the Brazilian grid and IPCC carbon emission factors for specific fuels were applied to calculate plant specific emission coefficients. For the calculation of the build margin emission coefficient, the conservative plant efficiencies recommended by the CDM Executive Board at its 22nd meeting were applied.</p> | | OK |
| B.2.3. Has the baseline been established on a project-specific basis? | /1/ /2/ | DR | Yes. | | 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/ /2/ | DR | All the national and/or sectoral policies implemented during the initial phase were considered. | | OK |

| Checklist Question | Ref. | MoV* | Comments | Draft Concl | Final Concl |
|---|-------------------|------|---|------------------------------------|-------------|
| B.2.5. Is the baseline determination compatible with the available data? | /1/ /2/ | DR | See B.2.2. | | OK |
| B.2.6. Does the selected baseline represent the most likely scenario among other possible and/or discussed scenarios? | /1/ /2/ | DR | Yes. | | OK |
| B.2.7. Is it demonstrated/justified that the project activity itself is not a likely baseline scenario? | /1/ /2/ /7/ | DR | <p>The additionality of the project is demonstrated by applying the “Tool for demonstration and assessment of additionality” which includes the following steps:</p> <p>Step 0 - -Preliminary screening based on the starting date of the project activity: The starting date of the CDM project activity, i.e. 23 April 2002, falls between 1 January 2000 and the date of the registration of the first CDM project activity (November 2004).</p> <p>The crediting period starting date, i.e. 09 April 2005, is evidenced by ANEEL’s Dispatches No. 1061, dated 15 December 2004, and No. 139, dated 28 January 2005, authorizing units #1 and #2 to start operations, respectively, after 16 December 2004 and 31 January 2005.</p> <p>The projects participants have requested validation to DNV before 31 December 2005 (PDD Version 1 of 28 December 2005 was published on 30 December 2005) and the project can thus request retroactive credits if it is registered by the Executive Board by 31 December 2006 at the latest.</p> | CL-6 CL-7 | OK |

* SELIC is an electronic book-entry system that controls the custody and registers all operations regarding domestic government securities also known as overnight interest rate.

* MoV = Means of Verification, DR= Document Review, I= Interview

| Checklist Question | Ref. | MoV* | Comments | Draft Concl | Final Concl |
|--------------------|------|------|--|-------------|-------------|
| | | | <p>However, further evidence is requested that shows that the CDM was seriously considered as the factor in the decision to implement the project.</p> <p>Step 1 - Identification of alternatives to the project activity consistent with current laws and regulations: The possible baseline scenarios considered are: a) the continuation of the current (previous) situation with the supply of electricity from N-NE Brazilian grid and b) implementation of the project without incentives from CDM. Both scenarios are in compliance with all applicable legal and regulatory requirements.</p> <p>Step 2 - Investment analysis: Not applicable (Only Step 3 is selected).</p> <p>Step 3. Barrier analysis: Investment barriers and Barriers due to prevailing practice are presented.</p> <p>a) Investment barriers: The project presents an IRR of 12.95% without CER revenues and 13.95% considering CER revenues. This IRR is lower than the SELIC* rate in effect when the contract with ANEEL was signed and the implementation of the project was decided (18.37 % as of April 2002). The IRR is also lower than the SELIC rate in effect in subsequent years (23.29% in 2003 and 16.25% in 2004). DNV assessed the IRR analysis and the figures provided are considered reliable and</p> | | |

* MoV = Means of Verification, DR= Document Review, I= Interview

| Checklist Question | Ref. | MoV* | Comments | Draft Concl | Final Concl |
|--------------------|------|------|---|-------------|-------------|
| | | | <p>justified. DNV requests further evidences of the IRR calculation, of the BNDES financing and the PPA.</p> <p>c) Barriers due to prevailing practice: DNV was also able to confirm that the regulatory environment for the electricity sector undergoes frequent changes in Brazil, which causes uncertainties for investors and developers of similar hydropower projects.</p> <p>Step 4 - Common practice analysis: Only few hydropower projects have recently been implemented by the private sector. Most similar activities produce energy to the grid and they can get more attractive financing conditions through BNDES (Brazilian Bank for Economic and Social Development) that demands a signed PPA. The project does not have a signed PPA because the plant is dedicated to self-production, i.e. the hydro plant supplies all of its energy to Votorantim Cimentos Ltda., which is the project owner. As there is no other source that is easily available to finance private projects on long term conditions, this project activity faces a barrier (access to financing) that similar activities do not face.</p> <p>Step 5 - Impact of CDM registration: The project participants were able to demonstrate that the sale of CERs will provide the necessary incentives for the project to alleviate the above presented barriers.</p> | | |

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| Checklist Question | Ref. | MoV* | Comments | Draft Concl | Final Concl |
|--|------------|------|---|-------------|-------------|
| | | | Given the above and in particular the investment barriers and barriers due to prevailing practice which the project faces, it is sufficiently demonstrated that the project is not a likely baseline scenario and that emission reductions are thus additional. | | |
| B.2.8. Have the major risks to the baseline been identified? | /1/ /2/ | DR | Yes, the major risk of the project is to not have capacity to produce the full amount of electricity provided by the two engines. | | OK |
| B.2.9. Is all literature and sources clearly referenced? | /1/ /2/ | DR | Yes | | OK |
| C. Duration of the Project/ Crediting Period <i>It is assessed whether the temporary boundaries of the project are clearly defined.</i> | | | | | |
| C.1.1. Are the project’s starting date and operational lifetime clearly defined and reasonable? | /1/ /2/ | DR | Yes. The project started on 23 April 2002 and its expected lifetime is 35 years. The project’s starting date was evidenced by the ANEEL’s Concession Contract (No. 19/2002) dated 23 April 2002. | | OK |
| C.1.2. Is the assumed crediting time clearly defined (renewable crediting period of seven years with two possible renewals or fixed crediting period of 10 years with no renewal)? | /1/ /2/ | DR | A renewable 7-year crediting period was selected starting on 09 April 2005. | | OK |

| Checklist Question | Ref. | MoV* | Comments | Draft Concl | Final Concl |
|---|-------------------|------|--|-------------|-------------|
| <p>D. Monitoring Plan</p> <p><i>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).</i></p> | | | | | |
| <p>D.1. Monitoring Methodology</p> <p><i>It is assessed whether the project applies an appropriate baseline methodology.</i></p> | | | | | |
| D.1.1. Is the monitoring methodology previously approved by the CDM Executive Board? | /1/ /2/ /6/ | DR | Yes. The project applies the approved consolidated monitoring methodology ACM0002 - “Consolidated monitoring methodology for zero-emissions grid-connected electricity generation from renewable sources”. | | OK |
| D.1.2. Is the monitoring methodology applicable for this project and is the appropriateness justified? | /1/ /2/ /6/ | DR | The monitoring methodology ACM0002 is applicable to grid-connected renewable power generation project activities that apply for electricity capacity additions from hydro power plants without increasing the volume of the reservoirs. ACM0002 is thus, applicable to the hydroelectric plant of the project. | | OK |
| D.1.3. Does the monitoring methodology reflect good monitoring and reporting practices? | /1/ /2/ | DR | Yes, it complies with parameters established in the monitoring methodology. | | OK |
| D.1.4. Is the discussion and selection of the monitoring methodology transparent? | /1/ /2/ | DR | Yes. | | OK |

* MoV = Means of Verification, DR= Document Review, I= Interview

| Checklist Question | Ref. | MoV* | Comments | Draft Concl | Final Concl |
|---|------------|------|---|-------------|-------------|
| D.2. Monitoring of Project Emissions <i>It is established whether the monitoring plan provides for reliable and complete project emission data over time.</i> | | | | | |
| 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/ /2/ | DR | The project consists of a hydroelectric plant and no project emissions are foreseen. | | OK |
| D.3. Monitoring of Leakage <i>It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.</i> | | | | | |
| D.3.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage? | /1/ /2/ | DR | Emissions from construction and transportation were considered insignificant. | | OK |
| D.4. Monitoring of Baseline Emissions <i>It is established whether the monitoring plan provides for reliable and complete project emission data over time.</i> | | | | | |
| 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/ /2/ | DR | The monitoring plan for determining emission reductions is based on monitoring the energy generated to the grid, which can be cross-checked with sales/dispatch receipts. The electricity baseline emission factor will for the first crediting period be updated annually ex-post for the year in which actual project generation and associated emissions reductions occur. For | GL-5 | OK |

* MoV = Means of Verification, DR= Document Review, I= Interview

| Checklist Question | Ref. | MoV* | Comments | Draft Concl | Final Concl |
|--|-------------------|------|--|-------------|-------------|
| | | | subsequent crediting periods it will be calculated ex-ante. It has to be clearly stated that: a) data should be archived during the crediting period and two years after; b) the electricity supplied by the project activity to the grid should be double checked by receipt of sales and c) the definition of responsibilities (operational and management structure) for plant monitoring and calibration of monitoring equipment. | | |
| D.5. Monitoring of Sustainable Development Indicators/ Environmental Impacts <i>It is checked that choices of indicators are reasonable and complete to monitor sustainable performance over time.</i> | | | | | |
| D.5.1. Does the monitoring plan provide the collection and archiving of relevant data concerning environmental, social and economic impacts? | /1/ /2/ /6/ | DR | Neither ACM0002 nor the Brazilian DNA requires monitoring of sustainable development indicators. | | OK |
| D.6. Project Management Planning <i>It is checked that project implementation is properly prepared for and that critical arrangements are addressed.</i> | | | | | |
| D.6.1. Is the authority and responsibility of project management clearly described? | /1/ /2/ | DR | It has to be clearly stated that: a) data should be archived during the crediting period and two years after; b) the electricity supplied by the project activity to the grid should be double checked by receipt of sales and c) the definition of responsibilities (operational and management structure) for | CL-5 | OK |

* MoV = Means of Verification, DR= Document Review, I= Interview

| Checklist Question | Ref. | MoV* | Comments | Draft Concl | Final Concl |
|---|------------|------|---|-------------|-------------|
| | | | plant monitoring and calibration of monitoring equipment. | | |
| D.6.2. Is the authority and responsibility for registration, monitoring, measurement and reporting clearly described? | /1/ /2/ | DR | See D.6.1. | CL-5 | OK |
| D.6.3. Are procedures identified for training of monitoring personnel? | /1/ /2/ | DR | See D.6.1. | CL-5 | OK |
| D.6.4. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions? | /1/ /2/ | DR | See D.6.1. | CL-5 | OK |
| D.6.5. Are procedures identified for calibration of monitoring equipment? | /1/ /2/ | DR | See D.6.1. | CL-5 | OK |
| D.6.6. Are procedures identified for maintenance of monitoring equipment and installations? | /1/ /2/ | DR | See D.6.1. | CL-5 | OK |
| D.6.7. Are procedures identified for monitoring, measurements and reporting? | /1/ /2/ | DR | See D.6.1. | CL-5 | 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/ /2/ | DR | See D.6.1. | CL-5 | OK |
| D.6.9. Are procedures identified for dealing with possible monitoring data adjustments and uncertainties? | /1/ /2/ | DR | See D.6.1. | CL-5 | OK |
| D.6.10. Are procedures identified for review of reported results/data? | /1/ /2/ | DR | See D.6.1. | CL-5 | OK |
| D.6.11. Are procedures identified for internal audits of GHG project compliance with operational requirements where applicable? | /1/ /2/ | DR | See D.6.1. | CL-5 | OK |
| D.6.12. Are procedures identified for project performance reviews before data is submitted | /1/ /2/ | DR | See D.6.1 | CL-5 | OK |

* MoV = Means of Verification, DR= Document Review, I= Interview

| Checklist Question | Ref. | MoV* | Comments | Draft Concl | Final Concl |
|--|------------|------|--|-------------|-------------|
| for verification, internally or externally? | | | | | |
| D.6.13. Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting? | /1/ /2/ | DR | See D.6.1 | CL-5 | OK |
| E. Calculation of GHG Emissions by Source <i>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.</i> | | | | | |
| E.1. Project GHG Emissions <i>The validation of ex-ante estimated project GHG emissions focuses on transparency and completeness of calculations.</i> | | | | | |
| E.1.1. Are all aspects related to direct and indirect GHG emissions captured in the project design? | /1/ /2/ | DR | The project consists of a hydroelectric plant and no project emissions are expected. | | OK |
| E.2. Leakage <i>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 and estimated ex-ante.</i> | | | | | |
| E.2.1. Are potential leakage effects beyond the chosen project boundaries properly identified? | /1/ /2/ | DR | No leakage from these activities was identified. See D.3.1. | | OK |

* MoV = Means of Verification, DR= Document Review, I= Interview

| Checklist Question | Ref. | MoV* | Comments | Draft Concl | Final Concl |
|---|--------------------------|------|--|--------------|-------------|
| E.3. Baseline Emissions <i>The validation of ex-ante estimated baseline GHG emissions focuses on transparency and completeness of calculations.</i> | | | | | |
| E.3.1. Have the most relevant and likely operational characteristics and baseline indicators been chosen as reference for baseline emissions? | /1/ /2/ /3/ /6/ | DR | The calculation of BM emission coefficient must be updated with regard to the requirements contained in the latest version of ACM0002, i.e. if 20% falls on part capacity of a plant, that plant is fully included in the calculation. Moreover, the OM emission coefficient must be determined as the generation weighted average of the OM emission coefficients determined for the years 2002-2004. | CAR-1 | OK |
| E.3.2. Are the baseline boundaries clearly defined and do they sufficiently cover sources and sinks for baseline emissions? | /1/ /2/ | DR | See B.2.2. | | OK |
| E.3.3. Are the GHG calculations documented in a complete and transparent manner? | /1/ /2/ | DR | See.E.3.1 | | OK |
| E.3.4. Have conservative assumptions been used when calculating baseline emissions? | /1/ /2/ | DR | See.E.3.2. | | OK |
| E.3.5. Are uncertainties in the GHG emission estimates properly addressed in the documentation? | /1/ /2/ | DR | See.E.3.1. | | OK |
| E.3.6. Have the project baseline(s) and the project emissions been determined using the same appropriate methodology and conservative assumptions? | /1/ /2/ | DR | For project baseline, see E.3.1. For project emissions, see E.1.1. | | OK |

* MoV = Means of Verification, DR= Document Review, I= Interview

| Checklist Question | Ref. | MoV* | Comments | Draft Concl | Final Concl |
|---|--------------------------|------|---|-------------|-------------|
| E.4.Emission Reductions <i>Validation of ex-ante estimated emission reductions.</i> | | | | | |
| E.4.1. Will the project result in fewer GHG emissions than the baseline scenario? | /1/ /2/ /3/ /6/ | DR | The project is expected to reduce CO ₂ emissions to the extent of 416 395 tCO ₂ e (59 485 tCO ₂ e / year average) over the crediting period. | | OK |
| F. Environmental Impacts <i>Documentation on the analysis of the environmental impacts will be assessed, and if deemed significant, an EIA should be provided to the validator.</i> | | | | | |
| F.1.1. Has an analysis of the environmental impacts of the project activity been sufficiently described? | /1/ /2/ | DR | DNV requests documented evidences of the Installation and Operation Environmental Licenses. | CL-1 | OK |
| F.1.2. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved? | /1/ /2/ | DR | See F.1.1. | CL-1 | OK |
| F.1.3. Will the project create any adverse environmental effects? | /1/ /2/ | DR | No significant environmental impacts are expected to be created. Given the nature of the project design this is reasonable. | | OK |
| F.1.4. Are transboundary environmental impacts considered in the analysis? | /1/ /2/ | DR | Not foreseen. | | OK |
| F.1.5. Have identified environmental impacts been addressed in the project design? | /1/ /2/ | 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/ /2/ | DR | See F.1.1. | | OK |

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| Checklist Question | Ref. | MoV* | Comments | Draft Concl | Final Concl |
|---|------------|------|---|-----------------|-------------|
| G. Stakeholder Comments | | | | | |
| <i>The validator should ensure that a stakeholder comments have been invited and that due account has been taken of any comments received.</i> | | | | | |
| G.1.1. Have relevant stakeholders been consulted? | /1/ /2/ | DR | Local stakeholders should be invited to comment on the project, in accordance with the requirements of Resolution 1 of the Brazilian DNA. | CL-2 | OK |
| G.1.2. Have appropriate media been used to invite comments by local stakeholders? | /1/ /2/ | DR | See G.1.1 | CL-2 | 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/ /2/ | DR | See G.1.1 | CL-2 | OK |
| G.1.4. Is a summary of the stakeholder comments received provided? | /1/ /2/ | DR | See G.1.1 | CL-2 | OK |
| G.1.5. Has due account been taken of any stakeholder comments received? | /1/ /2/ | DR | See G.1.1 | CL-2 | OK |

* MoV = Means of Verification, DR= Document Review, I= Interview

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 |
|--|---------------------------------|--|---|
| <p>CAR 1 The calculation of BM emission coefficient must be updated with regard to the requirements contained in the latest version of ACM0002, i.e. if 20% falls on part capacity of a plant, that plant is fully included in the calculation. Moreover, the OM emission coefficient must be determined as the generation weighted average of the OM emission coefficients determined for the years 2002-2004.</p> | <p>B.2.1 E.3.1</p> | <p>The calculation of BM emission coefficient was updated with regard to the requirements contained in Version 6 of ACM0002, i.e. if 20% falls on part capacity of a plant, that plant is fully included in the calculation. Also, the PDD was revised according to the most recent version of ACM0002, Version 6.</p> | <p>The PDD was revised to DNV's satisfaction and the Spreadsheet of Calculation of Combined Margin (BR NNE 2002-2004 2006.05.23.xls) was submitted. This CAR is therefore closed.</p> |
| <p>CL 1 DNV requests documented evidences of the Installation and Operation Environmental Licenses.</p> | <p>A.3.1 F.1.1 F.1.2</p> | <p>Copies of the Installation and Operation Environmental Licenses were provided to the DOE.</p> | <p>Votorantim Cimentos Ltda. has been granted a Precarious Operation Environmental License No. 4688, issued on 07 September 2004 by CRA after all possible environmental impacts were analyzed. Moreover, the Operation Environmental License No. 5068, issued on 07 January 2005, was renewed by CRA on 13 February 2005 (renewal No. 5206 /4/) with validity until 13 February 2009. This CL is therefore closed.</p> |
| <p>CL 2 Local stakeholders should be invited to comment on the project, in accordance with the requirements of Resolution 1 of the Brazilian DNA.</p> | <p>A.3.2 G.1.1 to G.1.5</p> | <p>Local stakeholders have been invited to comment on the project by mail, as evidenced by the AR (Avisos de Recebimento) provided to the DOE. The PDD was revised containing the list of stakeholders invited.</p> | <p>OK. Evidence of the letters sent to local stakeholders was provided and the consulted local organizations and institutions are mentioned in the revised PDD. This CL is therefore closed.</p> |

| Draft report corrective action requests and requests for clarifications | Ref. to Table 2 | Summary of project participants’ response | Final conclusion |
|--|--------------------------|---|---|
| <p>CL 3 DNV requests clarifications on the reservoir area (rectification) as per ANEEL Resolution 293 dated 06 March 2006.</p> | A.3.1 | <p>Project proponents clarify that the total area of the reservoir did not change due to project implementation. ANEEL Resolution 293 dated 06 March 2006 only rectifies the distribution of flooded area among the cities affected by the reservoir. This is to correct the payment of royalties to the cities due to the use of water resources (Compensação Financeira pela Utilização de Recursos Hídricos para fins de Geração de Energia Elétrica).</p> | <p>Clarifications requested were provided to DNV’s satisfaction. This CL is therefore closed.</p> |
| <p>CL 4 DNV requests clarifications with regard to the project participant name, “Votorantim Cimento S/A”, mentioned in ANNEX 1.</p> | A.3.1 | <p>The hydro plant belongs to Votorantim Cimentos Ltda which is a project participant and is administered by Votorantim Energia Ltda which is not a project participant. Both companies are subsidiaries of Grupo Votorantim.</p> | <p>Clarifications requested were provided and PDD (02 August 2006) was revised to DNV’s satisfaction. This CL is therefore closed.</p> |
| <p>CL 5 It has to be clearly stated that: a) data should be archived during the crediting period and two years after; b) the electricity supplied by the project activity to the grid should be double checked by receipt of sales and c) the definition of responsibilities (operational and management structure) for plant monitoring and calibration of monitoring equipment.</p> | D.4.1 D.6.1 to D.6.13 | <p>The PDD was revised including the information requested.</p> | <p>The PDD (02 August 2006) was revised to DNV’s satisfaction. This CL is therefore closed.</p> |
| <p>CL 6 However, further evidence is requested that shows that the CDM was seriously considered as the factor in the decision to implement the project.</p> | B.2.7 | <p>The PDD was revised to include further evidence.</p> | <p>Evidence that the CDM was seriously considered as the factor in the decision to implement the project is evidenced by the Cement Sustainability Initiative - Agenda for Action dated July 2002</p> |

| Draft report corrective action requests and requests for clarifications | Ref. to Table 2 | Summary of project participants’ response | Final conclusion |
|--|-----------------|--|--|
| | | | <p>(from the World Business Council for Sustainable Development - WBCSD) to which Votorantim Cimentos is signatory and since the beginning of the Initiative (July 1999), the company started to define strategies in order to meet that agenda. Group Votorantim is also associated to the Brazilian Enterprise Council for Sustainable Development (CEBDS - Conselho Empresarial Brasileiro para o Desenvolvimento Sustentável), a representative of the WBCSD in Brazil, founded in 1997. An article dated 17 June 2001 mentions some highlights of their annual reunion where discussions about climate change, ecoefficiency, etc, were carried out, confirming some actions before issuing the Agenda for Action of July 2002. Moreover, minutes of a meeting among Votorantim, Ecoinvest and an expert (Prof. J. R. Moreira), dated 23 August 2002, evidences discussions about the renewable sources electrical generation potential (biomass, hydro, etc). In DNV’s opinion, sufficient evidence has been provided that one of the objectives of the project was to mitigate climate change.</p> <p>This CL is therefore closed</p> |
| <p>CL 7 DNV requests further evidences of the IRR calculation, of the BNDES financing and the</p> | B.2.7 | Evidences of IRR calculation and BNDES financing were provided to the DOE. Project participants clarify that | Evidences of IRR’s calculations (CC 2 - Pedra do Cavalo_BNDES_030213B.xls), |

| Draft report corrective action requests and requests for clarifications | Ref. to Table 2 | Summary of project participants’ response | Final conclusion |
|---|-----------------|--|--|
| PPA. | | Votorantim Cimentos Ltda. does not have a PPA because UHE Pedra do Cavalo is dedicated to self-production, i.e., the hydro plant supplies all of its energy to Votorantim Cimentos Ltda. which is the project owner. Evidence of this fact is presented in the public concession contract between Votorantim Cimentos Ltda. and ANEEL (Brazilian regulatory agency) provided to the DOE. | BNDES’ financing and ANEEL’s concession contract provided to DNV’s satisfaction. This CL is therefore closed. |

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