VALIDATION REPORT

QUIMVALE AND GAS NATURAL FUEL SWITCH PROJECT, BRAZIL

REPORT NO. 2006-0649

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DET NORSKE VERITAS

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VALIDATION REPORT

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Summary:

Det Norske Veritas Certification Ltd. (DNV) has performed a validation of the "Quimvale and Gas Natural Fuel Switch 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, the simplified modalities and procedures for small-scale CDM project activities 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.

In summary, it is DNV's opinion that the project, as described in the project design document of *29 September 2006*, meets all relevant UNFCCC requirements for the CDM, is eligible as category AMS-III.B CDM project activity and correctly applies the methodology. Hence, DNV requests the registration of the "Quimvale and Gas Natural Fuel Switch Project" 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 the DNA of Brazil and Spain, including confirmation by the DNA of Brazil that the project assists in achieving sustainable development.

Report No.: 2006-0649	Subject Group: Environment	
Report title: Quimvale and Gas Natural Fuel Switch Project, Brazil		
Work carried out by: Luis Filipe Tavares, Soumik Biswas		
Work verified by: Susanne Haefeli		
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Abbreviations

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
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
FEEMA	State Environmental Agency
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
NGO	Non-governmental Organisation
ODA	Official Development Assistance
PDD	Project Design Document
UNFCCC	United Nations Framework Convention on Climate Change

1 INTRODUCTION

Quimvale and Gas Natural have commissioned Det Norske Veritas Certification Ltd. (DNV) to validate the "Quimvale and Gas Natural Fuel Switch Project" at Barra do Pirai Municipality; Rio de Janeiro State, Brazil, (hereafter called "the project").

The validation team consisted of the following personnel:

Mr. Luis Filipe Tavares	DNV Rio de Janeiro	CDM auditor
Mr. Soumik Biswas	DNV Kolkata	CDM auditor
Ms. Susanne Haefeli	DNV Oslo	Team leader, Technical reviewer
Mr. Michael Lehmann	DNV Oslo	Sector expert

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 the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords and the relevant decisions by the CDM Executive Board. The validation team has, based on the recommendations in the Validation and Verification Manual /5/, and employed 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/or corrective actions may have provided input for improvement of the project design

1.3 Description of Proposed CDM Project

Quimvale is a chemical installation that produces $CaCO_3$ (precipitate). In order to produce $CaCO_3$, a sequence of chemical reactions and a drying out process for the final product are required. The project activity consists of the investment in adapting the previous boiler (used for the drying out process), which utilized fuel oil to one which utilizes natural gas.

The estimated amount of GHG emission reductions from the project is calculated to be 116 520 tCO_2e during the fixed 10 years credit period, resulting in estimated average annual emission reductions of 11 652 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 "Quimvale and Gas Natural Fuel Switch Project" 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			
Draft 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 PDD (version 01 of 20 December 2005) /1/ submitted by Quimvale and Gas Natural and EcoSecurities, were assessed by DNV. Further background documents regarding the boiler's remaining lifetime, fuel prices and the baseline data were consulted by DNV /3/. A revised version of the PDD /2/ dated 14 April 2006 was submitted to address DNV's initial validation findings and was reviewed by DNV. Following the Brazilian DNA' requests for changes to the Project Design Document, a revised version has been sent in on 29th of September 2006.

The following changes have been made between the PDD version published for the 30 days stakeholder comments period and the one submitted for registration:

- Clarifications on project participant's name
- Elaboration of the additionality discussion to increase transparency
- Reference to Brazil's environmental legislation
- Adjustment to latest methodology version
- Editing of energy units
- Adjustment of net calorific value (NCV) for natural gas and thus re-calculation of project emissions and emission reductions.

2.2 Follow-up Interviews

On 07 April 2006, DNV performed interviews with Quimvale and EcoSecurities during a site visit at the Quimvale plant at Barra do Piraí municipality, Rio de Janeiro State, to confirm and to resolve issues identified in the document review. The following issues were addressed:

- Efficiency of fuel oil and natural gas consumption (receipts of combustible and steam production);
- Fuel oil and natural gas prices and purchase contracts;
- Boilers, ovens, heaters and other equipments capacity;
- Investment made and consideration of the CDM in the decision to implement the project;
- Cash flow analysis and NPV;
- Baseline emission calculations;
- Calibration requirements.

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 3 Corrective Actions Requests (CARs). The project participant's response to DNV's draft validation report findings, including the submission of a revised PDD in January 2006, addressed the CARs to DNV's satisfaction. To guarantee the transparency of the validation process, the concerns raised are documented in Table 3 of 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 validation findings relate to the PDD version 03 dated 29 September 2006.

3.1 Participation Requirements

The project participants are Quimvale of Brazil and Gas Natural SDG S.A. of Spain. The host Party Brazil and the Annex I Party Spain meet all relevant participation requirements.

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 Spain, including confirmation by the DNA of Brazil that the project assists in achieving sustainable development.

It has been confirmed that no ODA is involved in this project activity.

3.2 Project Design

The project activity is a fuel switch program that is based on the conversion of an existing boiler. The conversion is related to adaptations and modifications, allowing the use of natural gas instead of fuel oil. It has been verified that this process will not increase the production capacity nor the estimated remaining lifetime of the equipment. It has been verified that sufficient training has been administered to the operating personnel so as to assure the correct handling of the modified boiler.

The starting date of the project and the crediting period is 1 March 2003 and this date has been verified. The length of the crediting period is 10 years.

3.3 Project Baseline

The baseline is established according to the simplified baseline methodology for category III.B small-scale CDM project activities, version 9. The baseline emission coefficient is determined based on the fuel oil consumption and the calcium carbonate produced from January 2001 to February 2003 i.e. prior to the fuel switch being implemented. The ratio of 3.567 $tCaCO_3/t$ of oil has been verified and is fixed ex-ante for the entire crediting period. The net calorific value of fuel oil has been obtained from Brazilian official data: National Energy Balance /7/ and the IPCC value has been applied for the carbon content and oxidation factor.

It has been verified that the project is not a debundled component part of a large-scale project and that the methodology is applicable to the project activity.

3.4 Additionality

A barrier analysis has been presented in the PDD and assessed by DNV:

Financial barrier: The price for natural gas is 8% higher per energy unit than for fuel oil, based on the average prices for both fuels during the years 2000 and 2002 /4/.

Other barrier: Further, natural gas supply disruptions represent a risk to the production of $CaCO_3$ whereas fuel oil can be stored on site.

Hence, it is from these presented barriers sufficiently demonstrated that the project is not a likely baseline scenario and that emission reductions attributable to the project are additional.

3.5 Monitoring Plan

The project correctly applies the simplified monitoring methodology described for category III.B small-scale CDM project activities, version 9. The quantity of natural gas and production of $CaCO_3$ will be measured continuously during the crediting period. The net calorific value of the natural gas has been and continues to be obtained from the fuel supplier, CEG, based on monthly lab analysis. The same is true for the density and the methane content in the natural gas supplied, measured on line by CEG. IPCC default values have been applied for the carbon content and oxidation factors. All data will be kept until two years after the end of the crediting period.

Responsibilities and authorities for project management, monitoring procedures and QA/QC procedures are assured by the company's ISO 9001:2000 Quality Management System.

3.6 Calculation of GHG Emissions

The forecast emission reductions were based on 2004's $tCaCO_3$ production, the baseline $tCaCO_3$/t oil ratio, the 2004 natural gas consumption, density and net calorific value. The baseline coefficient is fixed ex-ante, whereas the project coefficient will be measured ex-post. The underlying values have been verified during the site visit. The *ex-ante* estimates of 3 567 $tCaCO_3$/ t fuel oil and 0,00368 $tCaCO_3$/ m^3 natural gas are thus deemed appropriate and conservative. The forecast annual emission reductions thus amount to 11 652 tCO_2.

3.7 Environmental Impacts

The fuel switch has rather positive environment impacts because of the reduced sulfur emissions to the atmosphere.

Quimvale has the Environment Operation License # 600/98 issued on 17/11/1998 and valid until 17/11/2003. On 15/07/03 Quimvale requested a new license from FEEMA (the State Environment Agency) registered as Proc. 202603/03 and including the natural gas system to the boiler. A new license is not yet issued, however according the notification from FEEMA, the process is under review and the compliance of Quimvale with environment legislation is accepted.

3.8 Comments by Local Stakeholders

Local stakeholders, such as the Municipal Government, the state and municipal agencies, the Brazilian forum of NGOs, neighboring 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 sufficient involvement of local stakeholders has been verified by copies sent to DNV.

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

The PDD of 20 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 Quimvale and Gas Natural Fuel Switch Project at Barra do Piraí Municipality, Rio de Janeiro State, Brazil. The validation was performed on the basis of UNFCCC criteria for CDM project activities, small-scale CDM projects and relevant Brazilian criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting and subsequent EB decisions.

The project participants are Quimvale of Brazil and Gas Natural SDG S.A. of Spain. The host Party Brazil and the Annex I Party Spain meet all relevant participation requirements.

Quimvale is a calcium carbonate producer. The project comprises fuel oil replacement with natural gas by refurbishment of a boiler.

The baseline scenario assumes that fuel oil would continue to be used during the crediting period. Emission reductions will thus be achieved through the use of natural gas, a fuel with a carbon emission factor that is lower than the carbon emission factor of the previously used fuel, fuel oil. By promoting the use of a cleaner fuel, the project is in line with the current sustainable development priorities of Brazil.

The project applies the appropriate simplified baseline methodology AMS-III.B, version 9. 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 project's application of the methodology is correct and the determination of the baseline is transparent and IPCC default emission factors are correctly used.

The monitoring methodology has been correctly applied. The monitoring plan sufficiently specifies the monitoring requirements of the main indicators. Responsibilities and authorities for project management, monitoring procedures and QA/QC procedures are assured by the company's ISO 9001:2000 Quality Management System.

The forecast emission reductions are based on accurate data and realistic assumptions. Given the continuous operation as planned, the project will result in emission reductions that are real, measurable and contribute to the long-term goal of mitigating climate change.

Local stakeholder comments were invited according to the Brazilian DNA Resolution 1. Public stakeholder input has also been invited via the UNFCCC web-site, but no comments have been received.

In summary, it is DNV's opinion that the Quimvale and Gas Natural Fuel Switch Project, as described in the revised and resubmitted project design document of 29 September 2006, meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the baseline and monitoring methodology AMS-III.B version 9. Hence, DNV requests the registration of the Quimvale and Gas Natural Fuel Switch 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 THE DNA OF BRAZIL AND SPAIN, 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/ Quimvale and Gas Natural and EcoSecurities: Project Design Document for the Quimvale and Gas Natural Fuel Switch Project Version 1 (20 December 2005).

/2/ Quimvale and Gas Natural and EcoSecurities: Project Design Document for the Quimvale and Gas Natural Fuel Switch Project Version 2 (14 April 2006).

/3/ Quimvale and Gas Natural and EcoSecurities: Project Design Document for the Quimvale and Gas Natural Fuel Switch Project Version 3 (29 September 2006).

/4/ Quimvale Fuel price and emissions calculation datasheet.

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/ Appendix B of the simplified modalities and procedures for small-scale CDM project activities: *Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories, Type III.B "Switching fossil fuels*. Version 09, 28 July 2006.

/7/ Brazilian Mines and Energy Ministry: *Balanço Energético Nacional - BEN 2004 (Brazilian Energy Data Profile), Item 1.3Unidades* *http://www.mme.gov.br/site/menu/select_main_menu_item.do?channelId=1432&pageId=4060*

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

/8/ Pedro Muniz – Quimvale

/9/ Rodrigo Brandão – Quimvale

/10/ Michiel ten Hoopen – Ecosecurities

/11/ Luis Filipe Kopp – Ecosecurites

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APPENDIX A

VALIDATION PROTOCOL
FOR SMALL-SCALE CDM PROJECT ACTIVITIES

Table 1 Mandatory Requirement for Small Scale 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 Gas Natural SDG SA of Spain as participating Annex I project participant.
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, Simplified Modalities and Procedures for Small Scale CDM Project Activities §23a		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 the DNA of Brazil and Spain, including 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.4.1
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, Simplified Modalities and Procedures for Small Scale CDM Project Activities §23a		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 Spain, including confirmation by the DNA of Brazil that the project assists in achieving sustainable development.
5. The emission reductions should 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.1 to E.4
6. Reduction in GHG emissions must 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	Kyoto Protocol Art. 12.5.c, Simplified Modalities and Procedures for Small Scale CDM Project Activities §26	OK	Table 2, Section B.2.1

Requirement	Reference	Conclusion	Cross Reference/ Comment
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 from Spain is involved.
8. Parties participating in the CDM shall designate a national authority for the CDM	CDM Modalities and Procedures § 29	OK	The Ministerio de Medio Ambiente is the DNA of Spain. The Ministry of Environment is the DNA of Brazil.
9. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol	CDM Modalities and Procedures § 30, 31b	OK	Brazil ratified the Kyoto Protocol on 23rd August 2002. Spain ratified the Kyoto protocol on 31st May 2002.
10. The participating Annex I Party's assigned amount shall have been calculated and recorded	CDM Modalities and Procedures §31b	NA	
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	
12. The proposed project activity shall meet the eligibility criteria for small scale CDM project activities set out in § 6 (c) of the Marrakesh Accords and shall not be a debundled component of a larger project activity	Simplified Modalities and Procedures for Small Scale CDM Project Activities §12a,c	OK	Table 2, Section A.1
13. The project design document shall conform with the Small Scale CDM Project Design Document format	Simplified Modalities and Procedures for Small Scale CDM Project Activities, Appendix A	OK	PDD is in accordance with CDM-SSC-PDD (version 02 of 8 July 2005).
14. The proposed project activity shall confirm to one of the project categories defined for small scale CDM	Simplified Modalities and Procedures for Small Scale	OK	Table 2, Section A.1.3, B and D

Requirement	Reference	Conclusion	Cross Reference/ Comment
project activities and uses the simplified baseline and monitoring methodology for that project category	CDM Project Activities §22e		
15. Comments by local stakeholders are invited, and a summary of these provided	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22b	OK	Table 2, Section G
16. If required by the host country, an analysis of the environmental impacts of the project activity is carried out and documented.	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22c	OK	Table 2, Section F
17. Parties, stakeholders and UNFCCC accredited NGOs have been invited to comment on the validation requirements and comments have been made publicly available	Simplified Modalities and Procedures for Small Scale CDM Project Activities §23b,c,d	OK	The PDD was made publicly available on www.dnv.com/certification/climatechange and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during the period of 30 December to 28 January 2006.

Table 2 Requirements Checklist

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
A. **Project Description** The project design is assessed.					
A.1. Small scale project activity It is assess whether the project qualifies as small scale CDM project activity.					
A.1.1. Does the project qualify as a small scale CDM project activity as defined in paragraph 6 (c) of decision 17/CP.7 on the modalities and procedures for the CDM?	/1/	DR	The project involves a fuel switch from fuel oil to natural gas and hence reduces anthropogenic emissions from sources and directly emits less than 15 kilotonnes of CO_2 e annually. Hence the project falls under category III.B of small-scale project activities.		OK
A.1.2. The small scale project activity is not a debundled component of a larger project activity?	/1/	DR, I	It has been confirmed that the project is not a debundled part of a large-scale project.		OK
A.1.3. Does proposed project activity confirm to one of the project categories defined for small scale CDM project activities?	/1/	DR	Yes. The project falls under category III. B of small scale project activities.		OK
A.2. Project Design Validation of project design focuses on the choice of technology and the design documentation of the project.					
A.2.1. Are the project's spatial (geographical) boundaries clearly defined?	/1/	DR	Yes, the project is situated in Barra do Pirai in the State of Rio de Janeiro of Brazil.		OK
A.2.2. Are the project's system (components and facilities used to mitigate GHG's)	/1/	DR	The project's system boundaries include the actual Quimvale installation where the fuel switch is taking		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
boundaries clearly defined?			place.		
A.2.3. Does the project design engineering reflect current good practices?	/1/	DR	The project is unlikely to be replaced by other more efficient technologies, at least within the 10-year crediting period.		OK
A.2.4. Will the project result in technology transfer to the host country?	/1/	DR	No, the technology used is produced in Brazil.		OK
A.2.5. Does the project require extensive initial training and maintenance efforts in order to work as presumed during the project period? Does the project make provisions for meeting training and maintenance needs?	/1/	DR	The project does not require extensive initial training or maintenance efforts. The minimal amount of training that will be required will be provided by Quimvale.		OK
A.3. Contribution to Sustainable Development The project's contribution to sustainable development is assessed					
A.3.1. Will the project create other environmental or social benefits than GHG emission reductions?	/1/	DR	The project will create temporary job opportunities during the modification of the boiler from fuel oil fired to natural gas fired.		OK
A.3.2. Will the project create any adverse environmental or social effects?	/1/	DR	The project is not likely to create any adverse environmental or social effects.		OK
A.3.3. Is the project in line with sustainable development policies of the host country?	/1/	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 confirmation by the DNA of Brazil that the project assists in achieving		

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			sustainable development.		
A.3.4. Is the project in line with relevant legislation and plans in the host country?	/1/	DR	Yes		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 selected baseline methodology in line with the baseline methodologies provided for the relevant project category?	/1/	DR	The baseline for the project has been selected as the emissions from fuel oil consumptions in the boiler prior to the fuel switch. This is in line with the baseline methodology provided for AMS-3 B. The latest methodology version has been adopted in the PDD.		OK
B.1.2. Is the baseline methodology applicable to the project being considered?	/1/	DR	Yes..		OK
B.2. Baseline Determination It is assessed whether the project activity itself is not a likely baseline scenario and whether the selected baseline represents a likely baseline scenario.					
B.2.1. Is it demonstrated that the project activity itself is not a likely baseline scenario due to the existence of one or more of the	/1/	DR, I	During the interviews it has been clarified that at the time of the decision being taken, the project	~~CAR 1~~	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
following barriers: investment barriers, technology barriers, barriers due to prevailing practice or other barriers?			faced two major barriers: - A financial barrier in that the price per kcal for natural gas was higher than for heavy fuel oil. The prices for the natural gas from 2000 to 2002 i.e. before the project started are based on information received from CEG, the natural gas supplier. Prices for the fuel oil from 2000 to 2002 are based on invoices to Quimvale before the project implementation. - A barrier due to the risk of supply interruption; the supply of natural gas is at higher risk than the supply of fuel oil because natural gas is provided from another country and is transported via pipelines. Fuel oil can be stored on-site. DNV confirms the relevance of these two barriers in the project's context. However, the respective part in the PDD should be revised to clearly represent the actual situation.		
B.2.2. Is the application of the baseline methodology and the discussion and determination of the chosen baseline transparent and conservative?	/1/	DR	The discussion of the selected baseline has been done in a transparent manner. The ratio of $CaCO_3$ to fuel oil is 3.567 and has been calculated based on all $CaCO_3$ produced and fuel oil consumption from jan/01 to feb/03.		OK
B.2.3. Are relevant national and/or sectoral policies and circumstances taken into account?	/1/	DR	All the national and/or sectoral policies implemented during the initial phase were considered.		OK
B.2.4. Is the baseline selection compatible with the available data?	/1/	DR	Yes, the baseline has been established on historical data.		OK
B.2.5. Does the selected baseline represent the	/1/	DR	See B.2.1		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
most likely scenario describing what would have occurred in absence of the project activity?					
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?	/1/	DR, I	The starting date of the project is 1st March 2003 according to the first receipt from CEG (natural gas supplying company). The operational lifetime of the boiler would have been in the baseline scenario and continues to be 20 years, according the manufacturer report (ATA/ Aalborg Industries SA).		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/	DR	The project selects a non-renewable crediting period of 10 years starting from 01/03 2003.		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.					
D.1. Monitoring Methodology It is assessed whether the project applies an appropriate monitoring methodology.					
D.1.1. Is the selected monitoring methodology in line with the monitoring methodologies	/1/	DR	The project selects the approved monitoring methodology AMS-IIIB.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
provided for the relevant project category?					
D.1.2. Is the monitoring methodology applicable to the project being considered?	/1/	DR	Yes, AMS-IIIB is applicable to the project since it is a fuel switch project.		OK
D.1.3. Is the application of the monitoring methodology transparent?	/1/	DR, I	Yes. IPCC default values, company level data and publicly available data have been transparently applied and verified during site visit.		OK
D.1.4. Will the monitoring methodology give opportunity for real measurements of achieved emission reductions?	/1/	DR	Same as in D.1.3		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/	DR, I	Yes. The following parameters are monitored: - volume of natural gas: continuous, cross-checked with invoices from CEG; - net calorific value and density of the natural gas: measured by CEG; - production of $CaCO_3$: continuous, cross-checked with sales records. The PDD should be revised in order to detail these monitoring requirements.	~~CAR 2~~	OK
D.2.2. Are the choices of project GHG indicators reasonable?	/1/	DR	CO_2 is the only GHG that needs to be considered.		OK
D.2.3. Will it be possible to monitor / measure the specified project GHG indicators?	/1/	DR	Yes.		OK
D.2.4. Will the indicators give opportunity for real	/1/	DR	Yes.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
measurements of project emissions?					
D.3. Monitoring of Leakage If applicable, 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/	I	There are no leakages for the project.		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/	DR, I	Yes. The volume, density and net calorific value are measured by the Natural Gas supplier and noted on the monthly invoice.		OK
D.4.2. Is the choice of baseline indicators, in particular for baseline emissions, reasonable?	/1/	DR	CO_2 is the only GHG indicator that needs to be accounted for.		OK
D.4.3. Will it be possible to monitor / measure the specified baseline indicators?	/1/	DR	Yes. The baseline coefficient of t $CaCO_3$/ t fuel oil i.e. 3.567 will be directly applied to the measured $CaCO_3$ production.		OK
D.4.4. Will the indicators give opportunity for real measurements of baseline emissions?	/1/	DR	Yes.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
D.5. Project Management Planning It is checked that project implementation is properly prepared for and that critical arrangements are addressed.					
D.5.1. Is the authority and responsibility of project management clearly described?	/1/	DR, I	Quimvale has a quality management system ISO 9001:2000 certified by BSI. The management of the CDM project is included in the quality management system.		OK
D.5.2. Is the authority and responsibility for registration monitoring measurement and reporting clearly described?	/1/	DR, I	See D.5.2		OK
D.5.3. Are procedures identified for training of monitoring personnel?	/1/	DR, I	See D.5.2		OK
D.5.4. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/	DR	There are no emergency situations that could the unintended emissions.		OK
D.5.5. Are procedures identified for calibration of monitoring equipment?	/1/	DR, I	See D.5.2		OK
D.5.6. Are procedures identified for maintenance of monitoring equipment and installations?	/1/	DR, I	See D.5.2		OK
D.5.7. Are procedures identified for monitoring, measurements and reporting?	/1/	DR, I	See D.5.2		OK
D.5.8. 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/	DR, I	See D.5.2		OK
D.5.9. Are procedures identified for dealing with	/1/	DR,	See D.5.2		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
possible monitoring data adjustments and uncertainties?		I			
D.5.10. Are procedures identified for internal audits of GHG project compliance with operational requirements as applicable?	/1/	DR, I	See D.5.2		OK
D.5.11. Are procedures identified for project performance reviews?	/1/	DR, I	See D.5.2		OK
D.5.12. Are procedures identified for corrective actions?	/1/	DR, I	See D.5.2		OK
***E.* Calculation of GHG emission** 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. Project GHG Emissions The validation of ex-ante estimated project GHG emissions focuses on transparency and completeness of calculations.					
E.1.1. Are all aspects related to direct and indirect project emissions captured in the project design?	/1/	DR	The direct emissions from the project activity involve combustion of the natural gas. There are no indirect emissions from the project activity.		OK
E.1.2. Have all relevant greenhouse gases and sources been evaluated?	/1/	DR	CO_2 is the only relevant GHG that needs to be evaluated.		OK
E.1.3. Do the methodologies for calculating project emissions comply with existing good practice?	/1/	DR, I	The project emissions are calculated from: - the natural gas consumed	~~CAR 3~~	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			- its net calorific value and - its CO_2 emission factor. It has been clarified during the follow up interviews that there is no other fuel used in case of natural gas supply interruption simply because the retrofitted boiler does not allow for the use of other fuel than natural gas. The net calorific value (NCV) of natural gas has been taken from the Brazilian Government data in the first version of the PDD. The PDD should be revised so as to adjust the NCV to the one monitored by CEG, the natural gas supplier. CEG and Quimvale have an agreement that the net calorific value must be between a specified range.		
E.1.4. Are the calculations documented in a complete and transparent manner?	/1/	DR	The calculations are documented in a complete and transparent manner.		OK
E.1.5. Have conservative assumptions been used?	/1/	DR	Yes.		OK
E.1.6. Are uncertainties in the project emissions estimates properly addressed?	/1/	DR	There are no uncertainties in the project emissions. Due to the reduction of the net calorific value, the forecast project emissions have been reduced to 8 160 t CO_2.		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 and estimated ex-ante.					
E.2.1. Are leakage calculation required for the selected project category and if yes, are the relevant leakage effects assessed?	/1/	DR	There are no leakages for the project activity.		OK
E.3. Baseline GHG Emissions The validation of ex-ante estimated baseline GHG emissions focuses on transparency and completeness of calculations.					
E.3.1. Are the baseline emission boundaries clearly defined and do they sufficiently cover sources for baseline emissions?	/1/	DR	Yes. The baseline emissions are due to the consumption of fuel oil.		OK
E.3.2. Are all aspects related to direct and indirect baseline emissions captured in the project design?	/1/	DR	The consumption of fuel oil is the only source of baseline emission. There are no indirect emissions from the baseline.		OK
E.3.3. Have all relevant greenhouse gases and sources been evaluated?	/1/	DR	CO_2 is the only GHG that needs to be evaluated.		OK
E.3.4. Do the methodologies for calculating baseline emissions comply with existing good practice?	/1/	DR, I	The emission factors are sourced from IPCC, and the PDD has been amended to include the exact reference.		OK
E.3.5. Are the calculations documented in a complete and transparent manner?	/1/	DR	Yes.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
E.3.6. Have conservative assumptions been used?	/1/	DR	Same as E.3.4		OK
E.3.7. Are uncertainties in the baseline emissions estimates properly addressed?	/1/	DR	There are no uncertainties in the baseline emissions.		OK
E.4. Emission Reductions Validation of ex-ante estimated emission reductions.					
E.4.1. Will the project result in fewer GHG emissions than the baseline case?	/1/	DR	The project is expected to reduce CO_2 emissions to the extent of 116 520 tCO_2e (11 652 tCO_2e / year average) over the 10-year crediting period.		OK
***F.* Environmental Impacts** It is assessed whether environmental impacts of the project are sufficiently addressed.					
F.1.1. Does host country legislation require an analysis of the environmental impacts of the project activity?	/1/	DR	The oil fuel switching by natural gas has less environment impacts as sulphur emissions are eliminated. Quimvale has the Environment Operation License # 600/98 issued on 17/11/1998 and valid until 17/11/2003. On 15/07/03 Quimvale requested a new license from FEEMA (the State Environment Agency) registered as Proc. 202603/03 and including the natural gas system to the boiler. A new license is not yet issued. However, according the notification from FEEMA, the process is under review and the compliance of Quimvale with environment legislation is accepted.		OK
F.1.2. Does the project comply with	/1/	DR	See F.1.1		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
environmental legislation in the host country?					
F.1.3. Will the project create any adverse environmental effects?	/1/	DR	The project is not likely to create any adverse environmental effects.		OK
F.1.4. Have environmental impacts been identified and addressed in the PDD?	/1/	DR	See F.1.1		OK
G. **Comments by Local Stakeholder** Validation of the local stakeholder consultation process.					
G.1.1. Have relevant stakeholders been consulted?	/1/	DR	The stakeholder consultation was carry out according to the Brazilian DNA Resolution 1, which defines the municipality, the Environment Agency, the Brazilian Forum of NOG's, District Attorney, and local associations. Copies of the letters were sent to DNV.		OK
G.1.2. Have appropriate media been used to invite comments by local stakeholders?	/1/	DR	See G.1.1		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/	DR	See G.1.1		OK
G.1.4. Is a summary of the comments received provided?	/1/	DR	See G.1.1		OK
G.1.5. Has due account been taken of any comments received?	/1/	DR	See G.1.1		OK

Table 3 Resolution of Corrective Action and Clarification Requests

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
CAR 1 Regarding additionality, DNV confirms the relevance of the two barriers in the project's context. However, the respective part in the PDD should be revised to clearly represent the actual situation.	B.2.1	Revised PDD version submitted to DNV.	OK The revised PDD describes the actual project context more clearly as well as the relevance of the two identified barriers for the project. It has thus been sufficiently demonstrated that the project is not a likely baseline scenario. This CAR is therefore closed.
CAR 2 The following parameters are monitored: - volume of natural gas: continuous, cross-checked with invoices from CEG; - net calorific value and density of the natural gas: measured by CEG; - production of $CaCO_3$: continuous, cross-checked with sales records. The PDD should be revised in order to detail these monitoring requirements.	D.2.1	Revised PDD version submitted to DNV.	OK The final PDD correctly states all monitoring requirements. This CAR is therefore closed.
CAR 3 The net calorific value (NCV) of natural gas has been taken from the Brazilian Government data in the first version of the PDD. The PDD should be revised so as to adjust the NCV to the one monitored by CEG, the natural gas supplier.	E.1.3	Revised PDD version submitted to DNV.	OK The actual net calorific value – measured by CEG, the natural gas supplier – has been applied in the forecast emission reduction calculations. The revised emission reductions represent thus a truer forecast.

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
			This CAR is therefore closed.

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