VALIDATION REPORT

"AÇOS VILLARES NATURAL GAS FUEL SWITCH PROJECT" IN BRZIL

REPORT NO. 2005-1171

REVISION NO. 02

DET NORSKE VERITAS

VALIDATION REPORT

Date of first issue: 2005-09-20	Project No.: 28624550 (42)
Approved by: Einar Telnes Technical Director	Organisational unit: DNV Certification, International Climate Change Services
Client: Aços Villares S.A.	Client ref.: Gumersindo Muiño

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Summary:
Det Norske Veritas Certification Ltd. (DNV) has performed a validation of the "Aços Villares Natural gas 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 and the subsequent decisions by the CDM Executive Board.
The validation consisted of the following three phases: i) a desk review of the project design and the baseline and monitoring plan, ii) follow-up interviews with project stakeholders and iii) the resolution of outstanding issues and the issuance of the final validation report and opinion.
This validation report summarizes the findings of the validation. The only changes made to this version of the validation report compared to the validation report rev. 01 dated 27 October 2005 referred to in the letter of approval of the DNA of Brazil are linked to the status of issuance of the letter of approval by the DNAs of Brazil and the United Kingdom.
In summary, it is DNV's opinion that the "Aços Villares Natural gas fuel switch project" as described in the revised PDD of 17 October 2005, meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the baseline and monitoring methodology AM0008. Hence, DNV requests the registration of the "Aços Villares Natural gas fuel switch project" as a CDM project activity.

Report No.: 2005-1171	Subject Group: Environment
Report title: "Aços Villares Natural gas fuel switch project" in Brazil	
Work carried out by: Luis Filipe Tavares, Cintia Dias	
Work verified by: Michael Lehmann	
Date of this revision: 2006-05-15	Rev. No.: 02 / Number of pages: 12

Indexing terms

Key words Climate Change Kyoto Protocol Validation Clean Development Mechanism	Service Area Verification Market Sector Process Industry

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Abbreviations

BEN	Balanço Energético Nacional (Brazilian Energy Data Profile)
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
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
LPG	Liquefied Petroleum Gas
MP	Monitoring Plan
MVP	Monitoring and Verification Plan
N_2O	Nitrous oxide
NGO	Non-governmental Organisation
ODA	Official Development Assistance
PDD	Project Design Document
UNFCCC	United Nations Framework Convention on Climate Change

1 INTRODUCTION

Aços Villares S.A. has commissioned Det Norske Veritas Certification Ltd. (DNV) to perform a validation of the "Aços Villares Natural gas fuel switch project" at Pindamonhangaba Municipality, São Paulo State, Brazil (hereafter called "the project").

This report summarises the findings of the validation of the project, performed on the basis of UNFCCC and host Party criteria for CDM projects, as well as criteria given to provide for consistent project operations, monitoring and reporting. This validation report summarizes the findings of the validation. The only changes made to this version of the validation report compared to the validation report rev. 01 dated 27 October 2005 referred to in the letter of approval of the DNA of Brazil are linked to the status of issuance of the letter of approval by the DNAs of Brazil and the United Kingdom.

The validation team consists of the following personnel:

Mr. Luis Filipe Tavares	DNV Rio de Janeiro	Team leader
Ms. Cintia Dias	DNV Rio de Janeiro	CDM auditor
Mr. Vicente San Valero	DNV Rio de Janeiro	CDM auditor
Mr. K. Chandrashekara	DNV Bangalore	Manufacturing industry sector expert
Mr. Michael Lehmann	DNV Oslo	Technical reviewer

1.1 Validation Objective

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

1.2 Scope

The validation scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against 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 **/6/**, 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 Project

Aços Villares S.A. is a steel company that operates three units in Brazil. The project is restricted to the Pindamonhangaba unit, the largest site in Brazil. Pindamonhangaba started operation in 1979, and its core business is the production of steel from scrap metal. It has been using fuel oil, LPG and electricity as the main energy sources for all the processes up to the year 2002. Aços Villares started a fuel switch process from fuel oil, LPG or electricity to natural gas in 2002. The

project activity consists of investments to adapt the existing equipment to the use of natural gas instead of fuel oil, LPG or electricity.

The estimated amount of GHG emission reductions from the project is calculated to be 190 344 tCO_2e during the first 7 years credit period, resulting in an estimated average annual emission reductions of 27 192 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 **/6/**. 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 "Aços Villares Natural gas 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 initial PDD (version 01 of 19 August 2005) /1/ submitted by Aços Villares S.A. and EcoSecurities on 09 September 2005 was reviewed by DNV. A revised version of the PDD /2/ dated 17 October 2005 was submitted to address DNV's initial validation findings and was reviewed by DNV. DNV also reviewed other project documents, such as the financial calculations and more detailed emission reduction calculations /3/.

Background documents consulted by DNV were the Brazilian Energy Data Profile (BEN) of 2004 **/8/** and the IPCC guidelines **/9/**.

2.2 Follow-up Interviews

On 27 and 28 September 2005, DNV performed interviews with Aços Villares S.A and EcoSecurities during a site visit at the Pindamonhangaba plant.

The main topics of the interviews were:

- 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;
- Additionality of the project;
- 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 is 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 one *Corrective Action Requests* and five requests for *Clarification.* 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. The project participants are invited to respond to DNV's Corrective Action Requests and request for Clarification and include their response 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 final validation findings relate to the project design as documented and described in the PDD of October 2005.

3.1 Participation Requirements

The project participants are Aços Villares S.A. of Brazil and EcoSecurities of the United Kingdom. All Parties involved, i.e., the host Party Brazil and the Annex I Party the United Kingdom meet the requirements to participate in the CDM and have provided written approval of voluntary participation in the project **/4//5/**.

3.2 Project Design

The project activity is a fuel switch program that is based on the conversion of 48 different types of equipment. The conversion is related to adaptations and modifications, allowing the use of natural gas instead of fuel oil, LPG or electricity. This process will not increase the lifetime of equipment nor the production capacity significantly.

The equipment included in the project activity is:

Villares Code	Name	Nominal capacity	Nominal Energy Consumption
UP 300- 1 and 2	Boilers Keystone 11M	19,8 tons steam/hr	12,740,000 kcal/hr
UP 520- 1, 2, 3, 4, 5	Ladle heater	80 tons/hr	1,200,000 kcal/hr
UP 600 - 1to 10	Soaking pit	45 tons/hr	3,000,000 kcal/hr
UP 600 – 12	Oven	90 tons/hr	34,800,000 kcal/hr
UP 710 – 1 and 2	Ladle heater	5 tons/hr	500,000 kcal/hr
UP 710 – 3	Ladle heater	15 tons/hr	1,000,000 kcal/hr
UP 710 – 4	Ladle heater	25 tons/hr	1,000,000 kcal/hr
UP 710 – 6, 7, 8	Stove FH	120 tons/hr	1,500,000 kcal/hr
UP 730 – 1 to 5	ToTo Oven	78 tons/hr	3,224,620 kcal/hr
UP 530 – 6	ToTo Oven	200 tons/hr	9,000,000 kcal/hr
UP 530- 9	Heating furnace F1	130 tons/hr	5,880,000 kcal/hr
UP 530- 10 and 12	Heating furnace F2 F4	250 tons/hr	10,872,000 kcal/hr
UP 600 –13	Bars heat treating furnace	44 tons/hr	3,870,000 kcal/hr Electricity
UP 530 – 2 to 5	ToTo Oven	100 tons/hr	1,100,000 kcal/hr
UP 720 – 1 to 7	ToTo Oven	100 tons/hr	1,100,000 kcal/hr
UP 630 – 1 and 2	Annealing furnace	20 tons/hr	1,200,000 kcal/hr

3.3 Project Baseline

The project applies the approved baseline methodology AM0008 - "*Industrial fuel switching from coal and petroleum fuels to natural gas without extension of capacity and lifetime of the facility*" **/7/**.

In a first analysis of the project, DNV considered that the project fulfilled only some of the applicability conditions under AM0008 with respect to the fact that: a) there is no local regulations to constraint the use of fuel oil, b) the facility would not have major efficiency improvements during the crediting period, c) the project activity does not increase the capacity of final output and lifetime of the existing facility during the crediting period and d) the project activity does not result in an integrated process change. During the site visit at the Pindamonhangaba plant DNV was able to confirm that the remaining lifetime of the equipment that was converted to natural gas is more than 20 years. The maintenance regime for the relevant equipment established by Villares would have assured the continuous operation of the equipment for more than 20 years, also if still fuelled with fuel oil and LPG. Hence, no major efficiency improvements would have been likely to occur during the project's crediting period and the project does not increase the lifetime of the existing facility.

The condition related to use of coal and/or petroleum fuels that are less expensive than natural gas per unit of energy in the country and sector was not initially confirmed: This was because official data from the Brazilian Energy Data Profile (BEN) from Mines and Energy Ministry **/8/** evidenced that the prices for natural gas were lower than the prices for fuel oil and LPG, thus contradicting the figures presented in the PDD and in the financial analysis **/3/**. Nonetheless, during the site visit several receipts were presented for heavy oil A3 previously supplied by Ipiranga Company, LPG supplied by Supergasbras to Aços Villares Pindamonhangaba and natural gas supplied by CONGAS to Aços Villares Mogi Plant in the same period the analysis (2000 and 2001). This confirmed the figures in the PDD and thus the related applicability condition of AM0008.

The project's application of the methodology is correct and the determination of the baseline is transparent considering IPCC default emission factors.

The methodology establishes that the fuel efficiency factor for natural gas (project scenario) should be measured at the early stage of the project for each process and should be calculated based on measurements with several load factors in order to get a curve for fuel efficiency values with statistical significance. The PDD mentions that the curves with significant statistical values will be presented during the verification. Hence, the measurement of natural gas consumption and respective capacity/output of the individual equipments and calculations of each natural gas efficiency factor must be implemented during the first monitoring period and be presented in the first verification.

AM0008 also establishes that the fuel efficiencies of the fuel used should be measured once prior to the fuel switch for each process with several load factors in order to get a curve of fuel efficiency values with statistical significance. As the project was implemented prior to entering into force of AM0008, the fuel efficiency can no longer be measured as suggested. Instead, the fuel efficiency for fuel oil and LPG was determined based on the fuel consumption and output of each equipment during the last 12 month prior to the fuel switching. These average fuel efficiencies are likely to be representative for the each equipment's fuel efficiency prior to the fuel switch and are hence deemed appropriate.

3.4 Additionality

In accordance with AM0008 **/7/**, the additionality of the project is demonstrated through two conditions:

a) No regulations/programs constraining the use of fuel oil or LPG. In fact there are no restrictions to use fuel oil. There are only environment restrictions on federal level with respect of sulphur oxides emissions. However, there are available fuel oil with different sulphur content which attend these requirements, if applicable.

b) Economic investment according to the cash flow analysis shall evidence a negative NPV, considering an appropriate discount rate in Brazil. An analysis was carried out using a discount rate of 18% which is deemed reasonable since the government bond rate was around 19% in the year 2002 according to the Brazilian Central Bank. The calculations made in the "Villares-ER-and-FA-Calculations" **/3/** demonstrated the NPV of the project is less attractive than the NPV of the baseline, i.e. there is a difference of –R$ 5 024 016[*] between the NPV of fuel oil/LPG and NPV of natural gas considering the average prices (2000-2001) of fuel oil of R$ 0.0079/kj, LPG R$ 0.0116/kj and natural gas R$ 0.089/kj. During the site visit, several receipts of heavy oil, LPG and natural gas were verified, confirming the prices considered in PDD and justifying the assumptions made in the NPV analysis. According to AM0008 the trends in fuel oil and natural gas consumption in Brazil and sector were analyzed and DNV was able to confirm the appropriateness of the analysis. Moreover, the influence of a possibly higher natural gas efficiency was considered in the NPV sensitivity analysis given in the PDD and the supporting financial analysis **/3/**. The sensitivity analysis demonstrated the NPV of the project remains less attractive than the NPV of the baseline scenario. Hence, it is demonstrated that the project is not a likely baseline scenario and that emission reductions can be considered additional.

In order to evidence that Aços Villares S.A. took into consideration the CDM in the implementation of the project, Aços Villares S.A. sent to DNV a letter of the Purchase Department to the Industrial Director of Aços Villares S.A. issued on 12 June 2001 commenting the contacts and meeting with a gas company, a fuel oil company, and Ecosecurities (consultancy) talking about the possibility of presenting the project as CDM project. Another letter from the Aços Villares S.A. President, Mr. José Maria Montero, was issued on 26 February 2002, approving the investment for switching the fuel oil to natural gas, and emphasizing the interest of Sidenor, the main shareholder of Aços Villares S.A., to present the project as CDM project.

3.5 Monitoring Plan

The project correctly applies the approved monitoring methodology AM0008 - "*Industrial fuel switching from coal and petroleum fuels to natural gas without extension of capacity and lifetime of the facility*" **/7/**.

The monitoring methodology considers monitoring emission reductions generated from switching from fuel oil combustion to natural gas at the Aços Villares - Pindamonhangaba heating equipments. The monitoring plan for emission reductions occurring within the project boundary are based on measuring the natural gas consumption through individual instruments identified in Annex 4 (Monitoring Plan) of PDD **/1/**.

[*] 1 US Dollar = 2,4 Reais in October 2005.

The monitoring plan includes the determination of the fuel efficiency of natural gas as a curve of fuel efficiency vs. load factor with statistical significance in accordance with AM0008.

Details of the data to be collected, the frequency of data recording, its certainty, and format and storage location are described. Algorithms and formulae used have also been clearly established. The recording frequency of the data is appropriate for the project.

Aços Villares - Pindamonhangaba is responsible for the project management monitoring and reporting of emission reductions as well as for organising and training of the staff in the appropriate monitoring, measurement and reporting techniques through the Internal Commission to Energy Conservation (CICE) and Utilities department.

The monitoring plan is straightforward and no specific procedures beyond already established procedures, including QA/QC procedures, are necessary. The established measures reflect good monitoring and reporting practices.

3.6 Calculation of GHG Emissions

Details of direct and indirect emissions are adequately discussed and calculations and their derivative formulas are derived from internationally recognised IPCC standards. The GHG emissions considered are:

- carbon dioxide emissions (CO_2) from combustion of natural gas (project) and fuel oil (baseline),
- methane (CH_4) emissions from combustion of natural gas (project) and fuel oil (baseline),
- nitrous oxide (N_2O) emissions from combustion of natural gas (project) and fuel oil (baseline),
- fugitive CH_4 emissions associated with natural gas production, transport and distribution (project),
- carbon dioxide emissions (CO_2) from transportation of fuel oil and LPG (baseline).

CO_2 emission factors for the different fuels were derived from the natural gas distributor COMGAS (natural gas) and the Brazilian energy Balance 2003 (Fuel oil and LPG). CH_4 and N_2O emission factors from combustion of the different fuels were derived from IPCC default figures for the relevant industrial boilers. Data of pipeline leakages is not available in Brazil. Hence, estimates for fugitive CH_4 emissions associated with natural gas production, transport and distribution are established based on selecting an emission factor from the range of emission factors stated in the IPCC guidelines. CO_2 emissions associated with fuel oil and LPG transports by truck in the baseline scenario were determined based on appropriately selected transport distances, truck capacities and average fuel consumption rates of the trucks. Total CH_4 and N_2O emissions (from combustion and fugitive emissions) are converted to equivalent CO_2 emissions using GWPs as agreed in the first commitment period of the Kyoto Protocol.

One equipment was switched from electricity to natural gas. While no baseline emissions are accounted for associated with electricity consumption of this equipment, project emissions from combusting natural gas in this equipment are accounted for. This is deemed conservative.

The estimates of future fuel consumption are used for the *ex-ante* determination of expected project and baseline emissions. However, actual project and baseline emissions and thus actual project emission reductions are dependent on the actual natural gas consumption (dynamic

baseline). The *ex-ante* estimates made are deemed appropriate, as there is no capacity increase involved.

3.7 Environmental Impacts

Considering the nature of the project, there are no adverse environmental impacts expected. Aços Villares - Pindamonhangaba has been granted an Operation Environmental License (number 300922 issued on 23 August 2002) by the state environmental agency (CETESB-Companhia de Tecnologia e Saneamento Ambiental), and applied to up grade the General Operation Environment Licence on 14/03/2005.

3.8 Comments by Local Stakeholders

Aços Villares–Pindamonhangaba and EcoSecurities invited 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, to provide comments for Aços Villares-Pindamonhangaba project on 25 August 2005, according to the Resolution 1 of the Brazilian DNA. One comment was received from the Brazilian NGO Forum. The comment only expressed its support of the way stakeholders were consulted. During the site visit the letters and the receipts were presented.

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

DNV Certification published the initial PDD of 19 August 2005 on the DNV Climate Change web site (http://www.dnv.com/certification/ClimateChange) and stakeholders were, through the UNFCCC CDM web site, invited to provide comments within a 30 days period from 31 August 2005 to 29 September 2005. No comment was received.

5 VALIDATION OPINION

Det Norske Veritas Certification Ltd. (DNV) has performed a validation of the "Aços Villares Natural gas fuel switch project" at Pindamonhangaba Municipality, São Paulo state, Brazil. The validation was performed on the basis of UNFCCC criteria for CDM project activities and relevant Brazilian criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The project participants are Aços Villares S.A. of Brazil and EcoSecurities of the United Kingdom. All Parties involved, i.e., the host Party Brazil and the Annex I Party the United Kingdom meet the requirements to participate in the CDM and have provided written approval of voluntary participation in the project.

Aços Villares S.A.- Pindamonhangaba is a steel company. It has been using fuel oil, LPG and electricity as the main energy sources for all the processes up to the year 2002 when it started a fuel switch process from fuel oil, LPG and electricity to natural gas. The project activity consists of the conversion of existing equipment to the use of natural gas instead of fuel oil, LPG or electricity.

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 and LPG. While no baseline emissions are accounted for associated with previous electricity consumption, project emissions from combusting natural gas from equipment previously operating with electricity are accounted. This is conservative.

By promoting the use of a more clean fuel, the project is in line with the current sustainable development priorities of Brazil. The DNA of Brazil confirmed that the project assists in achieving sustainable development.

The project applies the approved baseline and monitoring methodology AM0008, i.e. "Industrial fuel switching from coal and petroleum fuels to natural gas without extension of capacity and lifetime of the facility". 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 applied. The calculation of the fuel oil efficiency was based on steam and heavy oil and LFG consumption measurements of the equipment prior to the fuel switch. Appropriate estimates on future fuel consumption are used for the ex-ante determination of expected project and baseline emissions. However, actual project and baseline emissions and thus actual project emission reductions are dependent on the actual natural gas consumption (dynamic baseline).

The monitoring methodology has been applied correctly. The monitoring plan sufficiently specifies the monitoring requirements of the main project indicators. According to the monitoring plan, the fuel efficiency of natural gas will have to be determined as a curve of fuel

efficiency vs. load factor with statistical significance once at an early stage of the project in accordance with AM0008.

Local stakeholder comments were invited according to the Brazilian DNA Resolution 1. One comment was received from Brazilian NGO Forum supporting the way stakeholders were consulted. 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 "Aços Villares Natural gas fuel switch project", as described in the revised and resubmitted project design document of 17 October 2005, meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the baseline and monitoring methodology AM0008. Hence, DNV requests the registration of the "Aços Villares Natural gas fuel switch project" project as a CDM project activity.

REFERENCES

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

/1/ Aços Villares S.A. and EcoSecurities: Project Design Document for the "Aços Villares Natural gas fuel switch project". Version 1 (19 August 2005);

/2/ Aços Villares S.A. and EcoSecurities: Project Design Document for the "Aços Villares Natural gas fuel switch project". Version 2 (17 October 2005);

/3/ EcoSecurities Datasheet "Villares-ER-and-FA-Calculations.xls.

/4/ Comissão Interministerial de Mudança Global do Clima (DNA of Brazil): *Letter of Approval*. 09 May 2006

/5/ Department for Environment, Food and Rural Affairs (DNA of United Kingdom): *Written Approval of Voluntary Participation of UK DNA*. 16 May 2006

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

/6/ International Emission Trading Association (IETA) & the World Bank's Prototype Carbon Fund (PCF): *Validation and Verification Manual*. http://www.vvmanual.info

/7/ Approved Baseline and Monitoring Methodology AM0008: "*Industrial fuel switching from coal and petroleum fuels to natural gas without extension of capacity ad lifetime of the facility"*. Version 01 of 15 June 2004.

/8/ Brazilian Mines and Energy Ministry: *Balanço Energético Nacional - BEN 2004 (Brazilian Energy Data Profile), section 11.01 - Preços e Tarifas - Preços Médios Constantes de Fontes de Energia - U$S / Unidade Física (tab 7.9)* *http://www.mme.gov.br/site/menu/select_main_menu_item.do?channelId=1432&pageId=4060*

/9/ IPCC/NGGIP: Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories: Workbook – Module 1 Energy, Table 1-3 Selected Net Calorific Values

/10/ Combustible conversion project AVSA (Projeto para conversão de combustivel AVSA)

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

/11/ Afonso Carvalho Souza – Aços Villares S.A. – Pinda/MNP

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/14/ José Augusto Almeida – Aços Villares S.A. – Pida/Exe

/15/ Gumercindo Muiño – Aços Villares S.A. – Organizarion Manager

/16/ Pablo Fernandez – EcoSecurities

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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	OK	Table 2, Section E.4
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	OK	Table 2, Section A.3
3. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC	Kyoto Protocol Art.12.2.	OK	Table 2, Section E.4
4. The project shall have the written approval of voluntary participation from the designated national authority of each party involved	Kyoto Protocol Art. 12.5a, CDM Modalities and Procedures §40a	OK	DNA of Brazil: Letter of Approval. 09 May 2006 DNA of UK: Letter of Approval. 16 May 2006.
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 would have occurred in the absence of the registered CDM project activity	Kyoto Protocol Art. 12.5c, CDM Modalities and Procedures §43	OK	Table 2, Section B.2
7. Potential public funding for the project from Parties in Annex I shall not be a diversion of official development assistance	Decision 17/CP.7	OK	The validation did not reveal any information that indicates that the project can be seen as a diversion of ODA funding towards Brazil.
8. Parties participating in the CDM shall designate a national authority for the CDM	CDM Modalities and Procedures §29	OK	The Brazilian designated national authority for the CDM is the

Requirement	Reference	Conclusion	Cross Reference / Comment
			Comissão Interministerial de Mudança Global do Clima. The UK DNA is the Department for Environment, Food and Rural Affairs.
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. UK has ratified the Kyoto Protocol on 31 May 2002.
10. The participating Annex I Party's assigned amount shall have been calculated and recorded	CDM Modalities and Procedures §31b	OK	UK calculated and recorded its assigned amount units..
11. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7	CDM Modalities and Procedures §31b	OK	UK has in place a national registry and reported in October 2001 their 3rd communication.
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
13. Documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts, shall be submitted, and, if those impacts are considered significant by the project participants or the Host Party, an environmental impact assessment in accordance with procedures as required by the Host Party shall be carried out.	CDM Modalities and Procedures §37c	OK	Table 2, Section F
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	CDM Modalities and Procedures §40	OK	The PDD was published for public comments in the period of 31

Requirement	Reference	Conclusion	Cross Reference / Comment
for minimum 30 days, and the project design document and comments have been made publicly available			August 2005 to 29 September 2005 on www.dnv.com/certification/ClimateChange and comments were invited via the UNFCCC CDM website. No comment was received.
17. A baseline shall be established on a project-specific basis, in a transparent manner and taking into account relevant national and/or sectoral policies and circumstances	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 *The project design is assessed.*					
A.1. Project Boundaries *Project Boundaries are the limits and borders defining the GHG emission reduction project.*					
A.1.1. Are the project's spatial (geographical) boundaries clearly defined?	/1/	DR	The project boundaries are defined and limited by Aços Villares S.A., steel plant, at the Pindamonhangaba Municipality.		OK
A.1.2. Are the project's system (components and facilities used to mitigate GHGs) boundaries clearly defined?	/1/	DR	The project system boundaries are limited to 2 boilers, 9 ladle heaters, 17 ovens, 2 Annealing furnaces, 1 bars heat treating furnace, 3 heating furnaces, 1 soaking pit, 3 stoves and natural gas distribution and control system.		OK
A.2. Technology to be employed *Validation of project technology focuses on the project engineering, choice of technology and competence/ maintenance needs. The validator should ensure that environmentally safe and sound technology and know-how is used.*					
A.2.1. Does the project design engineering reflect current good practices?	/1/	DR	The project contemplates the conversion of existing equipments from fuel oil, LPG and electricity to natural gas and includes complementary safety conditions.		OK
A.2.2. Does the project use state of the art technology or would the technology result in a significantly	/1/	DR	The operational condition of the natural gas use is environmentally friend.		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
better performance than any commonly used technologies in the host country?					
A.2.3. Is the project technology likely to be substituted by other or more efficient technologies within the project period?	/1/	DR	The project technology is unlikely to be superseded by other more efficient technologies at least within the first 7-years commitment period.		OK
A.2.4. Does the project require extensive initial training and maintenance efforts in order to work as presumed during the project period?	/1/	DR	The project will require minimal additional training for the project maintenance since the fuel change is only a modification of the currently used technology, and Aços Villares already has a technical department at the Pindamonhangaba plant in charge of the equipment maintenance, including the Internal Commission to Energy Conservation (CICE).		OK
A.2.5. Does the project make provisions for meeting training and maintenance needs?	/1/	DR	The PDD only mentions that Aços Villares has a complete set of maintenance and operation procedures that can be used for training and maintenance. For reasons indicated in A.2.4, this is reasonable.		OK
A.3. Contribution to Sustainable Development *The project's contribution to sustainable development is assessed.*					
A.3.1. Is the project in line with relevant legislation and plans in the host country?	/1/	DR	The Aços Villares - Pindamonhangaba Plant has an Operational Environment Licence and applied to upgrade the General Operation Environment Licence of 14/03/2005. During the site visit the letter 420/05-CBT issued by CETESB was presented, confirming that all Environmental Licences, which have expired or will expire,		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			were all included in the process nº 03/00183/05 with reference to the request of general renewal. The switch of fuels to natural gas was included.		
A.3.2. Is the project in line with host-country specific CDM requirements?	/1/	DR	Brazil established Resolution 1. The project invited stakeholder comments according to this resolution. One comment was received from Brazilian NGO Forum supporting the way stakeholders were consulted. During the site visit the letters and the receipts were presented.		OK
A.3.3. Is the project in line with sustainable development policies of the host country?	/1/	DR	By using an environmentally friendly fuel, the project is in line with current sustainable development priorities in Brazil. The DNA of Brazil confirmed that the project assists in achieving sustainable development.		OK
A.3.4. Will the project create other environmental or social benefits than GHG emission reductions?	/1/	DR	The project has a positive environmental impact.		OK
B. Project Baseline *The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.*					
B.1. Baseline Methodology *It is assessed whether the project applies an appropriate baseline methodology.*					
B.1.1. Is the baseline methodology previously approved by the CDM Executive Board?	/1/	DR	The project applies the approved baseline methodology AM0008 - "Industrial fuel switching from coal and petroleum fuels to natural gas without extension of capacity		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			and lifetime of the facility".		
B.1.2. Is the baseline methodology the one deemed most applicable for this project and is the appropriateness justified?	/1/	DR	In a first analysis of the project, DNV considered that the project fulfilled only some of the conditions under which AM0008 is applicable with respect to the fact that: a) there is no local regulations to constraint the use of fuel oil, b) the facility would not have major efficiency improvements during the crediting period, c) the project activity does not increase the capacity of final output and lifetime of the existing facility during the crediting period and d) the project activity does not result in an integrated process change. The condition of using coal and/or petroleum fuels is less expensive than natural gas per unit of energy in the country and sector was not initially confirmed because official data from the Brazilian Energy Data Profile (BEN) from Mines and Energy Ministry /8/ evidenced that the prices for natural gas are lower than the prices for the fuel oil and LPG in opposition of the figures mentioned in the PDD and in the Calculation Datasheet /3/. Nonetheless, during the site visit several receipts of heavy oil A3 supplied by Ipiranga Company, LPG supplied by Supergasbras to Aços Villares Pindamonhangaba and Natural gas supplied by CONGAS to Aços Villares Mogi Plant in the same period of analysis (2000 and 2001) were verified and these records confirmed the figures in the PDD.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
B.2. Baseline Determination *The choice of baseline will be validated with focus on whether the baseline is a likely scenario, whether the project itself is not a likely baseline scenario, and whether the baseline is complete and transparent.*					
B.2.1. Is the application of the methodology and the discussion and determination of the chosen baseline transparent?	/1/	DR	The application of the methodology is correct and the baseline determination is transparent		OK
B.2.2. Has the baseline been determined using conservative assumptions where possible?	/1/	DR	The emission reductions of Aços Villares Pindamonhangaba project will be achieved through using natural gas, a fuel with lower carbon emission factor than the previously used fuels fuel oil and LPG. The baseline scenario assumes that fuel oil and LPG would otherwise continue to be used during the crediting period. However, the calculation of the efficiency of the natural gas was made based on the efficiency of fuel oil and LPG and not on the actual figures of consumption and output, as showed on Villares-ER-and-FA-Calculation datasheet /1/. DNV requests more information about the selected heating value for fuel oil.	~~CAR 1~~	OK
B.2.3. Has the baseline been established on a project-specific basis?	/1/	DR	The baseline has been specifically designed for this project.		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/	DR	There are no regulations/programs constraining the use of fuel oil or LPG: in fact there are no restrictions to use fuel oil or LPG. There are only environmental		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			restrictions in the federal level with respect to the sulphur oxide emissions. However, fuel oil with different sulphur content is available which would attend this restriction.		
B.2.5. Is the baseline determination compatible with the available data?	/1/	DR	See B.2.2	~~CAR 1~~	OK
B.2.6. Does the selected baseline represent the most likely scenario among other possible and/or discussed scenarios?	/1/	DR	In a first analysis of the project, DNV considered that the project fulfilled only some of the conditions under which AM0008 is applicable with respect to the fact that: a) there is no local regulations to constraint the use of fuel oil, b) the facility would not have major efficiency improvements during the crediting period, c) the project activity does not increase the capacity of final output and lifetime of the existing facility during the crediting period and d) the project activity does not result in an integrated process change. The condition of using coal and/or petroleum fuels is less expensive than natural gas per unit of energy in the country and sector was not initially confirmed because official data from the Brazilian Energy Data Profile (BEN) from Mines and Energy Ministry /8/ evidenced that the prices for natural gas are lower than the prices for the fuel oil and LPG in opposition of the figures mentioned in the PDD and in the Calculation Datasheet /3/. Nonetheless, during the site visit several receipts of heavy oil A3 supplied by Ipiranga Company, LPG supplied by Supergasbras to Aços Villares		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			Pindamonhangaba and Natural gas supplied by CONGAS to Aços Villares Mogi Plant in the same period of analysis (2000 and 2001) were verified. These records confirmed the figures in the PDD.		
B.2.7. Is it demonstrated/justified that the project activity itself is not a likely baseline scenario?	/1/	DR	According to AM0008 a cash flow analysis of the project shall evidence a negative NPV, considering a discount rate appropriate in Brazil. An analysis was carry out using a discount rate of 18% which is deemed reasonable since the government bond rate was around 19% in the year 2002 according to the Brazilian Central Bank. The calculations made in the "Villares-ER-and-FA-Calculations" /3/ demonstrated that the project NVP is negative considering average prices (2000-2001) of fuel oil of R$ 0.0079/kj, LPG of R$ 0.0116/kj and natural gas of R$ 0.089/kj. During the site visit, several receipts of heavy oil, LPG and natural gas deliveries were verified, confirming the prices considered in the PDD. Nonetheless, it remains to be clarified whether the NPV analysis has considered changes in the equipments efficiency as required by AM0008 (CL1). According to AM0008 the trends in fuel oil and natural gas consumption in Brazil and the relevant industry sector were analyzed and the presented analysis was verified. Although not required by AM0008, DNV requests information of how the CDM was	~~CL 1~~ ~~CL 5~~	OK OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			considered in the decision to implement the project.		
B.2.8. Have the major risks to the baseline been identified?	/1/	DR	See B.2.7		
B.2.9. Is all literature and sources clearly referenced?	/1/	DR	The source of fuel oil, LPG and natural gas price were verified during the site visit		OK
C. Duration of the Project/ Crediting Period *It is assessed whether the temporary boundaries of the project are clearly defined.*					
C.1.1. Are the project's starting date and operational lifetime clearly defined and reasonable?	/1/	DR	Yes, the project start date is 01/01/2003 with an expected lifetime 25 years. The project's starting data has been sufficiently evidenced.		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	Yes, a renewable 7 year-crediting period starting on 01/01/2003 is selected.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
D. *Monitoring Plan* *The monitoring plan review aims to establish whether all relevant project aspects deemed necessary to monitor and report reliable emission reductions are properly addressed ((Blue text contains requirements to be assessed for optional review of monitoring methodology prior to submission and approval by CDM EB).*					
D.1. Monitoring Methodology *It is assessed whether the project applies an appropriate baseline methodology.*					
D.1.1. Is the monitoring methodology previously approved by the CDM Executive Board?	/1/	DR	The project applies the approved monitoring methodology AM0008 - "Industrial fuel switching from coal and petroleum fuels to natural gas without extension of capacity and lifetime of the facility".		OK
D.1.2. Is the monitoring methodology applicable for this project and is the appropriateness justified?	/1/	DR	Yes		OK
D.1.3. Does the monitoring methodology reflect good monitoring and reporting practices?	/1/	DR	The monitoring plan for emissions reductions occurring within the project boundary is based on measuring the natural gas consumption through gas company receipts and field instruments. However, the table D.2.1 item 1 mentions that the sum of natural gas consumption of several equipments does not equal to the consumption of natural gas of Pindamonhangaba unit. DNV requests more information about that	~~CL 2~~ ~~CL 3~~	OK OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			(CL). The recording frequency of the data seems appropriate for the project; however, the information for how long the data is kept archived is not defined (CL).		
D.1.4. Is the discussion and selection of the monitoring methodology transparent?	/1/	DR	The monitoring plan includes the measurement of fuel efficiency of natural gas used at the process. It is mentioned in the PDD that a curve of fuel efficiencies vs. load factor will be presented during the verification. However, the methodology AM0008 establishes that it shall be presented at the early stage of the project. DNV requests more information about that curve.	~~CAR 1~~	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	The monitoring plan provides a detailed description of how natural gas consumption data will be used to calculate emissions (See section D.1.3). In addition, examples are given of the algorithms that will be used to process the data. The algorithms used follows well recognised formulas.		OK
D.2.2. Are the choices of project GHG indicators reasonable?	/1/	DR	Fuel consumption provides an accurate mechanism for measuring GHG reductions, when used with a well recognised GHG formula. However, the Table D.2.1 item 1 of	~~CL 2~~	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			PDD mentions that the sum of natural gas consumption of several equipments does not equal to the consumption of natural gas of Pindamonhangaba unit. DNV requests more information about that statement.		
D.2.3. Will it be possible to monitor / measure the specified project GHG indicators?	/1/	DR	See D.1.3		OK
D.2.4. Will the indicators give opportunity for real measurements of project emissions?	/1/	DR	See D.1.3		OK
D.2.5. Will the indicators enable comparison of project data and performance over time?	/1/	DR	See D.1.3		OK
D.3. Monitoring of Leakage *It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.*					
D.3.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	/1/	DR	Considering that safety procedures will be applicable, no leakage of CH_4 is likely to occur at the project site. For leakage due to production and transportation of natural gas an IPCC factor will be used.		OK
D.3.2. Are the choices of leakage indicators reasonable?	/1/	DR	Yes, according to the IPCC guidelines.		OK
D.3.3. Will it be possible to monitor / measure the specified leakage indicators?	/1/	DR	See D.3.1		OK
D.3.4. Will the indicators give opportunity for real measurements of leakage effects?	/1/	DR	See D.3.1		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
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	The monitoring plan is according to the established on the AM0008		OK
D.4.2. Is the choice of baseline indicators, in particular for baseline emissions, reasonable?	/1/	DR	See B.2.2	~~CAR 1~~	OK
D.4.3. Will it be possible to monitor / measure the specified baseline indicators?	/1/	DR	Baseline indicators will be indirectly monitored through measuring natural gas consumption and through monitoring equipment efficiencies. The model assumes that the equivalent amount of energy provided by fuel oil and LPG is being displaced by the same amount of energy provided by natural gas (including efficiency improvements resulting from the fuel switch).		OK
D.4.4. Will the indicators give opportunity for real measurements of baseline emissions?	/1/		See D.4.3		OK
D.5. Monitoring of Sustainable Development Indicators/ Environmental Impacts *It is checked that choices of indicators are reasonable and complete to monitor sustainable performance over time.*					
D.5.1. Does the monitoring plan provide the collection and archiving of relevant data concerning environmental, social and economic impacts?	/1/	DR	Neither AM0008 nor Resolution 1 of the Brazilian DNA requires the monitoring of social or environmental indicators.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
D.6. Project Management Planning *It is checked that project implementation is properly prepared for and that critical arrangements are addressed.*					
D.6.1. Is the authority and responsibility of project management clearly described?	/1/	DR	Aços Villares-Pindamonhangaba is responsible by the conditions established on operational and management structure.		OK
D.6.2. Is the authority and responsibility for registration, monitoring, measurement and reporting clearly described?	/1/	DR	Aços Villares-Pindamonhangaba has in place, in line with company policies and engineering best practices, a complete set of maintenance and operations procedures, which include the monitoring of process variable, instruments calibration and quality control. These practices are assured by the Internal Commission to Energy Conservation - CICE.		OK
D.6.3. Are procedures identified for training of monitoring personnel?	/1/	DR	See D.6.2		OK
D.6.4. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/	DR	See D.6.2		OK
D.6.5. Are procedures identified for calibration of monitoring equipment?	/1/	DR	See D.6.2		OK
D.6.6. Are procedures identified for maintenance of monitoring equipment and installations?	/1/	DR	See D.6.2		OK
D.6.7. Are procedures identified for monitoring, measurements and reporting?	/1/	DR	See D.6.2		OK
D.6.8. Are procedures identified for day-to-day records handling (including what records to keep,	/1/	DR	See D.6.2		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
storage area of records and how to process performance documentation)					
D.6.9. Are procedures identified for dealing with possible monitoring data adjustments and uncertainties?	/1/	DR	See D.6.2		OK
D.6.10. Are procedures identified for review of reported results/data?	/1/	DR	See D.6.2		OK
D.6.11. Are procedures identified for internal audits of GHG project compliance with operational requirements where applicable?	/1/	DR	See D.6.2		OK
D.6.12. Are procedures identified for project performance reviews before data is submitted for verification, internally or externally?	/1/	DR	See D.6.2		OK
D.6.13. Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting?	/1/	DR	See D.6.2		OK
E. Calculation of GHG Emissions by Source *It is assessed whether all material GHG emission sources are addressed and how sensitivities and data uncertainties have been addressed to arrive at conservative estimates of projected emission reductions.*					
E.1. Predicted Project GHG Emissions *The validation of predicted project GHG emissions focuses on transparency and completeness of calculations.*					
E.1.1. Are all aspects related to direct and indirect GHG emissions captured in the project design?	/1/	DR	Details of direct and indirect emissions are sufficiently discussed in the PDD. Project emissions include CO_2, CH_4 and N_2O		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			emissions from combusting natural gas in the boilers, furnaces and other equipment on site.		
E.1.2. Are the GHG calculations documented in a complete and transparent manner?	/1/	DR	Calculations and their derivative formulas are referenced to IPCC standards.		OK
E.1.3. Have conservative assumptions been used to calculate project GHG emissions?	/1/	DR	See E.1.2		OK
E.1.4. Are uncertainties in the GHG emissions estimates properly addressed in the documentation?	/1/	DR	Uncertainties are minimal given the nature of the project.		OK
E.1.5. Have all relevant greenhouse gases and source categories listed in Kyoto Protocol Annex A been evaluated?	/1/	DR	Yes. Carbon dioxide (CO_2), Nitrous Oxide and Methane (CH_4) are discussed in the project documentation		OK
E.2. Leakage *It is assessed whether there leakage effects, i.e. change of emissions which occurs outside the project boundary and which are measurable and attributable to the project, have been properly assessed.*					
E.2.1. Are potential leakage effects beyond the chosen project boundaries properly identified?	/1/	DR	Leakage beyond the project boundaries have been identified as methane emissions from natural gas production and transportation (project) and and CO_2 emissions from transportation of fuel oil and LPG (baseline). These emissions will be estimated through an IPCC recommended formula.		OK
E.2.2. Have these leakage effects been properly accounted for in calculations?	/1/	DR	Calculated using IPCC recommendations.		OK
E.2.3. Does the methodology for calculating leakage	/1/	DR	The leakage calculation is according to the		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
comply with existing good practice?			AM0008.		
E.2.4. Are the calculations documented in a complete and transparent manner?	/1/	DR	See E.2.2		OK
E.2.5. Have conservative assumptions been used when calculating leakage?	/1/	DR	See E.2.2		OK
E.2.6. Are uncertainties in the leakage estimates properly addressed?	/1/	DR	See E.2.2		OK
E.3. Baseline Emissions *The validation of predicted baseline GHG emissions focuses on transparency and completeness of calculations.*					
E.3.1. Have the most relevant and likely operational characteristics and baseline indicators been chosen as reference for baseline emissions?	/1/	DR	Baseline emissions are determined based on the amount of fuel oil and LPG displaced by natural gas. The amount of this fuel displaced is calculated from the natural gas (monitored ex-post) consumption, the efficiency of natural gas boilers and furnaces, (monitored ex-post) and the efficiency of the current fuel oil and LPG boilers using fuel oil and LPG, respectively (monitored ex-ante). However, the efficiency of natural gas was calculated considering the efficiency of fuel oil and not the ex-post measurements. DNV requests more information about that matter.	~~CAR 1~~	OK
E.3.2. Are the baseline boundaries clearly defined and do they sufficiently cover sources and sinks for baseline emissions?	/1/	DR	Baseline boundaries are clearly defined. The baseline boundary comprises the current four boilers. Emissions included in the baseline analysis are representative of the project.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
E.3.3. Are the GHG calculations documented in a complete and transparent manner?	/1/	DR	All formulas are described and derivative inputs appropriately referenced.		OK
E.3.4. Have conservative assumptions been used when calculating baseline emissions?	/1/	DR	See E.3.1	~~CAR 1~~	OK
E.3.5. Are uncertainties in the GHG emission estimates properly addressed in the documentation?	/1/	DR	According to the methodology both the natural gas and fuel oil/LPG equipment efficiency should not be a single value but a pattern (function) of "load factor" at the process. Preferable a graph as a function of load factor should be drawn. DNV requests information about the equipments efficiency variation according to the load factor.	~~CL 4~~	OK
E.3.6. Have the project baseline(s) and the project emissions been determined using the same appropriate methodology and conservative assumptions?	/1/	DR	See E.3.1	~~CAR 1~~	OK
E.4. Emission Reductions Validation of baseline GHG emissions will focus on methodology transparency and completeness in emission estimations.					
E.4.1. Will the project result in fewer GHG emissions than the baseline scenario?	/1/	DR	The project is expected to abate CO_2 emissions to the extent of 190 344 tCO_2e over the first 7 year-crediting period.		OK
F. Environmental Impacts *Documentation on the analysis of the environmental impacts will be assessed, and if deemed significant, an EIA should be provided to the validator.*					
F.1.1. Has an analysis of the environmental impacts of	/1/		Considering the nature of the project, there		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
the project activity been sufficiently described?			are no adverse environmental impacts expected. Aços Villares-Pindamonhangaba Plant has an Operational Environment Licence and applied to upgrade the General Operation Environment Licence of 14/03/2005. During the site visit the letter 420/05-CBT issued by CETESB was presented, confirming that all Environmental Licences, which have expired or will expire, were all included in the process nº 03/00183/05 with reference to the request of general renewal. The switch of fuels to natural gas was included.		
F.1.2. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved?	/1/	DR	See F.1.1		OK
F.1.3. Will the project create any adverse environmental effects?	/1/	DR	See F.1.1		OK
F.1.4. Are transboundary environmental impacts considered in the analysis?	/1/	DR	See F.1.1		OK
F.1.5. Have identified environmental impacts been addressed in the project design?	/1/	DR	See F.1.1		OK
F.1.6. Does the project comply with environmental legislation in the host country?	/1/	DR	See F.1.1		OK
G. Stakeholder Comments *The validator should ensure that a stakeholder comments have been invited and that due account has been taken of any comments received.*					
G.1.1. Have relevant stakeholders been consulted?	/1/	DR	Aços Villares–Pindamonhangaba and EcoSecurities invited local stakeholders, such as the Municipal Government, the		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			state and municipal agencies, the Brazilian forum of NGOs, neighbouring communities and the office of the attorney general, to provide comments for Aços Villares-Pindamonhangaba project on 25 August 2005, according to the Resolution 1 of the Brazilian DNA. One comment was received from Brazilian NGO Forum supporting the way stakeholders were consulted. During the site visit the letters and the receipts were presented.		
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 stakeholder comments received provided?	/1/	DR	See G.1.1		OK
G.1.5. Has due account been taken of any stakeholder 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 clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
CAR 1 The emission reductions of Aços Villares-Pindamonhangaba project will be achieved through using natural gas, a fuel with lower carbon emission factor than the previously used fuel, fuel oil and LPG. The baseline scenario assumes that fuel oil and LPG would otherwise continue to be used during the crediting period. However, the calculation of the efficiency of the natural gas was made based on the efficiency of fuel oil and not on the actual figures of consumption and output, as showed on Villares ER and FA Calculation datasheet /3/.	B.2.2 B.2.5 D.1.4 E.3.1 E.3.4	The applicability conditions related to methodology AM0008 are: do not present an increase in equipment efficiency and do not increase the production capacity. If there is no significant increase in the efficiency, the energy consumption factor (TJ/ unit produced) will be similar using fuel oil or natural gas. The natural gas fuel consumption factor (m3 / unit produced) was based on calculated based on this assumption. The actual value related to natural gas consumption factor will be measured during project activity, thus will be presented in the verification report.	As the methodology establishes the calculation of the fuel efficiency factor for natural gas (project scenario) measured at the early stage of each crediting period for each process with several load factors in order to get the curve with statistical significance, and the PDD mentions that the curves with significant statistical values will be presented during the verification, the measurement of natural gas and respective output of each equipment and calculation of each natural gas efficiency factor must be implemented during the first monitoring period and be presented in the first verification. This CAR is closed.
CL 1 Moreover, it remains to be clarified whether the NPV analysis has considered changes in the equipments efficiency as required by AM0008 (CL3).	B.2.7	No change on equipment efficiency is expected. For CERs calculation or financial analysis changes in equipment efficiency were not considered.	As the change in efficiency is not considered, DNV requests a further explanation for its reasons and the impact foreseen if the natural gas will be more efficient compared with fuel oil
CL1 Continuation As the change in efficiency is not considered, DNV requests a further explanation for its reasons and the impact foreseen if the natural gas will be more efficient compared with fuel oil		The changes on equipments are only related to substitution of burners. The project developer has been using the state of art on fuel oil burners. The project activity represents simple changes, using similar technology, thus it is not expected significant gain of efficiency. In financial analysis, changes on efficiency would present	The explanation and simulation provided on datasheet "Villares-ER-and-FA-Calculation v.15" could evidence that the additionality of project will not be affected if the natural gas had a higher efficiency. This CL is therefore closed

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
		similar results as variations in fossil fuel prices. For demonstration of this fact, in the most updated version of financial analysis calculation, it was added a new case, where the natural gas efficiency was increased in 10%. It means that for the same production, the project activity consumed 10% less energy than baseline scenario. The result was exactly the same as an increase of 10% on natural gas prices. It means that baseline scenario was R$ 716,170 cheaper than project activity.	
CL 2 Table D.2.1 item 1 mentions that the sum of natural gas consumption of several equipments does not equal to the consumption of natural gas of Pindamonhangaba unit. DNV requests more information about that	D.1.3	There are some equipments and/or facilities that use natural gas but are not included in project activity. Hence, the amount of natural gas sold to project developer, and monitored by gas distributor company (COMGAS) will not be the same as consumed by project activity.	DNV still requests the list of the equipment included in the project.
CL 2 Continuation DNV still requests the list of equipment included in the project.	D.1.3 D.2.2	This information is presented on annex 4 of updated PDD version nº03.	The information provided on revisedPDD is sufficient. This CL is therefore closed
CL 3 The recording frequency of the data seems appropriate for the project; however, the information for how long the data is kept archived is not defined (CL).	D.1.3	According to the most updated version of PDD guidelines (Extracted from chapter 14 of 19th meeting report of Executive board), this information is no more required, since the default period is the duration of	Justification was considered acceptable. This CL is therefore closed

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
		crediting period plus 2 years. The project developer will follow the EB recommendation and storage the data for the crediting period plus two years.	
CL 4 According to the methodology both the natural gas and fuel oil equipment efficiency should not be a single value but a pattern (function) of "load factor" at the process. Preferable a graph as a function of load factor should be drawn. DNV requests information about the equipments efficiency variation according to the load factor.		The pattern of efficiency for each equipment is requested only in the monitoring methodology. These graphs and functions related "Load Factor" and efficiency will be presented during the verification process, in the first Monitoring Report. The actual natural gas fuel consumption factor (m3 / unit produced) that will be used to effectively calculate the project emission reduction will be based on this function between "Load Factor" and equipment efficiency.	The estimates on future fuel consumption are used for the ex-ante determination of expected project and baseline emissions. Actual project and baseline emissions (and thus actual project emission reductions) are dependent on the actual natural gas consumption (dynamic baseline). Also the baseline GHG emissions are indirect calculated by taking into account the efficiency of fuel oil and LPG. The ex-ante estimates are deemed appropriate. Nonetheless, the efficiency of the natural must be calculated according to the methodology and this must be implemented and checked during the first verification through the installation of a new steam flow measurer gage. This CL is closed.
CL 5 Although not required by AM0008, DNV requests information of how the CDM was considered in the decision to implement the project	B.2.7	Documents were delivered to DOE. They are self-explainable.	Aços Villares S.A. sent to DNV a letter of Purchase Department to Industrial Director of Aços Villares S.A. issued on 12 June 2001 commenting the contacts and meeting with a gas company, fuel oil company, and Ecosecurities (consultancy) talking about the possibility of CER revenues. Another letter from the Aços Villares S.A. President, Mr. José Maria Montero, was issued on 26 February 2002, approving the investment for

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			switchingl to natural gas, and noting the interest of Sidenor, the main share holder of Aços Villares S.A., to present this project as CDM project.. This CL is therefore closed.

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