



---

# VALIDATION REPORT

---

## REDUCTION OF FLARING AND USE OF RECOVERED GAS FOR METHANOL PRODUCTION, EQUATORIAL GUINEA

REPORT No. 2006-1599

REVISION No. 02

DET NORSKE VERITAS



## VALIDATION REPORT

Date of first issue: 2006-10-27	Project No.: 45010050
Approved by: Einar Telnes Director	Organisational unit: DNV Certification, International Climate Change Services
Client: MDL Ambiente	Client ref.: Ben Richardson

DET NORSKE VERITAS  
CERTIFICATION LTD

Palace House  
3 Cathedral Street  
London SE19DE  
United Kingdom  
<http://www.dnv.com>

### Summary:

Det Norske Veritas Certification Ltd. (DNV) has performed the validation of the “Reduction of Flaring and Use of Recovered Gas for Methanol Production” project in Equatorial Guinea 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 documents, 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 1 December 2006, meets all relevant UNFCCC requirements for the CDM and correctly applies the methodology AM0037 (version 1). Hence, DNV requests the registration of the “Reduction of Flaring and Use of Recovered Gas for Methanol Production” project as a CDM project activity.

Report No.: 2006-1599		Subject Group: Environment	
Report title: Reduction of Flaring and Use of Recovered Gas for Methanol Production, Equatorial Guinea			
Work carried out by: Susanne Haefeli-Hestvik, Hendrik W. Brinks, Einar Telnes			
Work verified by: Soumik Biswas, Michael Lehmann			
Date of this revision: 2007-03-01	Rev. No.: 02	Number of pages: 16	

<b>Indexing terms</b>	
Key words Climate Change Kyoto Protocol Validation Clean Development Mechanism	Service Area Verification
	Market Sector
	Process Industry
<input checked="" type="checkbox"/> No distribution without permission from the client or responsible organisational unit	
<input type="checkbox"/> free distribution within DNV after 3 years	
<input type="checkbox"/> Strictly confidential	
<input type="checkbox"/> Unrestricted distribution	

© 2002 Det Norske Veritas AS

All rights reserved. This publication or parts thereof may not be reproduced or transmitted in any form or by any means, including photocopying or recording, without the prior written consent of Det Norske Veritas AS.



<b><i>Table of Content</i></b>	<b><i>Page</i></b>
1 INTRODUCTION .....	1
1.1 Validation Objective	1
1.2 Scope	1
1.3 Description of Proposed CDM Project	1
2 METHODOLOGY .....	2
2.1 Review of Documents	4
2.2 Follow-up Interviews	4
2.3 Resolution of Clarification and Corrective Action Requests	4
2.4 Internal Quality Control	5
3 VALIDATION FINDINGS .....	5
3.1 Participation Requirements	5
3.2 Project Design	5
3.3 Baseline Determination	6
3.4 Additionality	7
3.5 Monitoring Plan	9
3.6 Calculation of GHG Emissions	9
3.7 Environmental Impacts	9
3.8 Comments by Local Stakeholders	9
4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS .....	10
5 VALIDATION OPINION .....	15
REFERENCES .....	16
Appendix A Validation Protocol	
Appendix B Certificates of Competence	

***Abbreviations***

AMPCO	Atlantic Methanol Production Company
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
CH <sub>4</sub>	Methane
CL	Clarification request
CO <sub>2</sub>	Carbon dioxide
CO <sub>2</sub> e	Carbon dioxide equivalent
DCS	Distributed Control System
DNV	Det Norske Veritas
DNA	Designated National Authority
EIA	Environmental Impact Assessment
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
LPG	Liquefied Petroleum Gas
MP	Monitoring Plan
NGO	Non-Governmental Organisation
ODA	Official Development Assistance
PDD	Project Design Document
UNFCCC	United Nations Framework Convention on Climate Change
USJI	United States Initiative on Joint Implementation



## 1 INTRODUCTION

MDL Ambiente has commissioned Det Norske Veritas Certification Ltd. (DNV) to perform a validation of the “Reduction of Flaring and Use of Recovered Gas for Methanol Production” project in Equatorial Guinea, (hereafter called “the project”). This report summarises the findings of the validation of the project, performed on the basis of UNFCCC criteria for CDM projects, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The validation team consists of the following personnel:

Mrs Susanne Haefeli-Hestvik	DNV Norway	CDM validator
Mr Hendrik W. Brinks	DNV Norway	Team leader, GHG Auditor
Mr Einar Telnes	DNV Norway	Oil and gas sector expert
Mr Michael Lehmann	DNV Norway	Technical reviewer
Mr Soumik Biswas	DNV India	Technical reviewer (applicant)

### 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 /10/, 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

The project consists of the recovery and use of the previously flared tail gas of an existing gas processing facility on the northern coast of Bioko Island in Equatorial Guinea for the production of methanol. Methanol is used as feedstock in a variety of industries. The project is forecast to reduce emissions by 2 263 165 tCO<sub>2</sub>e per annum.



## 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 /10/. 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 “Reduction of Flaring and Use of Recovered Gas for Methanol Production” 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



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

  

<b>Validation Protocol Table 2: Requirement Checklist</b>				
<b>Checklist Question</b>	<b>Reference</b>	<b>Means of verification (MoV)</b>	<b>Comment</b>	<b>Draft and/or Final Conclusion</b>
<i>The various requirements in Table 1 are linked to checklist questions the project should meet. The checklist is organised in seven different sections. Each section is then further sub-divided. The lowest level constitutes a checklist question.</i>	<i>Gives reference to documents where the answer to the checklist question or item is found.</i>	<i>Explains how conformance with the checklist question is investigated. Examples of means of verification are document review (DR) or interview (I). N/A means not applicable.</i>	<i>The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is further used to explain the conclusions reached.</i>	<i>This is either acceptable based on evidence provided (<b>OK</b>), or a <b>Corrective Action Request (CAR)</b> due to non-compliance with the checklist question (See below). A request for <b>Clarification (CL)</b> is used when the validation team has identified a need for further clarification.</i>

  

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

**Figure 1 Validation protocol tables**



## 2.1 Review of Documents

The PDD version 1 of 28 September 2006 and version 2 of 1 December 2006 /1/ have been assessed as a part of the validation, as well as an excel file containing all baseline and project emission calculations /2/. In addition, a letter from the Methanol Institute has been reviewed (cf. Annex 5).

The following changes were made between version 1 and 2 of the PDD:

- Change of project participants
- Annex 5 added
- Investment barrier removed
- Fuel units changed
- Emission factors and calculations changed
- Pipeline schematic added
- PDD document form changed

## 2.2 Follow-up Interviews

On 9 November 2006 DNV performed interviews with project stakeholders /14//15/ to confirm selected information and to resolve issues identified in the document review. Representatives of AMPCO were interviewed. The main topics of the interviews are summarised in Table 1.

**Table 1 Interview topics**

Interviewed organisation	Interview topics
AMPCO	<ul style="list-style-type: none"> <li>➤ Baseline and project emission calculations</li> <li>➤ Pipeline schematics and type and number of vales, pump seals, connector flanges, open-ended lines, etc.</li> <li>➤ Measurement records of gas volume and carbon content as well as auxiliary fuel use</li> <li>➤ Additionality</li> </ul>

## 2.3 Resolution of Clarification and Corrective Action Requests

The objective of this phase of the validation was to resolve any outstanding issues which needed to be clarified for DNV's positive conclusion on the project design. The initial validation of the project identified some corrective action requests (CARs) and request for clarification (CLs) and the project participants were invited to provide a respond to these requests.

The project participant's response to DNV's initial findings, which also included the submission of the PDD of 1 December 2006, addressed the raised requests to DNV's satisfaction.

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





## 2.4 Internal Quality Control

The draft validation report including the initial validation findings underwent a technical review before being submitted to the project participants. The final validation report underwent another technical review before requesting registration of the project activity. The technical review was performed by a technical reviewer qualified in accordance with DNV's qualification scheme for CDM validation and verification.

## 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 project design documentation of 1 December 2006.

### 3.1 Participation Requirements

The project participants are Atlantic Methanol Production Company (AMPCO) and MDL Ambiente. Both participants are authorized by Equatorial Guinea to participate in this project. The project has also a valid letter of approval from the DNA of Equatorial Guinea, and Equatorial Guinea meets the requirements to participate in the CDM. The project also has a valid letter of approval from the annex-I Party, the United Kingdom. None of the Parties are taking part in the project as project participants.

### 3.2 Project Design

The project involves the production of methanol using tail gas being transported via three pipelines from a nearby LPG plant. The tail gas would – in the absence of the project – have been flared. The production of methanol via stream/hydrocarbon reforming includes the following steps:

- Desulphurization of the feedstock (the recovered gas)
- Reforming
- Synthesis gas compression
- Methanol synthesis
- Methanol purification (distillation)

The plant is the first of its kind in the region and represents current good technology. All major equipment as well as the technical know-how had to be transferred from an Annex I country. Sufficient training has been provided to all operating staff and local habitants are employed wherever possible, depending on the skills level required. The methanol plant needs a manufacturing and marketing agreement with the government of Equatorial Guinea, which it has received /3/. No other permits or licences are required.

The starting date of the project has been identified as 3 May 2001 when AMPCO took control of the plant and commercial production commenced /6/.



The start of the crediting period is 3 May 2001 and a 10 year fixed crediting period has been chosen.

The project generates sustainable development benefits in that it also reduces local emissions of sulphur dioxide and nitrogen oxides and in that parts of the revenue from selling the CERs will go to Sonogas, a government owned oil company. The DNA of Equatorial Guinea has provided confirmation that the project assists in achieving sustainable development.

### 3.3 Baseline Determination

The project correctly applies AM0037, version 1 /11/, and meets all applicability requirements:

- Records of LPG production from 1998 – 2000 have been reviewed and the only possibility to get rid of the tail gas was to flare it at an open, rudimentary ground flare;
- Natural gas is the only feedstock for methanol and has an equivalent CO<sub>2</sub> impact to the methane rich tail gas from the LPG plant;
- The Methanol Institute, which is a non-profit industry association that maintains comprehensive data on methanol technology, end-uses, production and commodity markets and trends, has confirmed in a letter to DNV that it is highly unlikely that the project plant displaces the production of a methanol production facility that emits more than 1% of the emissions due to flaring of the tail gas in the baseline scenario (cf. Annex 5);
- There is no fuel use outside the project boundary, which is not accounted for;
- Energy requirements for the methanol plant are primarily met using the previously flared tail gas. A small amount of diesel is used for start up operations and auxiliary boilers during maintenance as well as to run the vehicles of the methanol plant. The diesel consumption is accounted for as project emissions.
- It has been verified during the site visit that accurate data on the quantity and carbon content on the tail gas are available.

The only plausible alternative baseline scenarios are the business as usual scenario, i.e. the flaring of the tail gas at the LPG plant, and the project scenario in the absence of CDM benefits, i.e. the production of methanol. Through the application of the “Tool for the Demonstration and Assessment of Additionality” /12/ it is demonstrated that the most likely baseline scenario is the flaring of the tail gas at the LPG plant (see section 3.4).

The project boundary includes the pipeline connecting the LPG plant to the methanol plant and the methanol plant itself. The fugitive emissions from the pipeline connecting the LPG plant to the flare in the baseline scenario have been excluded, for reasons of simplicity and conservativeness. No energy is necessary to transport the tail gas from the LPG plant to neither the flare (in the baseline scenario) nor the methanol plant (in the project scenario) because the gas exiting the LPG plant has sufficient pressure.

The project emissions thus comprise the diesel consumption for start-up and during maintenance as well as for the vehicles used at the methanol plant and the fugitive emissions from the pipeline transport to the methanol plant.



### 3.4 Additionality

The project correctly applies the “Tool for the Demonstration and Assessment of Additionality” /12/:

#### *Step 0*

The starting date of a CDM project activity is the date at which the implementation or construction or real action of a project activity begins. The starting date of the project has been identified as 3 May 2001 when AMPCO took control of the plant and commercial production commenced. A letter confirming that AMPCO took care in custody control 3 May 2001 has been provided /6/. The construction of the plant started in 1998.

Furthermore, in a memorandum in May 2000 /7/ there is evidence for consideration of continuation of the construction of the methanol plant due to low methanol prices and proposals for banning MTBE in the United States. Emission credits by means of a United States Initiative on Joint Implementation (USII) application were considered to offer an improved economic justification for bringing the project to fruition. A CMS Energy Board report from 20 September 2000 /8/ clearly demonstrates that the final goal is credits under the CDM. With CDM considered at an early stage, the project proponents however did not seek registration under CDM until it was clear from the CDM project #0072 (Landfill gas extraction on the landfill Villa Dominico, Buenos Aires, Argentina), that AIJ projects could qualify as CDM projects. The Argentinean project, originally conceived as a potential site for AIJ project activity, secured registration as a CDM project from the CDM-EB September 17, 2005.

#### *Step 1*

The following alternative baseline scenarios have been assessed with regards to their likelihood:

- **flaring at the oil or gas processing site;**

This is the baseline scenario and does not face any legislative or other barriers. Although the government of Equatorial Guinea since 2006 incites new-built facilities to look for alternative uses of tail gas other than flaring, a newly built LNG plant not far from the project site, which will flare large amounts of tail gas, shows that there is no binding requirement and no enforcement to reduce flaring of tail gas.

- **on-site consumption of tail gas for energy;**

The LPG plant already uses a small fraction of the tail gas for its own consumption. The remaining part is much larger than needed for captive power demand.

- **injection of tail gas into oil reservoir;**

Currently, part of the tail gas from the LPG plant is re-injected at the Alba field awaiting the start of operation of a new LNG plant adjacent to the industrial site where also the methanol plant is located. At the time of project implementation, the known reserves at the Alba field and the prices for LNG were not sufficient to justify a LNG plant or a methanol plant with higher capacity than the project plant. Re-injection of gas would have decreased the oil to gas ratio, which was not desirable and would thus only have caused higher costs without any related benefit. Thus, re-injection was not an option at the time of decision making.

- **Recovery, transportation, processing and distribution of tail gas to end-users;**



Part of the tail gas from the LPG plant already fuels a government owned power plant supplying electricity to the island. It is noted here that the Bioko Island was and continuous to be a very virgin environment, with little human habitat and a poor local population. The current power plant more than suffices today's power demand of the island's inhabitants.

- **Tail gas is used as a fuel and/or feedstock at offsite facility;**

It is claimed that the option of a LNG plant was not economically viable at the time of project implementation. Only after the project was initiated, new oil reserves have been found at the Alba field, which have led to an extension of the LPG plant capacity and – together with rising LNG prices – has justified the construction of a new LNG plant. This will use the additional tail gas from the expanded LPG plant, and is forecasted to start operation in 2007.

- **Another source of feedstock, other than the tail gas, is used at the end use facility.**

There is no other feedstock possible than natural gas for the production of methanol and there is no natural gas available on the island.

In conclusion, it is demonstrated that the only plausible scenario except for the project activity is scenario 1, i.e. the flaring of the tail gas at the LPG plant. This alternative is in compliance with legal and regulatory requirements of Equatorial Guinea.

*Step 2*

This step has not been selected.

*Step 3*

The project faces a technological barrier. Equatorial Guinea is one of the poorer non-Annex I countries and there was very limited infrastructure available supporting the construction of the methanol plant. Local inhabitants are mostly low-skilled and work either at foreign oil companies' premises or in the agricultural sector. The Methanol Institute confirmed that there is no other methanol plant in the region using tail gas as feedstock. All technology as well as the skilled engineering work force had to be imported. This fact coupled with a decrease in methanol demand during the years 1999 and 2000 incited AMPCO's management to seriously reconsider to proceed with the construction, which was started in May 1998 /7/. However, the construction was continued and finished in early 2001.

In conclusion, the project scenario faced a relevant technological barrier that the baseline scenario, i.e. the flaring of the tail gas, does not face.

*Step 4*

The Methanol Institute confirms that there is no other methanol plant in the region as of today /9/.

*Step 5*

The revenue from the selling of the CERs helps reduce the impact of volatile methanol prices and support an adequate return on investment given the considerable country risk.

In conclusion, it has been sufficiently demonstrated that the project reduces anthropogenic emissions of greenhouse gases below those that would have occurred in its absence.



### 3.5 Monitoring Plan

The monitoring methodology follows AM0037 (version 1), i.e. the quantity and composition of tail gas from the LPG plant and the diesel consumption is monitored.

The gas flow is measured at the intake of the methanol plant and calibration is done according to the specifications of the equipment supplier and in presence of employees both from the methanol plant and the LPG plant.

The tail gas carbon content is measured weekly and the gas chromatograph is calibrated each time before an analysis is performed.

The diesel consumption is calculated based on purchasing records from the local diesel provider. Default values for the net calorific value and the CO<sub>2</sub> emission factor for diesel are taken from the 2006 IPCC Guidelines for National Greenhouse Gas Inventories as no local values are available /13/.

Fugitive project emissions along the three pipelines are calculated based on the CH<sub>4</sub> content of the tail gas.

No leakage occurs as the tail gas transportation is within the control of the project and as methanol does not substitute other feedstock with lower carbon intensity. The monitoring of emission reduction during accidental events is monitored by a flow meter at the inlet to the LPG factory which is conservative, because the amounts by the inlet to the LPG factory is larger than the tail gas output.. No accidents have so far been reported in the project operations.

The frequency, responsibility and authority for registration, monitoring, measurement and reporting activities is clearly defined and addresses all monitoring methodology requirements. Procedures exist for internal review and corrective actions.

### 3.6 Calculation of GHG Emissions

The baseline emissions have been calculated from the amount of tail gas used in the methanol production plant and the carbon content of the tail gas. The annual project emissions have been estimated from diesel use and fugitive emissions along the pipelines are calculated based on flow rates and gas analyses during the years 2001 to 2005 and making realistic assumptions for the years 2006 to 2011. The calculations do not account for any emissions due to transportation of the tail gas since no additional energy is required to transport the gas. Similarly, emissions due to accidents have not been accounted for since there has been no precedence.

The *ex-ante* forecast emission reductions per year are 2 263 165 tCO<sub>2</sub>e and are deemed realistic.

### 3.7 Environmental Impacts

It has been confirmed during the site visit that no environmental impact assessment (EIA) is required by local law. However, an EIA was performed by the project in October 1999 and no significant adverse environmental impacts were found to occur from the methanol plant.

### 3.8 Comments by Local Stakeholders

The methanol plant is built on an already existing industrial area. The relevant local stakeholders are thus the LPG plant and the government representatives. The government was consulted and



approved the project plan in 1998 and issued a manufacturing and marketing agreement. No adverse comments were received.

#### 4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

The PDD of 28 September 2006 was made publicly available on DNV's climate change website ([www.dnv.com/certification/climatechange](http://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 7 October 2006 to 5 November 2006.

One comment was received and is given (in unedited form) in the below text box.

**Comment by:** Axel Michaelowa, Hamburg Institute of International Economics (HWWA)

**Inserted on:** 2006-11-03

**Subject:** Project start before 2000, lack of additionality and insufficient stakeholder consultation

**Comment:** The project should not be registered due to the following reasons:

1. The project is not eligible for CDM as it started before Jan. 1, 2000. According to the website of the joint venture developing the project (Atlantic Methanol) <http://www.atlanticmethanol.com/HISTORY.html>, the project started already in 1997: "March 1997, Samedan began the feasibility study, CMS joined the project and a development agreement was signed in September 1997. In October 1997, the owners hired one commercial and one technical consultant. While in-house expertise was limited to these two people, their input combined with that of Mustang Engineering was effective and significant while moving through the various project stages. In March 1998, the manufacturing and marketing agreement was signed with the Government in EG, securing the gas position and creating the right to build a methanol facility and market the project. In May 1998, notice to proceed was given to the EPC contractor, United Contractors, at that time a Raytheon Company. In October 1999, the site manager was hired. Other operating and maintenance personnel were hired soon afterwards, and the input and review process was immediately implemented to bridge the operating input gap." Also, an external website <http://www.chemicals-technology.com/projects/bioko/>, specifies that the contracts for the methanol plant were awarded in the 1990s and the building of the plant was well underway by the end of 1999. The website states that "Raytheon [...] was awarded an engineering, procurement and construction (EPC) contract worth \$300 million through its United Engineers International arm in January 1998. Raytheon will be responsible for erecting the core plant as well as ancillary features such as docks and roads. As is usual in such contracts, a number of smaller contracts have been awarded by Raytheon. In October 1999, Foster Wheeler was awarded the substantial contract for a large steam-methane reformer furnace [...]. For more than \$20 million, Foster Wheeler's Fired Heater Division was contracted to supply the design, materials, fabrication and delivery of the reformer unit [...] The unit was successfully delivered in





January 2000.”

2. The project is not additional as both its original developer as well as the buyer consistently stressed its commercial attractiveness and make it clear that the gas has specifically been developed to fuel the plant. The 2001 annual report of Marathon Oil, one of the two shareholders in Atlantic Methanol (<http://www.marathon.com/content/released/marathon2001Sm-4.pdf>), states on p. 13 that “Marathon's newly acquired interests in Equatorial Guinea, West Africa, include an onshore Methanol facility and a liquids processing plant. This acquisition establishes a profitable new core business area, immediately enhances reserve replacement and production volumes for 2002 and adds a world-class asset to our portfolio, all at very competitive acquisition and development costs.” The 2002 report states “On January 3, 2002, Marathon acquired a 45 percent interest in a methanol plant located in Malabo, Equatorial Guinea from CMS Energy. Feedstock for the plant is supplied from a portion of Marathon’s natural gas production in the Alba field. Methanol production totalled 719,000 gross metric tons (324,000 net metric tons) in 2002. Production from the plant is used to supply customers in Europe and the U.S.” A press release of Oct. 4, 2000 “CMS Energy's Oil and Gas Unit Completes Successful Development Well In Equatorial Guinea as Part of an Accelerated Development Program” by the previous owner of the plant (<http://www.cmsenergy.com/Invest/>, see news section) states “The wells are part of an accelerated development project initiated in 1999 to increase the field's production capacity from 90 million cubic feet of natural gas per day to 225 million cubic feet per day. Approximately 115 million cubic feet per day will be supplied to a methanol production plant currently under construction on Bioko Island, 10 million cubic feet per day will be used for onshore operations and the remainder will be re-injected offshore. The methanol production plant, 45 percent owned by subsidiaries of CMS Energy Corporation and Noble Affiliates, respectively, and 10 percent owned by the Government of Equatorial Guinea, is scheduled to be completed by the second quarter of 2001.” This leaves the impression that the methanol plant was designed specifically to take this gas and not to collect “leftover” gas that would have otherwise have been flared. CMS Energy’s 2000 annual report ([http://media.corporate-ir.net/media\\_files/NYS/CMS/reports/cms\\_ar.pdf](http://media.corporate-ir.net/media_files/NYS/CMS/reports/cms_ar.pdf)) corroborates this impression with the statement on p. 32 “Our production of liquid petroleum gas and condensate in Equatorial Guinea has been so successful that we began an accelerated development program. The program has nearly increased production from 90 MMcf/day to 225 MMcf/day. More than 100 MMcf/day of this production will be feedstock for our 2,500 metric ton/day methanol plant when it begins operation in 2001. Expected to be one of the world’s lowest-cost producers of methanol, the plant is also environmentally friendly.”

The project also does not pass step 0 of the additionality test as the date of application to the USIJI programme in October 2000 was long after the project had been started (see discussion under point 1). Moreover, USIJI was clearly



distinct from the CDM, as it only related to the AIJ pilot phase, which did not allow projects to generate credits. The EPC contract was awarded before the purported review of the viability of the project in spring 1999.

3. There is no evidence of a dedicated stakeholder consultation (meeting or invitation of comments through appropriate media).

### **How DNV has considered the comment received in its validation:**

*The project is not eligible for CDM as it started before Jan. 1, 2000.*

In the guidelines for completing the project design document (CDM-PDD) (version 06.1), the starting date of a CDM project activity is defined as “the date at which the implementation or construction or real action of a project activity begins”. This project’s starting date is interpreted as when commercial production commenced, i.e. on 3 May 2001. Evidence of this starting date has been provided /6/. Personnel such as the site manager were hired before that date for obvious reasons, i.e. to facilitate the implementation and training of personnel, so that operation would not be delayed once construction was terminated. The consortium owning AMPCO has long searched for possibilities to stop flaring due to environmental health and safety concerns. As outlined in the additionality assessment, there were not many possibilities to prevent flaring. Construction of the project activity started in May 1998 and came almost to a halt in 2000 due to falling methanol prices, insufficient local infrastructure to support the project and problems with the installation of the reformer.

*The project is not additional as both its original developer as well as the buyer consistently stressed its commercial attractiveness and make it clear that the gas has specifically been developed to fuel the plant.*

The project’s commercial viability depends on the global price of methanol and that price was particularly low during the construction period in 1999 and 2000. As shown in the memorandum from May 2000 /7/ there was serious consideration of continuing the construction of the methanol plant due to low methanol prices and proposals for banning MTBE in the United States. Emission credits by means of an USJI application were considered to offer an improved economic justification for bringing the project to fruition. However, the additionality argument is not built on a financial barrier but a technological barrier, which has been explained in chapter 3.4 of this report. This barrier is also confirmed by text provided by Mr. Michaelowa: “Marathon's *newly* acquired interests... This acquisition establishes a profitable new core business area”. This source confirms the fact that neither of the project partners had experience with methanol plants beforehand.

Further, it is incorrect that the gas has been produced specifically to serve the needs of the methanol plant. The original LPG production plant has been in operation long before the methanol plant has been installed. At the time of investment decision i.e. between 1997 and 2001, there was no obvious use for the tail gas and its continuous flaring was the only economically viable alternative. The fact that the methanol plant was solely designed to use the gas from the LPG plant is evidenced by the fact that there are three pipelines from the LPG to the methanol plant: In case of upsets at the LPG plant, the gas coming from off-shore can be transferred directly to the methanol plant via a high-pressure pipeline, so that no flaring is needed. Finally, the LPG plant also produces small amounts of regenerated syngas, which would





need to be flared in the absence of the project activity. Due to the methanol plant, even these small amounts are directed via a third pipeline to the project plant and put to use.

*The project also does not pass step 0 of the additionality test as the date of application to the USIJI programme in October 2000 was long after the project had been started (see discussion under point 1).*

The starting date of a CDM project activity is the date at which the implementation or construction or real action of a project activity begins. The starting date of the project has been identified as 3 May 2001 when AMPCO took control of the plant and commercial production commenced. A letter confirming that AMPCO took care in custody control 3 May 2001 has been provided /6/.

*Moreover, USIJI was clearly distinct from the CDM, as it only related to the AIJ pilot phase, which did not allow projects to generate credits.*

The AIJ was destined to involve private companies in reducing global greenhouse gases. In this respect it is not clear why the programme is “clearly distinct” from the CDM. A CMS Energy Board report from 20 September 2000 /8/ clearly shows that the final goal for this project is credits under CDM.

Decision 5/CP.1 says: 1. (f) That no credits shall accrue to any Party as a result of greenhouse gas emissions reduced or sequestered during the pilot phase from activities implemented jointly;

Parties are prohibited from accruing credits, but entities are not prohibited from registering AIJ projects under the CDM. The CDM project #0072 (Landfill gas extraction on the landfill Villa Dominico, Buenos Aires, Argentina) originally conceived as a potential site for a AIJ project activity was registered on 17 September 2005. In addition, on 21 January 2006, the EB registered the CDM project #0172, Matanzas Hydroelectric Plant, a project that had been accepted into the AIJ program on 25 February 1998.

*The EPC contract was awarded before the purported review of the viability of the project in spring 1999.*

First, the fact that a company has been contracted to build a plant does not mean that the project has actually started, i.e. started operation. Second, even though EPC has been awarded the contract, there was serious discussion about stopping the implementation due to falling methanol prices and problems during construction. It is at this stage where additional funding from selling carbon credits has been sought as evidenced by the memorandum in May 2000 /7/. In conclusion, the fact that EPC has been contracted before the valuation of carbon credits has been sought, does not prove that the project would have been implemented in the absence of it being registered as a CDM project.

*There is no evidence of a dedicated stakeholder consultation (meeting or invitation of comments through appropriate media).*

“Stakeholders” is defined as the public, including individuals, groups or communities affected, or likely to be affected, by the proposed clean development mechanism project activity (para 1.(e) of the modalities and procedures for a clean development mechanism). The pipelines and methanol plant are located on an industrial area on Bioko Islands. Relevant stakeholders are the government and the employees. The manufacturing and marketing agreement /3/ with the government to build own and operate the methanol plant, is evidence that relevant stakeholders



have been considered and their approval sought and received. The PDD has been amended so as to make this point clearer.



## 5 VALIDATION OPINION

*Det Norske Veritas Certification Ltd. (DNV) has performed a validation of the "Reduction of Flaring and Use of Recovered Gas for Methanol Production" project at Punta Europa on Bioko Islands in Equatorial Guinea. The validation was performed on the basis of UNFCCC criteria for CDM project activities and relevant host country, as well as criteria given to provide for consistent project operations, monitoring and reporting.*

*The project participants are AMPCO and MDL Ambiente. The Parties are Equatorial Guinea and the United Kingdom, which both meet the requirements to participate in the CDM. Both Parties have provided written approval of voluntary participation in the project.*

*The project comprises of the use of tail gas from an existing LPG plant in a methanol plant. The baseline scenario is the flaring of the tail gas. The project correctly applies the approved baseline and monitoring methodology AM0037, version 1. 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. IPCC default emission factors are applied where appropriate. Appropriate estimates on future gas production are used for the ex-ante determination of expected project and baseline emissions. However, actual project and baseline emissions and thus actual emission reductions are dependent on the actual gas flow (dynamic baseline).*

*The monitoring methodology of AM0037, version 1, has been correctly applied. The monitoring plan sufficiently specifies the monitoring requirements of the main project indicators.*

*The project does not create any major environmental impacts. Local stakeholder comments have been invited in an appropriate manner. Stakeholder input has also been invited via the UNFCCC web-site. One comment has been received and taken into account by DNV.*

*In summary, it is DNV's opinion that the "Reduction of Flaring and Use of Recovered Gas for Methanol Production" project, as described in the revised project design document of 1 December 2006, meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the baseline and monitoring methodology AM0037 (version 01). Hence, DNV requests the registration of the "Reduction of Flaring and Use of Recovered Gas for Methanol Production" project as a CDM project activity.*



## REFERENCES

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

- /1/ CDM PDD, Reduction of Flaring and Use of Recovered Gas for Methanol Production, Version 1 of 28 September 2006 and version 2 of 1 December 2006.
- /2/ Excel spreadsheet with calculation of emission reductions based on historical values from 2001 to 2005 and predictions from 2006 to 2011.
- /3/ Manufacturing and Marketing Agreement by and between the Republic of Equatorial Guinea and Atlantic Methanol Production Company LLC, 21 March 1998. Confidential
- /4/ Ministry of Mines Industry and Energy, Republic of Equatorial Guinea: Letter of Approval
- /5/ Department for Environment Food and Rural Affairs, UK: Written approval of voluntary participation, 28 November 2006.
- /6/ Notice of First Industrial Production, 3 May 2001.
- /7/ Memorandum from James W. Cook (Senior Vice President, Technology and Development) in CMS Energy to Rodney Cook (Manager of International Operations) in Samedan Oil Corporation of 10 May 2000. Presented in Annex 6.
- /8/ CMS Energy Board of Directors, Environmental and Corporate Responsibility Committee on 20 September 2000: "Environmentally Responsible Gas Processing in Equatorial Guinea: Creating Value Thru GHG Emissions Reduction". Presented in Annex 6.
- /9/ Letter from Methanol Institute, dated 12 January 2006 (received 12 January 2007).

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

- /10/ International Emission Trading Association (IETA) & the World Bank's Prototype Carbon Fund (PCF): *Validation and Verification Manual*. <http://www.vvmanual.info>.
- /11/ AM0037, Flare reduction and gas utilization at oil and gas processing facilities, CDM baseline and monitoring methodology, Version 01, 29 September 2006.
- /12/ Tool for the Demonstration and Assessment of Additionality, Version 02, 28 November 2005.
- /13/ IPCC, 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Stationary Combustion, Volume 2.2.

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

- /14/ Mr. Bob Avery, Project Engineer Consultant, Noble Energy
- /15/ Mr. Clifford Jones, Project Engineer, AMPCO.

- o0o -

## **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.4.1
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	<del>CAR 4</del> 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.	<del>CAR 4</del> OK	Table 2, Section E.4.1
4. The project shall have the written approval of voluntary participation from the designated national authority of each party involved	Kyoto Protocol Art. 12.5a, CDM Modalities and Procedures §40a	<del>CAR 4</del> OK	
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. 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	DNV has not come across any evidence that official funding has been used for this project.
8. Parties participating in the CDM shall designate a national authority for the CDM	CDM Modalities and Procedures §29	OK	The Ministerio de Minas, Industria y Energía is the DNA of Equatorial Guinea. Department for Environmental Food and

Requirement	Reference	Conclusion	Cross Reference / Comment
9. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol	CDM Modalities §30/31a	OK	Rural Affaire is the DNA of UK. Equatorial Guinea has ratified the Kyoto Protocol on 2000-08-16. UK has ratified the Kyoto Protocol on 2002-05-31
10. The participating Annex I Party's assigned amount shall have been calculated and recorded	CDM Modalities and Procedures §31b	OK	The UK's assigned amount is 92% of the emissions in 1990.
11. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7	CDM Modalities and Procedures §31b	OK	UK has in place a national system for estimating GHG emissions and a national registry.
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 for minimum 30 days, and the project design document and comments have been made publicly available	CDM Modalities and Procedures §40	OK	The PDD of 28 September 2006 was made publicly available on DNV's climate change website and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 7 October 2006 to 5 November 2006.

Requirement	Reference	Conclusion	Cross Reference / Comment
			One comment was received.
17. A baseline shall be established on a project-specific basis, in a transparent manner and taking into account relevant national and/or sectoral policies and circumstances	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	



**Table 2 Requirements Checklist**

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
<b>A. General Description of Project Activity</b> <i>The project design is assessed.</i>					
<b>A.1. Project Boundaries</b> <i>Project Boundaries are the limits and borders defining the GHG emission reduction project.</i>					
A.1.1. Are the project's spatial (geographical) boundaries clearly defined?	/1/	DR	Yes. The project comprises of the three pipelines from the LPG plant to the methanol facility as well as the methanol plant. All elements are located at Punta Europa, the industrial area located on Bioko Island of Equatorial Guinea.		OK
A.1.2. Are the project's system (components and facilities used to mitigate GHGs) boundaries clearly defined?	/1/	DR	Yes. The system boundaries are the same as the project boundaries.		OK
<b>A.2. Technology to be employed</b> <i>Validation of project technology focuses on the project engineering, choice of technology and competence/ maintenance needs. The validator should ensure that environmentally safe and sound technology and know-how is used.</i>					
A.2.1. Does the project design engineering reflect current good practices?	/1/	DR	Yes. The pipelines and the methanol plant have been designed according to current good practice.		OK
A.2.2. Does the project use state of the art technology or would the technology result in a significantly better performance than any commonly used	/1/	DR, I	No methanol plant exists in the region.		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
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, I	The methanol facility has a gas delivery contract with PSC (Production sharing contract i.e. a joint venture type of agreement between Marathon, Noble Energy and the government). Thus, even though – due to the increased oil production at the Alba field, more tail gas is available from the LPG facility, which justified the recent construction of a LNG plant, the methanol plant will not see its contracted gas quantity being reduced. Further, given that LNG will eventually result in increased GHG emissions to the atmosphere, whereas methanol binds hydrocarbons as a feedstock without releasing them a priori, the LNG plant would anyway not qualify as more efficient technology.		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	Yes. The operation and maintenance of a methanol plant is complex.		OK
A.2.5. Does the project make provisions for meeting training and maintenance needs?	/1/	DR, I	Yes. AMPCO has sufficiently trained operational staff.		OK
<b>A.3. Contribution to Sustainable Development</b> <i>The project's contribution to sustainable development is assessed.</i>					
A.3.1. Is the project in line with relevant legislation and plans in the host country?	/1/	DR, I	Yes. The project has a manufacturing and marketing agreement with the government, which is the only approval needed for the building and operation of the methanol plant.		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
A.3.2. Is the project in line with host-country specific CDM requirements?	/1/	DR, I	There are no host-country-specific CDM requirements.		OK
A.3.3. Is the project in line with sustainable development policies of the host country?	/1/	DR	Yes. The country supports the reduction of flaring at oil and gas facilities, although it has no binding legislation or policy in place to encourage the reduction of flaring. However, the Letter of Approval is yet to be received.	CAR-1	OK
A.3.4. Will the project create other environmental or social benefits than GHG emission reductions?	/1/	DR	Yes. The project will decrease emissions of sulphur dioxide and nitrous oxides from gas being flared.		OK
<b>B. Project Baseline</b> <i>The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.</i>					
<b>B.1. Baseline Methodology</b> <i>It is assessed whether the project applies an appropriate baseline methodology.</i>					
B.1.1. Is the baseline methodology previously approved by the CDM Executive Board?	/1/	DR	Yes, AM0037, version 1 is applied.		OK
B.1.2. Is the baseline methodology the one deemed most applicable for this project and is the appropriateness justified?	/1/	DR, I	Yes. The project correctly applies AM0037, version 1 /11/, and meets all applicability requirements: - Records of LPG production from 1998 – 2000 have been reviewed and the only possibility to get rid of the tail gas was to flare it at an open, rudimentary ground flare;		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			<ul style="list-style-type: none"> <li>- Natural gas is the only feedstock for methanol and has an equivalent CO<sub>2</sub> impact to the methane rich tail gas from the LPG plant;</li> <li>- The Methanol Institute, which is a non-profit industry association that maintains comprehensive data on methanol technology, end-uses, production and commodity markets and trends, has confirmed in a letter to DNV that it is highly unlikely that the project plant displaces the production of a methanol production facility that emits more than 1% of the emissions due to flaring of the tail gas in the baseline scenario (cf. Annex 5);</li> <li>- There is no fuel use outside the project boundary, which is not accounted for;</li> <li>- Energy requirements for the methanol plant are primarily met using the previously flared tail gas. A small amount of diesel is used for start up operations and auxiliary boilers during maintenance as well as to run the vehicles of the methanol plant. The diesel consumption is accounted for as project emissions.</li> <li>- It has been verified during the site visit that accurate data on the quantity and carbon content on the tail gas are available.</li> </ul>		

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
<b>B.2. Baseline Determination</b> <i>The choice of baseline will be validated with focus on whether the baseline is a likely scenario, whether the project itself is not a likely baseline scenario, and whether the baseline is complete and transparent.</i>					
B.2.1. Is the application of the methodology and the discussion and determination of the chosen baseline transparent?	/1/	DR	Yes. The baseline is built on the assumption that the gas volume transported to the methanol plant would have been flared in the absence of the project.		OK
B.2.2. Has the baseline been determined using conservative assumptions where possible?	/1/	DR	Yes. The baseline assumes that the tail gas would have been fully oxidized in the absence of the project. Having seen pictures of the previous rudimentary ground flare, the assumption of full oxidization is conservative.		OK
B.2.3. Has the baseline been established on a project-specific basis?	/1/	DR	Yes.		OK
B.2.4. Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	/1/	DR, I	Yes. No regulation is currently place that would have prevented the LPG from continuous flaring of the tail gas.		OK
B.2.5. Is the baseline determination compatible with the available data?	/1/	DR	Yes. The gas flow to the methanol plant is measured continuously.		OK
B.2.6. Does the selected baseline represent the most likely scenario among other possible and/or discussed scenarios?	/1/	DR	Yes. All other alternative scenarios proposed in AM0037 have been discussed and found non realistic.		OK
B.2.7. Is it demonstrated/justified that the project activity itself is not a likely baseline scenario?	/1/	DR	Additionality is assessed by means of the latest tool for the Demonstration and Assessment of Additionality:	<del>CAR-2</del> <del>CAR-3</del>	OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			<p><i>Step 0:</i></p> <p>More evidence is required with regards to the starting date of the project activity falling between 2000-01-01 and the date of registration of the first CDM project.</p> <p>Also, evidence is required to prove that the incentive from the CDM was seriously considered in the decision to proceed with the project activity.</p> <p><i>Step 1:</i></p> <p>The following alternative baseline scenarios have been assessed with regards to their likelihood:</p> <ul style="list-style-type: none"> <li>- <b>flaring at the oil or gas processing site;</b></li> </ul> <p>This is the baseline scenario and does not face any legislative or other barriers. Although the government of Equatorial Guinea since 2006 incites new-built facilities to look for alternative uses of tail gas other than the release to the atmosphere, a newly built LNG plant not far from the project site, which will flare large amounts of tail gas, shows that there is no binding requirement and no enforcement to reduce flaring of tail gas.</p> <ul style="list-style-type: none"> <li>- <b>on-site consumption of tail gas for energy;</b></li> </ul> <p>The LPG plant already uses a small fraction of the tail gas for its own</p>		

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			<p>consumption. The remaining part is much larger than needed for captive power demand.</p> <ul style="list-style-type: none"> <li>- <b>injection of tail gas into oil reservoir;</b></li> </ul> <p>Currently, part of the tail gas from the LPG plant is re-injected at the Alba field awaiting the start of operation of a new LNG plant adjacent to the industrial site where also the methanol plant is located. At the time of project implementation, the known reserves at the Alba field and the prices for LNG were not sufficient to justify a LNG plant or a methanol plant with higher capacity than the project plant. Re-injection of gas would have decreased the oil to gas ratio, which was not desirable and would thus only have caused higher costs without any related benefit. Thus, re-injection was not an option at the time of decision making.</p> <ul style="list-style-type: none"> <li>- <b>Recovery, transportation, processing and distribution of tail gas to end-users;</b></li> </ul> <p>Part of the tail gas from the LPG plant already fuels a government owned power plant supplying electricity to the island. It is noted here that the Bioko Island was and continuous to be a very virgin environment, with little human</p>		

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			<p>habitat and a poor local population. The current power plant more than suffices today's power demand of the island's inhabitants.</p> <p>- <b>Tail gas is used as a fuel and/or feedstock at offsite facility;</b></p> <p>It is claimed that the option of a LNG plant was not economically viable at the time of project implementation. Only after the project was initiated, new oil reserves have been found at the Alba field, which have led to an extension of the LPG plant capacity and – together with rising LNG prices – has justified the construction of a new LNG plant. This will use the additional tail gas from the expanded LPG plant, and is forecasted to start operation in 2007.</p> <p>- <b>Another source of feedstock, other than the tail gas, is used at the end use facility.</b></p> <p>There is no other feedstock possible than natural gas for the production of methanol and there is no natural gas available on the island.</p> <p>In conclusion, it is clear that the only plausible scenario except for the project activity is scenario 1, i.e. the flaring of the tail gas at the LPG plant. This alternative is in compliance with legal and regulatory</p>		

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



Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			<p>requirements of Equatorial Guinea.  Step 2 has not been chosen.  Step 3</p> <p>The project faces a technological barrier. As mentioned earlier, Equatorial Guinea is one of the poorer non-Annex I countries and there was very limited infrastructure available supporting the construction of the methanol plant. Local inhabitants are mostly low-skilled and work either at foreign oil companies' premises or in the agricultural sector. The Methanol Institute confirmed that there is no other methanol plant in the region. All technology as well as the skilled engineering work force had to be imported. This fact coupled with a decrease in methanol demand during the years 1999 and 2000 incited AMPCO's management to put the project on hold before it finally went ahead with construction that finished in 3 May 2001.</p> <p>Also, neither of the project partners had the methanol production as part of their core business. Evidence provided is the reference to the web-pages of the two investing companies i.e.:</p> <p><a href="http://www.nobleenergyinc.com/neiweb/international.htm#eg">http://www.nobleenergyinc.com/neiweb/international.htm#eg</a>  <a href="http://www.nobleenergyinc.com/neiweb/index.htm">http://www.nobleenergyinc.com/neiweb/index.htm</a>  <a href="http://www.cmsenergy.com/AboutCMS/">http://www.cmsenergy.com/AboutCMS/</a></p>		

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			<p>Although the project was marginally financially viable at the time of investment decision, there is not sufficient evidence to support an economic barrier. This barrier and the investment climate barrier have thus to be removed from the PDD.</p> <p><i>Step 4</i></p> <p>The Methanol Institute confirms that there is no other methanol plant in the region as of today /9/.</p> <p><i>Step 5</i></p> <p>The revenue from the selling of the CERs helps reduce the impact of volatile methanol prices and support an adequate return on investment given the considerable country risk.</p>		
B.2.8. Have the major risks to the baseline been identified?	/1/	DR	<p>Yes. The only plausible major risk to the baseline would mean that the tail gas would actually not have been flared but used for the production of LNG for example, as will be done from 2007 onwards. It is noted here that at the time of investment decision, the proven reserves at the Alba field coupled with lower LNG prices did not make the LNG production from the tail gas at the LPG plant financially viable. Only the discovery of bigger liquids reserves allowed for this option. It is further noted here that the LNG plant does not constitute any risk of tail gas</p>		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			volume being diverted from being sent to the methanol plant, as the methanol plant has a contract of gas delivery with the LPG plant.		
B.2.9. Is all literature and sources clearly referenced?	/1/	DR	Yes.		OK
<b>C. Duration of the Project/ Crediting Period</b> <i>It is assessed whether the temporary boundaries of the project are clearly defined.</i>					
C.1.1. Are the project's starting date and operational lifetime clearly defined and reasonable?	/1/	DR, I	Yes. The project started operation in 3 May 2001, date when AMPCO took care in custody control, which is normally when commercial production starts. Evidence of the starting date has been provided /6/. The project's operational lifetime is 25 years.		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 starting date of the crediting period is 3 May 2001 and a 10 year fixed crediting period has been selected.		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
<b>D. Monitoring Plan</b> <i>The monitoring plan review aims to establish whether all relevant project aspects deemed necessary to monitor and report reliable emission reductions are properly addressed ((Blue text contains requirements to be assessed for optional review of monitoring methodology prior to submission and approval by CDM EB).</i>					
<b>D.1. Monitoring Methodology</b> <i>It is assessed whether the project applies an appropriate baseline methodology.</i>					
D.1.1. Is the monitoring methodology previously approved by the CDM Executive Board?	/1/	DR	Yes, AM0037, version 1 is applied.		OK
D.1.2. Is the monitoring methodology applicable for this project and is the appropriateness justified?	/1/	DR, I	Yes. All applicability criteria have been met.		OK
D.1.3. Does the monitoring methodology reflect good monitoring and reporting practices?	/1/	DR	Yes. The monitoring of baseline and project emissions is straight forward.		OK
D.1.4. Is the discussion and selection of the monitoring methodology transparent?	/1/	DR	Yes.		OK
<b>D.2. Monitoring of Project Emissions</b> <i>It is established whether the monitoring plan provides for reliable and complete project emission data over time.</i>					
D.2.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas emissions within the project boundary during the crediting period?	/1/	DR	Yes. The following parameters are monitored: - Methane content of tail gas delivered to the methanol plant; - diesel use at the methanol plant;		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			<p>- CH<sub>4</sub> emissions from transport of tail gas in pipelines when an accidental event occurs.</p> <p>There are no emissions from the use of energy to transport the tail gas as it exits the LPG plant at a sufficiently high pressure.</p> <p>Most of the plant's energy needs are covered by burning tail gas on-site.</p>		
D.2.2. Are the choices of project GHG indicators reasonable?	/1/	DR, I	<p>A pipeline schematics needs to be provided clearly showing all equipment types such as valves, pump seals, connectors and flanges for all three pipelines i.e.</p> <ul style="list-style-type: none"> <li>- the low-pressure pipeline (transporting the tail gas),</li> <li>- the high-pressure pipeline (transporting the gas containing also liquids and condensate in case of a failure and shutdown at the LPG plant), and</li> <li>- the "REGEN" pipeline (transporting regeneration gas i.e. another waste gas from the LPG plant which otherwise would be flared).</li> </ul>	CL-4	OK
D.2.3. Will it be possible to monitor / measure the specified project GHG indicators?	/1/	DR	<p>Yes. IPCC default factors have been used for the net calorific value and carbon content of diesel.</p> <p>As for the fugitive emissions along the valves and flanges of the pipeline,</p>		OK
D.2.4. Will the indicators give opportunity for real measurements of project emissions?	/1/	DR, I	<p>Yes. For reasons of conservativeness and simplicity, the operation time of the pipeline is assumed 24h/365d and thus not monitored, in line with AM0037.</p>		OK
D.2.5. Will the indicators enable comparison of project	/1/	DR,	Yes. However the monitoring plan in the	CAR-4	OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
data and performance over time?		I	PDD needs to be made more project specific with regards to fuels used, units, sources etc.		
<b>D.3. Monitoring of Leakage</b> <i>It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.</i>					
D.3.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	/1/	DR	<p>No leakage occurs as the fugitive emissions from tail gas transport are not outside the control of the project participants.</p> <p>Also, there is no possibility of additional fuel consumption or substitution of fuels with lower carbon intensity outside the project boundaries.</p>		OK
<b>D.4. Monitoring of Baseline Emissions</b> <i>It is established whether the monitoring plan provides for reliable and complete project emission data over time.</i>					
D.4.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining baseline emissions during the crediting period?	/1/	DR	<p>Yes. The following parameters are monitored:</p> <ul style="list-style-type: none"> <li>- Volume of tail gas utilized at the methanol plant</li> <li>- The carbon content of the tail gas.</li> </ul>		OK
D.4.2. Is the choice of baseline indicators, in particular for baseline emissions, reasonable?	/1/	DR, I	Yes. No energy was used to transport the tail gas to the flare and – for reasons of conservativeness and simplicity – no emission reductions are claimed for the avoidance of fugitive emissions along the pipeline in the baseline.		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
D.4.3. Will it be possible to monitor / measure the specified baseline indicators?	/1/	DR	Yes, all baseline indicator will be monitored		OK
D.4.4. Will the indicators give opportunity for real measurements of baseline emissions?	/1/	DR	Yes.		OK
<b>D.5. Monitoring of Sustainable Development Indicators/ Environmental Impacts</b> <i>It is checked that choices of indicators are reasonable and complete to monitor sustainable performance over time.</i>					
D.5.1. Does the monitoring plan provide the collection and archiving of relevant data concerning environmental, social and economic impacts?	/1/	DR, I	There is no need to monitor environmental, social or economic impacts of the project.		OK
<b>D.6. Project Management Planning</b> <i>It is checked that project implementation is properly prepared for and that critical arrangements are addressed.</i>					
D.6.1. Is the authority and responsibility of project management clearly described?	/1/	DR, I	<p>Yes. The technical services department handles all records related to this project activity. The maintenance department maintains the flow meters and calibration.</p> <p>The operations manager transfers the gas volume records directly from the distributed control system (DCS) into excel files.</p> <p>The carbon and methane content of the tail gas are measured weekly. The ones of the high pressure pipeline are measured when gas is transported i.e. after shutdowns at the LPG plant. The results are transferred manually in the master excel file, where the annual average carbon and methane</p>		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			content is automatically calculated. The diesel consumption is monitored by keeping invoices from the local diesel supplier and cross-checking it with the records from the diesel supplier itself.		
D.6.2. Is the authority and responsibility for registration, monitoring, measurement and reporting clearly described?	/1/	DR	Yes. The shift supervisor reports the flow data. The laboratory supervisor reports the carbon and methane content. Internal verification is performed by the production manager. The flow rate measurement records are the basis for PSC (MEGPL) to invoice AMPCO for the gas flow. PSC thus cross-checks the measurements. Cross-checking is done by PSC (MEGPL).		OK
D.6.3. Are procedures identified for training of monitoring personnel?	/1/	DR, I	Yes. The maintenance department organizes training programmes for operators.		OK
D.6.4. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/	DR, I	Yes. The emergency shutdown procedures for the plant are in place.		OK
D.6.5. Are procedures identified for calibration of monitoring equipment?	/1/	DR	Yes. All monitoring equipment is calibrated according to equipment standards.		OK
D.6.6. Are procedures identified for maintenance of monitoring equipment and installations?	/1/	DR	Yes.		OK
D.6.7. Are procedures identified for monitoring, measurements and reporting?	/1/	DR	Yes.		OK
D.6.8. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	/1/	DR	Yes. The flow meter records are part of the distributed control system and can – at any time – be verified. The records of the carbon and methane content analyses are all saved electronically in the laboratory computer and		OK

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



Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			regular backups are taken. The diesel records are kept along with other purchasing information.		
D.6.9. Are procedures identified for dealing with possible monitoring data adjustments and uncertainties?	/1/	DR	Yes. In case of discrepancies between the tail gas volumes measured at AMPCO and MEGPL, the settlement is done in accordance with the existing gas agreement.		OK
D.6.10. Are procedures identified for review of reported results/data?	/1/	DR, I	Yes. AMPCO's project engineer is in charge of reviewing all GHG data.		OK
D.6.11. Are procedures identified for internal audits of GHG project compliance with operational requirements where applicable?	/1/	DR, I	Yes.		OK
D.6.12. Are procedures identified for project performance reviews before data is submitted for verification, internally or externally?	/1/	DR	Yes. Accounting audits are held at the end of each year.		OK
D.6.13. Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting?	/1/	DR	Yes.		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
<b>E. Calculation of GHG Emissions by Source</b> <i>It is assessed whether all material GHG emission sources are addressed and how sensitivities and data uncertainties have been addressed to arrive at conservative estimates of projected emission reductions.</i>					
<b>E.1. Project GHG Emissions</b> <i>The validation of ex-ante estimated project GHG emissions focuses on transparency and completeness of calculations.</i>					
E.1.1. Are all aspects related to direct and indirect GHG emissions captured in the project design?	/1/	DR	Yes. Project emissions stem from fugitive CH <sub>4</sub> emissions along the pipeline and diesel use at the methanol plant.		OK
E.1.2. Are the GHG calculations documented in a complete and transparent manner?	/1/	DR	Yes.		OK
E.1.3. Have conservative assumptions been used to calculate project GHG emissions?	/1/	DR	The following needs revision in the PDD version 1: - IPCC default values from the 2006 IPCC Guidelines for National Greenhouse Gas Inventories need to be used; - the years 2005 – 2011 data (including reasonable forecasts) need to be added; - the calculations of the fugitive CH <sub>4</sub> emissions along the pipeline need to be revised; - all flow gas units need to be transformed in metric units.	<del>CAR-5</del>	OK
E.1.4. Are uncertainties in the GHG emissions estimates properly addressed in the	/1/	DR	Yes.		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
documentation?					
E.1.5. Have all relevant greenhouse gases and source categories listed in Kyoto Protocol Annex A been evaluated?	/1/	DR	Yes. CO <sub>2</sub> and CH <sub>4</sub> are considered.		OK
<b>E.2.Leakage</b> <i>It is assessed whether there leakage effects, i.e. change of emissions which occurs outside the project boundary and which are measurable and attributable to the project, have been properly assessed and estimated ex-ante.</i>					
E.2.1. Are potential leakage effects beyond the chosen project boundaries properly identified?	/1/	DR	No leakage calculations are required.		OK
<b>E.3.Baseline Emissions</b> <i>The validation of ex-ante estimated baseline GHG emissions focuses on transparency and completeness of calculations.</i>					
E.3.1. Have the most relevant and likely operational characteristics and baseline indicators been chosen as reference for baseline emissions?	/1/	DR, I	Yes. As the methanol plant has been in operation since 2001, detailed data on past performance is available.		OK
E.3.2. Are the baseline boundaries clearly defined and do they sufficiently cover sources and sinks for baseline emissions?	/1/	DR	Yes. No fuel was needed to transport the gas to the flare and – for reasons of conservativeness and simplicity – the fugitive emissions along the pipeline in the baseline scenario are not accounted for.		OK
E.3.3. Are the GHG calculations documented in a complete and transparent manner?	/1/	DR, I	During the site visit, slight inconsistencies between the quantities and carbon contents reported in the PDD and the monitoring records have been detected. The calculations in part E.4 and Annex 3 thus	CAR-6	OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			need to be reviewed.		
E.3.4. Have conservative assumptions been used when calculating baseline emissions?	/1/	DR	Yes. See E.3.2.		OK
E.3.5. Are uncertainties in the GHG emission estimates properly addressed in the documentation?	/1/	DR	Yes. There is little uncertainty in the GHG emission estimates as they are based on monitored data in terms of the gas flow and carbon content.		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	Yes.		OK
<b>E.4.Emission Reductions</b> <i>Validation of ex-ante estimated emission reductions.</i>					
E.4.1. Will the project result in fewer GHG emissions than the baseline scenario?	/1/	DR	Yes. The project is forecast to reduce on average 2 263 165 tCO <sub>2e</sub> per year.		OK
<b>F. Environmental Impacts</b> <i>Documentation on the analysis of the environmental impacts will be assessed, and if deemed significant, an EIA should be provided to the validator.</i>					
F.1.1. Has an analysis of the environmental impacts of the project activity been sufficiently described?	/1/	DR, I	Yes. Possible impacts of methanol spills to the water are considered insignificant. Possible impacts on employees in case of their skin being in contact with methanol, have been analysed and safety measures and procedures implemented. Nearby company housing has been emptied and is only used for rotating employees during shutdowns of the plant.		OK
F.1.2. Are there any Host Party requirements for an	/1/	DR	No.		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
Environmental Impact Assessment (EIA), and if yes, is an EIA approved?					
F.1.3. Will the project create any adverse environmental effects?	/1/	DR	No significant environmental impacts are foreseen.		OK
F.1.4. Are transboundary environmental impacts considered in the analysis?	/1/	DR	No, there are no plausible transboundary environmental impacts.		OK
F.1.5. Have identified environmental impacts been addressed in the project design?	/1/	DR	Yes. Precautionary measures have been taken.		OK
F.1.6. Does the project comply with environmental legislation in the host country?	/1/	DR	Yes.		OK
<b>G. Stakeholder Comments</b> <i>The validator should ensure that a stakeholder comments have been invited and that due account has been taken of any comments received.</i>					
G.1.1. Have relevant stakeholders been consulted?	/1/	DR, I	Relevant stakeholders are the government as this methanol plant has been built on the existing industrial premises called "Punta Europa", as well as the other companies operating at Punta Europa. The government has been involved, which is evidenced by the fact that a government-owned company Sonagas has a 25% stake in the CERs. Also, the project has a manufacturing and marketing agreement with the government.		OK
G.1.2. Have appropriate media been used to invite comments by local stakeholders?	/1/	DR	Yes. Many meetings were held with both the government and the companies operating at Punta Europa.		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	/1/	DR, I	No stakeholder consultation process is required by Equatorial Guinea's regulations than the one that has been carried out with		OK

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

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
out in accordance with such regulations/laws?			local and national authorities.		
G.1.4. Is a summary of the stakeholder comments received provided?	/1/	DR	No comments were received.		OK
G.1.5. Has due account been taken of any stakeholder comments received?	/1/	DR	No comments were received.		OK

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

**Table 3: Resolution of Corrective Action and Clarification Requests**

<b>Draft report corrective action requests and requests for clarifications</b>	<b>Ref. to Table 2</b>	<b>Summary of project participants' response</b>	<b>Final conclusion</b>
CAR 1 The project has not yet received host country approval and the project participants have not yet been authorized by Equatorial Guinea or UK to participate in the project.	Table 1, A.3.3	Letters of Approvals have been submitted to the DOE	Reviewed and closed.
CAR 2 More evidence is required with regards to the starting date of the project activity falling between 2000-01-01 and the date of registration of the first CDM project. Also, evidence is required to prove that the incentive from the CDM was seriously considered in the decision to proceed with the project activity.	B.2.7	The document "Notice of first industrial production" determines the starting date of the project activity to 3 May 2001. Memorandum of 10 May 2000 shows that the project has been put on hold because of uncertainty of methanol prices and possible banning of MTBE in United States, but a decision was taken to proceed with the construction of the factory because of the possibilities for emission credits through USIJI. A report from the CMS Energy Board 20 September 2000 shows that the final goal was CDM credits, not USIJI.	OK. "Notice of first industrial production" shows that AMPCO took care in custody control 3 May 2001 and that the commercial production started after that. It seems clear from the documents that emission credits was important to overcome the barriers to completion of the project, and that CDM was considered in the decision process. A CMS Energy Board report from 20 September 2000 /8/ clearly shows that the final goal is credits under CDM.
CAR 3 Although the project was marginally financially viable at the time of investment decision, there is not sufficient evidence to support a financial barrier.	B.2.7	Investment barrier has been removed.	Reviewed and closed.
CAR 4 The monitoring plan in the PDD needs to be made more project specific with regards to fuels used, units, sources etc.	D.2.5	PDD has been updated with more project specific information	Reviewed and closed
CAR 5	E.1.3	The spreadsheet has been updated	Reviewed and closed

<b>Draft report corrective action requests and requests for clarifications</b>	<b>Ref. to Table 2</b>	<b>Summary of project participants' response</b>	<b>Final conclusion</b>
<p>The following needs revision in the PDD version 1:</p> <ul style="list-style-type: none"> <li>- IPCC default values from the 2006 IPCC Guidelines for National Greenhouse Gas Inventories need to be used;</li> <li>- the years 2005 – 2011 data (including reasonable forecasts) need to be added;</li> <li>- the calculations of the fugitive CH<sub>4</sub> emissions along the pipeline need to be revised;</li> <li>- all flow gas units need to be transformed in metric units.</li> </ul>		with this information.	
<p>CAR 6</p> <p>During the site visit, slight inconsistencies between the quantities and carbon contents reported in the PDD and the monitoring records have been detected. The calculations in part E.4 and Annex 3 thus need to be reviewed.</p>	E.3.3	Inconsistencies have been corrected and tables replaced in E.4. and Annex 3.	Reviewed and closed
<p>CL 1</p> <p>A pipeline schematics needs to be provided clearly showing all equipment types such as valves, pump seals, connectors and flanges for all three pipelines i.e.</p> <ul style="list-style-type: none"> <li>- the low-pressure pipeline (transporting the tail gas),</li> <li>- the high-pressure pipeline (transporting the gas containing also liquids and condensate in case of a failure and shutdown at the LPG plant), and</li> <li>- the "REGEN" pipeline (transporting reformed</li> </ul>	D.2.2	Pipeline schematics for three pipelines have been included in the PDD.	Reviewed and closed



<b>Draft report corrective action requests and requests for clarifications</b>	<b>Ref. to Table 2</b>	<b>Summary of project participants' response</b>	<b>Final conclusion</b>
gas i.e. another waste gas from the LPG plant which otherwise would be flared.			

## **APPENDIX B**

---

### **CERTIFICATES OF COMPETENCE**



---

## CERTIFICATE OF COMPETENCE

---

***Hendrik W. Brinks***

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJi-i1

***GHG Auditor:*** Yes

***CDM Validator:*** - ***JI Validator:*** -

***CDM Verifier:*** - ***JI Verifier:*** -

***Industry Sector Expert for Sectoral*** Sectoral scope 1,2,3,12  
***Scope(s):***

Høvik, 1 February 2007

Einar Telnes  
Director, International Climate Change Services

Michael Lehmann  
Technical Director



# CERTIFICATE OF COMPETENCE

***Susanne Haefeli***

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJ1-i1)

<b>GHG Auditor:</b>	Yes		
<b>CDM Validator:</b>	Yes	<b>JI Validator:</b>	Yes
<b>CDM Verifier:</b>	--	<b>JI Verifier:</b>	--
<b>Industry Sector Expert for Sectoral Scope(s):</b>	--		
<b>Technical Reviewer for (group of) methodologies:</b>			
ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G	Yes	AM0021	--
ACM002, AMS-I.A-D, AM0019, AM0026, AM0029	Yes	AM0023	--
ACM003, ACM0005, AM0033, AM0040	--	AM0024	--
ACM0004	--	AM0027	--
ACM0006, AM0007, AM0015, AM0036, AM0042	Yes	AM0028, AM0034	--
ACM0007	--	AM0030	--
ACM0008	--	AM0031	--
ACM0009, AM0008, AMS-III.B	--	AM0032	--
AM0006, AM0016, AMS-III.D	Yes	AM0035	--
AM0009, AM0037	--	AM0038	--
AM0013, AM0022, AM0025, AM00379, AMS- III.H, AMS-III.I	--	AM0041	--
AM0014	--	AM0034	--
AM0017	--	AMS-II.A-F	--
AM0018	--	AMS-III.A	--
AM0020	--	AMS-III.E, AMS-III.F	--

Høvik, 6 November 2006

**Einar Telnes**  
*Director, International Climate Change Services*

**Michael Lehmann**  
*Technical Director*



---

## CERTIFICATE OF COMPETENCE

---

***Soumik Biswas***

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJI-i1

<b><i>GHG Auditor:</i></b>	Yes		
<b><i>CDM Validator:</i></b>	Yes	<b><i>JI Validator:</i></b>	--
<b><i>CDM Verifier:</i></b>	--	<b><i>JI Verifier:</i></b>	--
<b><i>Industry Sector Expert for Sectoral Scope(s):</i></b>	--		

Høvik, 6 November 2006

Einar Telnes  
*Director, International Climate Change Services*

Michael Lehmann  
*Technical Director*



# CERTIFICATE OF COMPETENCE

***Michael Lehmann***

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJ1-i1)

<b>GHG Auditor:</b>	Yes		
<b>CDM Validator:</b>	Yes	<b>JI Validator:</b>	Yes
<b>CDM Verifier:</b>	Yes	<b>JI Verifier:</b>	Yes
<b>Industry Sector Expert for Sectoral Scope(s):</b>	Sectoral scope 1,2,3 & 9		
<b>Technical Reviewer for (group of) methodologies:</b>			
ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G	Yes	AM0021	Yes
ACM002, AMS-I.A-D, AM0019, AM0026, AM0029	Yes	AM0023	Yes
ACM003, ACM0005, AM0033, AM0040	Yes	AM0024	Yes
ACM0004	Yes	AM0027	Yes
ACM0006, AM0007, AM0015, AM0036, AM0042	Yes	AM0028, AM0034	Yes
ACM0007	Yes	AM0030	Yes
ACM0008	Yes	AM0031	Yes
ACM0009, AM0008, AMS-III.B	Yes	AM0032	Yes
AM0006, AM0016, AMS-III.D	Yes	AM0035	Yes
AM0009, AM0037	Yes	AM0038	Yes
AM0013, AM0022, AM0025, AM00379, AMS-III.H, AMS-III.I	Yes	AM0041	Yes
AM0014	Yes	AM0034	Yes
AM0017	Yes	AMS-II.A-F	Yes
AM0018	Yes	AMS-III.A	Yes
AM0020	Yes	AMS-III.E, AMS-III.F	Yes

Høvik, 6 November 2006

**Einar Telnes**  
*Director, International Climate Change Services*

**Michael Lehmann**  
*Technical Director*



## CERTIFICATE OF COMPETENCE

***Einar Ternes***

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJ1-i1)

<b>GHG Auditor:</b>	Yes		
<b>CDM Validator:</b>	Yes	<b>JI Validator:</b>	Yes
<b>CDM Verifier:</b>	Yes	<b>JI Verifier:</b>	Yes
<b>Industry Sector Expert for Sectoral Scope(s):</b>	Sectoral scope 1,2,3,6 & 10		
<b>Technical Reviewer for (group of) methodologies:</b>			
ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G	Yes	AM0021	Yes
ACM002, AMS-I.A-D, AM0019, AM0026, AM0029	Yes	AM0023	Yes
ACM003, ACM0005, AM0033, AM0040	Yes	AM0024	Yes
ACM0004	Yes	AM0027	Yes
ACM0006, AM0007, AM0015, AM0036, AM0042	Yes	AM0028, AM0034	Yes
ACM0007	Yes	AM0030	Yes
ACM0008	Yes	AM0031	Yes
ACM0009, AM0008, AMS-III.B	Yes	AM0032	Yes
AM0006, AM0016, AMS-III.D	Yes	AM0035	Yes
AM0009, AM0037	Yes	AM0038	Yes
AM0013, AM0022, AM0025, AM00379, AMS-III.H, AMS-III.I	Yes	AM0041	Yes
AM0014	Yes	AM0034	Yes
AM0017	Yes	AMS-II.A-F	Yes
AM0018	Yes	AMS-III.A	Yes
AM0020	Yes	AMS-III.E, AMS-III.F	Yes

Høvik, 6 November 2006

Einar Ternes  
Director, International Climate Change Services

Michael Lehmann  
Technical Director