

Validation Report

PetroSA Biogas to Energy Project

Final Report



Client: MethCap SPV1(Pty) Ltd
Client Contact: Charles Liebenberg
Date: 17 August 2006

Independent Assurance Statement to MethCap SPV1 (Pty) Ltd

Responsibilities and scope

We have been engaged to carry out a validation of the “PetroSA biogas to energy” project (hereafter called “the project”) in South Africa in order to express a conclusion on the Project Design Document (PDD) version 11, dated 16 August 2006, as well as the projected annual emission reduction volumes. Our conclusions are based on the information contained in the Project Design Document (PDD) version 11, dated 16 August 2006, and associated monitoring plan dated 25 January 2006. The basis for the opinion are the criteria set by the United Nations Framework Convention for Climate Change (UNFCCC) for the Clean Development Mechanism (CDM), the simplified modalities and procedures for small-scale CDM project activities and the subsequent decisions by the CDM Executive Board.

Project description

This project falls under the approved small-scale methodology AMS-I.D “*Grid connected renewable electricity generation*” (Version 9). The project proposes to use biogas resulting from anaerobic digestion of wastewater at a petroleum refinery. The proposed installation will make use of the waste gas, presently flared, to generate electricity for the on-site use by the Petroleum Oil and Gas Corporation of South Africa (PetroSA). This installation will be built, owned, operated and maintained by MethCap SPV1 (Propriety) Limited (MethCap SPV 1); the project developer. MethCap SPV1 has prepared the PDD and monitoring plan. The estimated annual electricity production is 31.6 GWh and the project is expected to reduce carbon dioxide (CO₂) emissions by 29 933 tons of CO₂ equivalent annually. This installation has, however, not been constructed yet. Therefore, the evaluation was based on interviews, a site visit, review of project documentation, proposed procedures as well as relevant contracts. Initial verification will have to be performed to determine the effectiveness of implementation and the degree of compliance with proposed policies and procedures.

Assurance engagement

Our engagement was performed to provide reasonable assurance on the PDD and limited assurance¹ on the projected annual CO₂ emission reduction volumes. The engagement was conducted in accordance with the International Assurance Standard on Assurance Engagements other than Audits or Reviews of Historical Financial Information (ISAE3000). The validation consisted of the following four phases:

- i) A document review of the PDD;
- ii) Revision of the validation protocol;
- iii) On-site visit and interviews with project stakeholders, and
- iv) The resolution of outstanding issues and the issuance of the final validation report and opinion.

¹ The reason for the limited assurance on the emission reduction volumes is due to the fact that the quantity will remain an estimate as the installation is not yet operational, therefore the exact volume remains uncertain. This number and the assumption underlying its calculation has, however, been evaluated to ensure a conservative estimate.

Work performed on the PDD

Our work comprised the following procedures for evaluation of the PDD:

- For the evaluation of the “business as usual” scenario, interviews were held with relevant technical and engineering managers at PetroSA, to evaluate the current processes and verify the existence and quality of the anaerobic digesters and flaring system. We assessed data trends of the gas composition for the last five years and tested the calculations made at PetroSA.
- For the financial additionality we inspected the calculation and recalculated the Net Present Values and Internal Rate of Return. The calculation method and assumptions used in the calculation were discussed with the director, Mr. C Liebenberg from MethCap SPV1, to determine whether it seems reasonable.
- Estimated methane production as the input stream has been verified to determine the conservativeness of the calculation. The parameter for the calculations was evaluated and the results compared to the PetroSA estimates.
- We evaluated the remaining information in the PDD for consistency with our knowledge of the South African regulatory and current operating environment.

We believe that our work provides a reasonable basis for our conclusion on the PDD.

Work performed on the projected annual CO₂ emission reduction volumes

Our work comprised the following procedures for evaluation of the projected annual CO₂ emission reduction volumes:

- For the greenhouse gas reduction estimates we evaluated the technical model and calculations, and compared the data with PetroSA estimates.

Although, due to the nature of the projected annual CO₂ emission reduction volume, only a limited assurance can be obtained, enough evidence has been obtained to reach a conclusion.

Conclusion

We conclude that the PDD “PetroSA biogas to energy project”, version 11, dated 16 August 2006, meets all relevant UNFCCC criteria and correctly applies the baseline and monitoring methodology AMS-I.D “*Grid connected renewable electricity generation*” (Version 9).

Nothing has come to our attention to indicate that the projected annual emission reduction of 29 933 tCO₂e is not achievable.

PricewaterhouseCoopers Inc. (South Africa) thus requests the registration of the project as a CDM project activity.



Herman Zulch
Partner, PricewaterhouseCoopers Inc
Registered Accountants and Auditors
Applicant Entity UNFCCC ref no: CDM-E-0029
Sunninghill, South Africa
17 August 2006

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1. Introduction

MethCap SPV 1 (Pty) Ltd (MethCap SPV1) has commissioned PricewaterhouseCoopers Certification to validate the “PetroSA biogas to energy” project (hereafter called “the project”). This report summarises the findings of the validation of the small-scale project, performed on the basis of UNFCCC criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

UNFCCC criteria refer to the Kyoto Protocol criteria, the CDM rules and modalities as agreed in the Bonn Agreement, the Marrakech Accords and the CDM Executive Board’s decisions.

The validation team consisted of the following personnel:

Ms Harmke Immink	DOE Manager
Mr Brian Hayes	GHG lead auditor
Mr Anton-Louis Olivier	Technical Expert, energy generation
Ms Marna Nel	Junior assessor
Mr Louis Nell	Chartered Accountant
Mr Jacs van Rooy	Technical reviewer
Mr Ferdi Linde	Internal quality reviewer

OBJECTIVE

MethCap SPV1 has commissioned PricewaterhouseCoopers to validate the “PetroSA biogas to energy” project. 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 reasonable and meets the stated requirements and identified criteria. Validation is a requirement for all CDM projects and is seen as necessary in providing assurance to stakeholders on the quality of the project and its intended generation of certified emission reductions (CERs).

SCOPE

The validation scope is defined as an independent and objective review of the project design document, the project’s baseline study and monitoring plan, and other relevant documents. The information in these documents is reviewed against Kyoto Protocol requirements, UNFCCC rules and associated interpretations. PricewaterhouseCoopers has, based on the recommendations in the Validation and Verification Manual, employed a risk-based approach in the validation, focusing on the identification of significant risks for project implementation and the generation of CERs.

The validation is not meant to provide any consulting or advice for the project participants. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the project design.

GHG PROJECT DESCRIPTION

PetroSA (The Petroleum Oil and Gas Corporation of South Africa) is a state-owned petroleum refinery which is situated some 12 kilometres from Mossel Bay, on the south coast of South Africa. The production process at the plant results in waste process water that has been processed through anaerobic digestion. The anaerobic digestion is continuous and a critical process for the operation of the PetroSA plant. In the anaerobic digestion process biogas is naturally generated.

The digesters are equipped with a smokestack that houses a flaring apparatus to flare the biogas. It is estimated that the equivalent of at least 1 300 gigawatt-hours of gross heat value has been wasted in this manner over the lifetime of the plant.

The proposed project will use the waste gas currently flared to generate electricity to be used on-site by PetroSA. This project will be built, owned, operated and maintained by MethCap SPV1 the project developer. Annual electricity production of 31.6 GWh is forecasted and the project is expected to reduce CO₂ emissions by 29 933tCO₂e annually.

2. Methodology

The validation consisted of the following four phases:

- I A document review of the project design documentation;
- II Revision of the validation protocol;
- III On-site visit to PetroSA; and
- IV 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. The protocol describes criteria (requirements), means of verification and the results from validating the identified criteria, in a transparent manner. 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 of the “PetroSA biogas to energy” 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 that directly impact 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 validation team may also use the term Clarification, where:

- iv) additional information is needed to fully clarify an issue.

Validation Protocol Table 1: Mandatory requirements			
Requirement	Reference	Conclusion	Cross reference
The requirements the project must meet.	Gives reference to the legislation or agreement where the requirement is found.	This is either acceptable based on evidence provided (OK), or a Corrective Action Request (CAR) of risk or non-compliance with stated requirements. The corrective action requests are numbered and presented to the client in the Validation report.	Used to refer to the relevant checklist questions in Table 2 to show how the specific requirement is validated. This is to ensure a transparent Validation process.

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

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

Figure 1 Validation protocol tables

REVIEW OF DOCUMENTS

The Project Design Documentation submitted by MethCap SPV1 (Ltd) Pty are listed as Reference documents in section 6. These documents were assessed during a document review session on 14 December 2005 and 16 August 2006.

FOLLOW-UP INTERVIEWS

In January 2006, PricewaterhouseCoopers performed interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. Information was obtained during the on-site visit 12 January 2006 and a validation meeting in Johannesburg on 18 January 2006. Representatives of MethCap SPV1 (Pty) Ltd as well as PetroSA were interviewed. The main topics of the interviews are summarised in Table 2. The revised PDD, version 11, dated 16 August 2006, were assessed on 16 August 2006.

Table 2 Interview topics

Organisation interviewed	Interview topics
MethCap SPV1 (Pty) Ltd	<ul style="list-style-type: none"> ➤ General information about the project ➤ Baseline determination ➤ Monitoring and management ➤ Financial analysis, project barrier and additionality ➤ Stakeholder consultation ➤ Changes in PDD versions
PetroSA	<ul style="list-style-type: none"> ➤ Technology on site ➤ Project management ➤ Risks involved and safety standards

RESOLUTION OF CLARIFICATION AND CORRECTIVE ACTION REQUESTS

One Corrective Action Request has been identified during the validation of the project, pertaining to the outstanding host country approval. The South African government, as a host country for this project, only provides approval on receiving the draft report from the validators. The host country approval is, therefore, outstanding during the initial stages of the project. Host country approval has however been obtained and this corrective action is cleared. Clarification Requests raised by PricewaterhouseCoopers have been resolved during communications between PricewaterhouseCoopers and MethCap SPV1.

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

3. Validation findings

The findings of the validation are stated in the following sections. The validation criteria (requirements), the means of verification and the results from validating the identified criteria are documented in more detail in the validation protocol in Appendix A. The final validation findings relate to the project design as documented and described in the revised and resubmitted project design documentation of January 2006.

The following sections describe the findings of the validation. The validation findings for each validation subject are presented as follows:

- 1) The findings from the desk review of the original project design documents and the findings from interviews during the follow-up visit are summarised. A more detailed record of these findings can be found in the Validation Protocol in Appendix A.
- 2) Where PricewaterhouseCoopers had identified issues that needed clarification or that represented a risk to the fulfilment of the project objectives, a Clarification or Corrective Action Request, respectively, has been issued. The Clarification and Corrective Action Requests are stated, where applicable, in the following sections and are further documented in the Validation Protocol in Appendix A. The validation of the Project resulted in one Corrective Action Request and twenty seven Clarification Requests.
- 3) The exchanges between the MethCap SPV1 and PricewaterhouseCoopers to resolve these Clarifications are summarised in the protocol attached as Appendix A.
- 4) The conclusions for validation subject are indicated as cleared, where enough evidence was provided to clarify the respective issues.

The final validation findings relate to the project design as documented and described in the revised and resubmitted project design documentation.

PARTICIPATION REQUIREMENTS

This is a unilateral project. The host country is South Africa. Government of South Africa ratified the Kyoto Protocol in 2002 and the Designated National Authority resides in the Department of Minerals and Energy.

The project was approved by the South African DNA on 17 February 2006.

PROJECT DESIGN

The "PetroSA biogas to energy" project involves the installation of three Jenbacher engines with a total installed capacity of 4.248 MW estimated to yield an annual generation of 37 212.48 MWh. In every third year the PetroSA plant is expected to have a shut-down and less electricity will be generated. There will probably also be down-time/maintenance on the Jenbacher engines in other years. If a conservative, average, annual load factor of 85% is selected, the project will generate approximately 31 Gigawatt-hours of electricity annually. The project contributes to sustainable development by production of electricity based on a renewable source. The electricity will be introduced back into the local grid and used onsite by PetroSA. It has been

confirmed by the South African DNA that the project contributes to the national sustainable development criteria.

The maximum electricity generation capacity of the project does not exceed the 15MW threshold for small-scale CDM project activities. Thus, the project is eligible as category AMS-I.D of small-scale CDM activities.

The financial plans for the project do not involve public funding from Annex I countries.

The project's crediting period is ten years and will start in 2006.

BASELINE AND ADDITIONALITY

The project applies the approved simplified baseline methodology for type AMS-I.D “*Grid connected renewable electricity generation*” (Version 9) small-scale CDM project activities:

The additionality criteria of the simplified baseline methodology for a small-scale CDM project activity require the project participants to demonstrate that the project activity would otherwise not be implemented due to the existence of barriers. The PDD describes both investment and prevailing practice barriers. It is demonstrated that the project itself is not a likely baseline scenario due to the existence of the various barriers.

The project is an AMS-I.D “*Grid connected renewable electricity generation*” (Version 9) defined in the simplified modalities and procedures for a small-scale CDM project activities. The baseline as specified in Section 9 and 9b of AMS-I.D “*Grid connected renewable electricity generation*” (Version 9) is:

“For all other systems, the baseline is the kWh produced by the renewable generating unit multiplied by an emission coefficient (measured in kg CO₂equ/kWh) calculated in a transparent and conservative manner as:

- (a); or*
- (b) The weighted average emissions (in kg CO₂equ/kWh) of the current generation mix. The data of the year in which project generation occurs must be used”.*

This has been calculated in a transparent and conservative manner as the weighted average emissions (in kg CO₂equ/kWh) of the current generation mix as provided by the national utility ESKOM.

MONITORING PLAN

The project applies the simplified monitoring methodology proposed for *Grid connected renewable electricity generation* project activities (Type AMS-I.D Version 9).

The monitoring methodology will provide real-time measurement of energy production and thus the achieved emission reductions. In addition to the calibrated Alstom meter, which will be the primary source of electricity production data, the DIA.NE WIN online management system of the Jenbacher power plant will be used as for indicative purposes. Data will be archived by MethCap SPV1 Compliance Officer (Elzette

Gaigher). In accordance with the methodology, AMS-I.D “*Grid connected renewable electricity generation*” (Version 9) no leakage is considered.

Detailed responsibilities and authorities for project management, procedures for monitoring and reporting, and QA/QC procedures are described and allow for consistent subsequent verifications of emission reduction.

CALCULATION OF GHG EMISSIONS

The project spatial boundaries are clearly described.

Appropriate assumptions regarding expected amounts of electricity generated have been used to forecast emission reductions. An average load factor of 85% has been assumed and is deemed to be reasonable based on the operating regime and proven operating figures of the Jenbacher turbines.

The project does not represent equipment transfer from another activity and leakage calculations are not required for category AMS-I.D project activities.

ENVIRONMENTAL IMPACTS

Environmental effects are sufficiently addressed and will not be significant. South African law requires an Environmental Impact Assessment (EIA) to be completed for the project. A scoping EIA has been carried out and exemption of a full EIA has been issued and approved by the relevant authority confirming the negligible environmental impact resulting from the project. The Project Activity is a listed activity in terms of the Environment Conservation Act and the regulations thereto.

COMMENTS BY LOCAL STAKEHOLDERS

Local stakeholders have been consulted. The local stakeholder process includes the publication of the project in newspapers. The local stakeholder involvement process has been assessed in the scoping EIA, based on which the environmental licence has been issued. The responses of MethCap SPV1 to the stakeholder comments are summarised in the PDD.

4. Comments by parties, stakeholders and NGOs

The PDD, version 7, was made publicly available on www.cdm.unfccc.int/projects/validation and parties, stakeholders and NGOs were invited through the CDM website to provide comments during the period of 22 December 2005 to 20 January 2006. No comments were received.

5. Validation conclusion

PricewaterhouseCoopers has performed a validation of the PetroSA biogas to energy project in South Africa. The validation was performed on the basis of UNFCCC criteria, as well as criteria given by the International Emission Trading Association (IETA) to provide for consistent project operations, monitoring and reporting.

The review of the project design documentation and the subsequent follow-up interviews have provided PricewaterhouseCoopers with sufficient evidence to determine

the fulfilment of stated criteria. In our opinion, the project meets relevant UNFCCC requirements for the CDM. The project will hence be recommended by PricewaterhouseCoopers for registration with the UNFCCC.

South Africa, the host party, has confirmed that the project activity assists it in achieving sustainable development. By replacing fossil fuel-based electricity with electricity generated from a renewable source, the project results in reductions of CO₂ emissions that are real, measurable and give long-term benefits to the mitigation of climate change. An analysis of the investment and technological barriers demonstrates that the proposed project activity is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity. Provided that the project is implemented as designed, the project is likely to achieve the estimated amount of emission reductions.

The GHG emission calculations are documented in a complete and transparent manner. The algorithm and methodologies for accounting GHG emissions are appropriate and emission factors are deemed to be of sufficient accuracy.

Detailed responsibilities and authorities for project management, monitoring and reporting and QA/QC procedures have been developed and are documented in the Monitoring Plan and respective contracts.

PricewaterhouseCoopers requests the registration of the “PetroSA biogas to energy” project as a CDM project activity.

6. References

A. Documents provided by the project proponent that relate directly to the project.

1. Letter from the NER to Eskom, dated 29 June 2004, confirming approval of the NER Energy Efficiency and Demand Side Management Regulatory Policy on 25 May 2004.
2. Record of Decision (ROD) dated 6 December 2005 from the Department of Environmental Affairs and Development Planning (DEADP) in respect of the PetroSA biogas to energy project.
3. Fieldstone Africa (Pty) Ltd: Statement on barriers to renewable energy and private equity hurdle rates regarding renewable energy in South Africa, dated 13 December 2005.
4. Owner's Letter of Consent for the PetroSA biogas to energy project from PetroSA to the Department of Environmental Affairs and Development Planning, dated 11 July 2005.
5. PDD version 5: PetroSA biogas to energy project.
6. PDD version 6: PetroSA biogas to energy project.
7. Memorandum of Understanding (MoU) between MethCap (Pty) Ltd and The Petroleum Oil and Gas Corporation of South Africa (Pty) Ltd (“PetroSA”) dated 10 March 2005.
8. Five-year Digester Data provided by PetroSA Process Engineer Process Technology (Claudio Miller).
9. Specifications for GE Jenbacher Gas Engine JGS 420 GS-B.L.

10. http://www.gepower.com/prod_serv/products/recipe_engines/en/downloads/type4_en.pdf
11. Draft GE Jenbacher Preventive and Corrective Agreement between GE Jenbacher and MethCap SPV1 (Pty) Ltd.
12. Letter from Eden District Municipality to the Department of Environmental Affairs and Development Planning, dated 9 June 2005, acknowledging royalty for poverty alleviation projects
13. DSM Subsidy Application by BioTherm (Pty) Ltd as the Energy Services Company and project manager.
14. Comments/minutes of stakeholder meeting held at the PetroSA site on 7 September 2005.
15. Copy of advertisement of the Environmental Impact Assessment ("EIA") process for the PetroSA biogas to energy project as published in the Mossel May Advertiser on 29 July 2005.
16. PetroSA Biogas Monitoring Plan – 25 January 2006.
17. PDD version 7: PetroSA biogas to energy project.
18. PDD version 8: PetroSA biogas to energy project.
19. PDD version 9: PetroSA biogas to energy project.
20. DNA letter of approval 16 February 2006
21. DNA unconditional letter of approval 23 February 2006
22. PetroSA Biogas Monitoring Plan – 7 April 2006
23. PDD version 10: PetroSA biogas to energy project.
24. PDD version 11: PetroSA biogas to energy project.

B. Background documents relating to the design and/or methodologies employed in the design or other reference documents:

1. Validation Protocol.
2. Methodology AMS-1.D Version 7.
3. Methodology AMS-1.D Version 8.
4. Validation Procedure (PwC-DOE/209).
5. DNV Validation Report.
6. PwC-DOE/311.1A: Validation Report Template.
7. Environment conservation act No 73 of 1989, Sec 20.
8. White Paper on Renewable Energy.
9. Methodology AMS-1.D Version 9.

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

1. Charles Liebenberg, Managing Director, MethCap (Pty) Ltd and MethCap SPV1 (Pty) Ltd
2. Carel Steyn, Optimisation and Development Manager, PetroSA
3. Andre Claassen, Electrical Reliability Engineer, PetroSA
4. Claudio Miller, Process Engineer Process Technology, PetroSA
5. Eileen Green, Environmental Leader, PetroSA

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Appendix A:

Validation Protocol for small-scale CDM project activities

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

REQUIREMENT	REFERENCE	CONCLUSION	Cross Reference/ Comment
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3.	Kyoto Protocol Art. 12.2	OK	Table 2, Section E.4.1
2. The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof.	Kyoto Protocol Art. 12.2, Simplified Modalities and Procedures for Small Scale CDM Project Activities §23a	OK	Table 2, Section A.3
3. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC.	Kyoto Protocol Art. 12.2.	OK	Table 2, Section E.4.1
4. The project shall have written approval of voluntary participation from the designated national authorities of each party involved.	Kyoto Protocol Art. 12.5a, Simplified Modalities and Procedures for Small Scale CDM Project Activities §23a	OK	Voluntary participation is confirmed in the DNA approval letter 16 Feb (this was the conditional approval which was subsequently amended with a letter on the 23 Feb to provide unconditional approval).
5. The emission reductions should be real, measurable and give long-term benefits relating to the mitigation of climate change.	Kyoto Protocol Art. 12.5b	OK	Table 2, Section E.1 to E.4

REQUIREMENT	REFERENCE	CONCLUSION	Cross Reference/ Comment
6. Reduction in GHG emissions must be additional to any that would occur in absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity.	Kyoto Protocol Art. 12.5.c, Simplified Modalities and Procedures for Small Scale CDM Project Activities §26	OK	Table 2, Section B.2.1
7. Potential public funding for the project from Parties in Annex I shall not be a diversion of official development assistance.	Marrakech Accords (Decision 17/CP.7)	OK	The PDD section A4.4 on page 9 declares receiving no public funding from an Annex 1 country, or diversion of developing funding for this project. In the financial evaluation of the business model we found nothing that contradicted this statement
8. Parties participating in the CDM shall designate a national authority for the CDM	Marrakesh Accords (CDM modalities§ 29)	OK	This is a unilateral project and the DNA approval letter of 16 Feb stated that South Africa has ratified the UNFCCC and the Kyoto Protocol and is in compliance with the obligations with these international instruments

REQUIREMENT	REFERENCE	CONCLUSION	Cross Reference/ Comment
9. The host country shall be a Party to the Kyoto Protocol	Marrakesh Accords (CDM modalities § 30)	OK	Accession: 31/07/2002
10. The proposed project activity shall meet the eligibility criteria for small-scale CDM project activities set out in § 6 (c) of the Marrakesh Accords and shall not be a debundled component of a larger project activity.	Simplified Modalities and Procedures for Small-Scale CDM Project Activities §12a,c	OK	Table 2, Section A.1
11. The project design document shall conform with the Small Scale CDM Project Design Document format.	Simplified Modalities and Procedures for Small-Scale CDM Project Activities, Appendix A	OK	We evaluated the format, the headings and the tables prescribed in the Small scale project template version 2 (in effect as of 8 July 2005)
12. The proposed project activity shall conform to one of the project categories defined for small-scale CDM project activities and uses the simplified baseline and monitoring methodology for that project category.	Simplified Modalities and Procedures for Small-Scale CDM Project Activities §22e	OK	Table 2, Section A.1.3 and B.1
13. Comments by local stakeholders are invited, and a summary of these provided.	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22b	OK	Table 2, Section G
14. If required by the host country, an analysis of the environmental impacts of the project activity is carried out and documented.	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22c	OK	Table 2, Section F

REQUIREMENT	REFERENCE	CONCLUSION	Cross Reference/ Comment
15. Parties, stakeholders and UNFCCC-accredited NGOs have been invited to comment on the validation requirements, and comments have been made publicly available.	Simplified Modalities and Procedures for Small Scale CDM Project Activities §23b,c,d	OK	The project has invited comments at the Environmental Impact Assessment stage and the comments thereof has been collated and documented in the PDD. The project has been on the UNFCCC website for the required 30 days and no comments were received. The project has been on the DNA website for the required 45 days and no comments were received.

Table 2 Requirements Checklist

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
A. Project Description The project design is assessed.					
A.1. Small-scale project activity It assesses whether the project qualifies as small-scale CDM project activity.					
A.1.1. Does the project qualify as a small-scale CDM project activity as defined in paragraph 6 © of decision 17/CP.7 on the modalities and procedures for the CDM?	A.6	DR	Design generation capacity 4.248 MW < 15MW	OK	OK
A.1.2. The small-scale project activity is not a debundled component of a larger project activity?	A.6 A.8 C.4	DR I	Gas delivery volumes restricted, supported through historical data	OK	OK
A.1.3. Does proposed project activity conform to one of the project categories defined for small-scale CDM project activities?	A.6	DR	Approved Small-Scale CDM Methodology I.D This project is not claiming emission reductions for methane recovery. There is a legal safety requirement for flaring, regular inspection and maintenance undertaken to ensure compliance.	OK	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
A.2. Project Design Validation of project design focuses on the choice of technology and the design documentation of the project.					
A.2.1. Are the project's spatial (geographical) boundaries clearly defined?	A.4	DR	Farm Duinzicht, Mossel Bay	CL 2 Cleared	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
A.2.2. Are the project's system (components and facilities used to mitigate GHGs) boundaries clearly defined?	A.6 C.3	I	Supply facilities confirmed, infrastructure for electricity.	OK	OK
A.2.3. Does the project design engineering reflect current good practices?	A.10 C.1 C.4	DR I	Yes	CL 7 cleared CL 8 cleared CL 10 cleared CL 19 Cleared	OK
A.2.4. Will the project result in technology transfer to the host country?	A.6	DR	Yes. First time commercial application.	OK	OK
A.2.5. Does the project require extensive initial training and maintenance efforts in order to work as presumed during the project period? Does the project make provisions for meeting training and maintenance needs?	C.1	I	Training of operator at Jenbacher training facility.	OK	OK
A.3. Contribution to Sustainable Development The project's contribution to sustainable development is assessed.					

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
A.3.1. Will the project create environmental or social benefits other than GHG emission reductions?	A.11 A.12	DR	Yes, support of poverty alleviation projects in the area as well as job creation opportunities.	CL 4 cleared CL 11 Cleared	OK
A.3.2. Will the project create any adverse environmental or social effects?	A.2	DR	Negligible noise and combustion emissions from the Jenbacher engines.	OK	OK
A.3.3. Is the project in line with sustainable development policies of the host country?	A.19 A.20	DR	Yes DNA provided conditional approval on 16 February 2006, and unconditional approval on 23 February 2006	CAR1	OK
A.3.4. Is the project in line with relevant legislation and plans in the host country?	C.5 A.7 A.10	I DR	Compliance with the required Health, Safety and Environmental regulations are verbally confirmed by PetroSA environmental representative and are also built into the respective contracts: Memorandum of Understanding between PetroSA and MethCap SPV1, Preventive and Corrective Agreement between GE Jenbacher and MethCap SPV1.	CL 17 cleared CL 15 Cleared	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B. Project Baseline The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.					
B.1. Baseline Methodology It is assessed whether the project applies an appropriate baseline methodology.					
B.1.1. Is the selected baseline methodology in line with the baseline methodologies provided for the relevant project category?	B.2 A.17	DR	Yes, the project applies 7b, one of the simplified baseline methodologies proposed for type 1 D small-scale project activities.	CL 3 Cleared	OK
B.1.2. Is the baseline methodology applicable to the project being considered?	B.2 A.17	DR	Yes, the weighted average emissions are verified and published on an annual basis by the national utility, Eskom.	OK	OK
B.2. Baseline Determination It is assessed whether the project activity itself is not a likely baseline scenario and whether the selected baseline represents a likely baseline scenario.					
B.2.1. Is it demonstrated that the project activity itself is not a likely baseline scenario due to the existence of one or more of the following barriers: investment barriers, technology barriers, barriers due to prevailing practice or other barriers?	A.6	DR	Investment barriers, technology barriers and prevailing practice reflect South African conditions. It is demonstrated that the project is not a likely baseline scenario.	CL 11 cleared CL 12 cleared	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.2.2. Is the application of the baseline methodology and the discussion and determination of the chosen baseline transparent and conservative?	A.17	DR	Yes, the chosen baseline refers to the emission factors published of the national energy utility, Eskom. The figures are verified and published on an annual basis. To date, PetroSA has only been using energy from the national grid.	CL. 26 Cleared	OK
B.2.3. Are relevant national and/or sectoral policies and circumstances taken into account?	A.17 B.7	DR	Yes. This project is in line with the White Paper on Renewable Energy. A recent government initiative to reduce energy demand could be applicable to this project. However the application has not yet been processed and it would not affect the additionality of the project.	CL 11 Cleared	OK
B.2.4. Is the baseline selection compatible with the available data?	A.17	DR	ESKOM is the baseline. Emission factors are published annually.	OK	OK
B.2.5. Does the selected baseline represent the most likely scenario describing what would have occurred in absence of the project activity?	A.17 C2	DR I	Yes. ESKOM is providing 95% of all electricity in SA with a 40 000MW installed capacity. PetroSA is currently utilising only ESKOM power.	OK	OK
C. Duration of the Project / Crediting Period It is assessed whether the temporary boundaries of the project are clearly defined.					
C.1.1. Are the project's starting date and operational lifetime clearly defined?	A.17	DR	Yes, the planned starting date is July 2006. This will need to be verified during the first verification. The operational lifetime is linked to that of PetroSA.	CL 21 Cleared	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
C.1.2. Is the crediting period clearly defined (seven years with two possible renewals or 10 years with no renewal)?	A.17	DR	Yes, a 10-year period was chosen.	OK	OK
D. Monitoring Plan The monitoring plan review aims to establish whether all relevant project aspects deemed necessary to monitor and report reliable emission reductions are properly addressed.					
D.1. Monitoring Methodology It is assessed whether the project applies an appropriate monitoring methodology.					
D.1.1. Is the selected monitoring methodology in line with the monitoring methodologies provided for the relevant project category?	B.2 A.17	DR	The monitoring methodology is consistent with the selected baseline methodology and also in line with the simplified monitoring methodologies for type I.D simplified modalities and procedures for small-scale CDM project activities.	OK	OK
D.1.2. Is the monitoring methodology applicable to the project being considered?	B.2 A.17 A.15	DR	Yes, there will a meter measuring electricity output.	OK	OK
D.1.3. Is the application of the monitoring methodology transparent?	A.17 A.15	DR	Yes, the monitoring plan describes the responsibilities and controls to ensure that the electricity output will be measured.	OK	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
D.1.4. Will the monitoring methodology give opportunity for real measurements of achieved emission reductions?	A17 A.15	DR	Yes, procedures and contracts are in place to ensure suitable monitoring of the electricity output by the Alstom meter. Should this primary calibrated meter be out of order, no measurements will be taken and consequently no emission reductions allowed.	OK	OK
D.2. Monitoring of Project Emissions It is established whether the monitoring plan provides for reliable and complete project emission data over time.					
D.2.1. Are the choices of project emission indicators reasonable?	A.15	DR	Yes. Not included in baseline. Assumption regarding project emissions verified.	CL 26 Cleared	OK
D.2.2. Will it be possible to monitor/measure the specified project emission indicators?	A.15	DR	Yes. Not included in baseline. There are no project emissions.	OK	OK
D.2.3. Do the measuring technique and frequency comply with good monitoring practices?	A.15	DR	Yes. Not included in baseline. There are no project emissions.	OK	OK
D.2.4. Are the provisions made for archiving project emission data sufficient to enable later verification?	A.15	DR	Yes. Not included in baseline. There are no project emissions.	OK	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
D.3. Monitoring of Leakage It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.					
D.3.1. If applicable, are the choices of leakage indicators reasonable?			N/A	N/A	N/A
D.4. Monitoring of Baseline Emissions It is established whether the monitoring plan provides for reliable and complete project emission data over time.					
D.4.1. Is the choice of baseline indicators, in particular for baseline emissions, reasonable?	A.17	DR	Yes, the national electricity utility, ESKOM, publishes annually verified emission factors associated with the national grid.	OK	OK
D.4.2. Will it be possible to monitor/measure the specified baseline emission indicators?	A.17	DR	Yes	OK	OK
D.4.3. Do the measuring technique and frequency comply with good monitoring practices?	A.17	DR	Yes	OK	OK
D.4.4. Are the provisions made for archiving baseline emission data sufficient to enable later verification?	A.17	DR	Yes	OK	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
D.5. Project Management Planning It is checked that project implementation is properly prepared for and that critical arrangements are addressed.					
D.5.1. Is the authority and responsibility of project management clearly described?	A.6 A.15	DR	Yes, the monitoring plan describes the respective responsibilities, mainly within the company Biotherm, and contracts are developed to formalise the various agreements.	CL 20 Cleared	OK
D.5.2. Is the authority and responsibility for registration monitoring measurement and reporting clearly described?	A.15	DR	Yes, the monitoring plan describes the responsibilities, mainly residing in the entity Agaricus, and a contract is developed to formalise the agreement.	CL 6 Cleared	OK
D.5.3. Are procedures identified for training of monitoring personnel?	A.15	DR	Yes, the training procedures are developed by GE Jenbacher, and the contracts are developed to formalise the training agreement with the respective entities.	CL 23 Cleared	OK
D.5.4. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	A.15	DR	Yes, the flare will remain on-line.	CL 18 Cleared	OK
D.5.5. Are procedures identified for calibration of monitoring equipment?	A.21 A.22	DR	Yes, Alstom meter will be calibrated by an accredited laboratory.	OK	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
D.5.6. Are procedures identified for maintenance of monitoring equipment and installations?	A.21	DR	Yes, as prescribed by GE Jenbacher (the installation) and Alstom (the monitoring equipment). The detail procedures are contained in the monitoring plan	CL 22 Cleared	OK
D.5.7. Are procedures identified for monitoring, measurements and reporting?	A.21	DR	Yes, as part of the electricity sales process, based on the Alstom meter reading.	CL 24 Cleared	OK
D.5.8. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation).	A.15	DR	Yes, daily meter readings by the operator.	CL 24 Cleared	OK
D.5.9. Are procedures identified for dealing with possible monitoring data adjustments and uncertainties?	A.15	DR	Yes, in the monitoring plan.	CL 24 Cleared	OK
D.5.10. Are procedures identified for internal audits of GHG project compliance with operational requirements as applicable?	A.15	DR	Yes, annual internal audit planned.	CL 25	OK
D.5.11. Are procedures identified for project performance reviews?	A.15	DR	Yes, in the monitoring plan.	CL 25	OK
D.5.12. Are procedures identified for corrective actions?	A.15 A.10	DR	Yes, in the GE Jenbacher corrective action contract.	OK	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
E. Calculation of GHG emission It is assessed whether all material GHG emission sources are addressed and how sensitivities and data uncertainties have been addressed to arrive at conservative estimates of projected emission reductions.					
E.1. Project GHG emissions The validation of predicted project GHG emissions focuses on transparency and completeness of calculations.					
E.1.1. Are all aspects relating to direct and indirect project emissions captured in the project design?	A.17	DR	Yes	CL 26 Cleared	OK
E.1.2. Have all relevant greenhouse gases and sources been evaluated?	A.17	DR	Yes	CL 26 Cleared	OK
E.1.3. Do the methodologies for calculating project emissions comply with existing good practice?	A.17	DR	Yes. Calculations verified.	CL 7 Cleared	OK
E.1.4. Are the calculations documented in a complete and transparent manner?	A.17	DR	Yes	OK	OK
E.1.5. Have conservative assumptions been used?	A.17 C.4	DR I	Yes	CL 26 Cleared	OK
E.1.6. Are uncertainties in the project emissions estimates properly addressed?	A.17	DR	Yes	CL 26 Cleared	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
E.2. Leakage It is assessed whether the leakage effects, i.e. change of emissions which occurs outside the project boundary and which are measurable and attributable to the project, have been properly assessed.					
E.2.1. Are leakage calculations required for the selected project category and if yes, are the relevant leakage effects assessed?			N/A	N/A	N/A
E.3. Baseline GHG Emissions The validation of predicted baseline GHG emissions focuses on transparency and completeness of calculations.					
E.3.1. Are the baseline emission boundaries clearly defined and do they sufficiently cover sources for baseline emissions?	A.6	DR	Yes, ESKOM and current flaring practice.	OK	OK
E.3.2. Are all aspects relating to direct and indirect baseline emissions captured in the project design?			N/A	N/A	N/A
E.3.3. Have all relevant greenhouse gases and sources been evaluated?	A.17	DR	Yes	OK	OK
E.3.4. Do the methodologies for calculating baseline emissions comply with existing good practice?	A.17 C.4	DR I	Yes	OK	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
E.3.5. Are the calculations documented in a complete and transparent manner?	A.17	DR	Yes	OK	OK
E.3.6. Have conservative assumptions been used?	A.17	DR	Yes. One published factor.	OK	OK
E.3.7. Are uncertainties in the baseline emission estimates properly addressed?	A.17	DR	Yes. ESKOM emission factor verified and published annually.	OK	OK
E.4. Emission Reductions Validation of baseline GHG emissions will focus on methodology transparency and completeness in emission estimations.					
E.4.1. Will the project result in fewer GHG emissions than the baseline case?	A.17	DR	Yes, the project is expected to result in an annual emission reduction of 29933tCO ₂ e. Estimated emissions from the engine is lower than estimated emissions from the flare.	CL 26 Cleared	OK
F. Environmental Impacts It is assessed whether environmental impacts of the project are sufficiently addressed.					
F.1.1. Does the host country legislation require an analysis of the environmental impacts of the project activity?	A.17 A.2 B.6	DR	Yes. Environment Conservation Act 73 of 1989, Sec 20 and further.	OK	OK
F.1.2. Does the project comply with environmental legislation in the host country?	A.2	DR	ROD for compliance with the act was obtained.	OK	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
F.1.3. Will the project create any adverse environmental effects?	A.2	DR	Negligible noise and emissions levels are expected from the project.	OK	OK
F.1.4. Have environmental impacts been identified and addressed in the PDD?	A.17 A.2	DR	Yes.	OK	OK
G. Comments by Local Stakeholder Validation of the local stakeholder consultation process.					
G.1.1. Have relevant stakeholders been consulted?	A.13	DR	Yes. Meeting was held 7 Sept 2005.	CL 16 Cleared	OK
G.1.2. Have appropriate media been used to invite comments by local stakeholders?	A.14	DR	Advertised in local newspaper and direct contact with identified stakeholders.	CL 5 Cleared	OK
G.1.3. If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	A.2 A.13 A.14	DR	Yes. As per records observed and duration for comment according to regulation 4 of the regulations published in GNR 1183 under section 26 of environment conservation act.	CL 5 Cleared CL 15 Cleared	OK
G.1.4. Is a summary of the comments received provided?	A.13	DR	Yes. Records were available.	OK	OK
G.1.5. Has due account been taken of any comments received?	A.17	DR	N/A. Comments all of positive nature.	OK	OK

Table 3 Resolution of Corrective Action and Clarification Requests

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
CAR 1 The project has yet to receive the approval letter from the South African DNA.	Table 1	Conditional host country approval received on 16 February 2006 and unconditional host country approval on 23 February 2006.	Cleared
CL 1. Version control: PDD version as well as date must be included under the project title.	General	PDD version and date will be included under project title in PDD.	Cleared
CL 2. Physical address of PetroSA must be indicated in the PDD.	A.2.1	Physical address of PetroSA will be included in PDD.	Cleared
CL 3. Verify whether methane is currently being flared – what is the reliability of the flare?	B.1.1 E.1.5	Legal safety requirement for flaring, regular inspection undertaken to ensure compliance.	Cleared
CL 4. Obtain a letter from the local municipality regarding aspect of royalty from MethCap.	A.3.1	<p>Commitment has been made in the MOU between MethCap and Petro SA.</p> <p>As per extract: “MethCap shall pay a royalty to PetroSA which shall be calculated and payable by MethCap as follows:</p> <p style="margin-left: 40px;">~ 7.5% of all revenue generated from the sale of Certified Emission Reduction (CER) credits (excluding VAT) payable within 30 days from receipt by MethCap of CER sales proceeds.</p>	Cleared

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		<p>The Parties acknowledge that the terms of the royalty agreement under which, in return for MethCap having the exclusive rights to any and all CERs generated as a result of completing the Proposed Transaction, MethCap will pay the royalty described in clause 3.2 above, directly to Eden District Municipality on behalf of PetroSA related to sale price of CERs to be so generated.</p> <p>The following documents confirming the royalty payment and were presented to PwC:</p> <ul style="list-style-type: none"> - The original signed MOU between MethCap & PetroSA (clauses 3.2 and 4) dated 10 March 2005. - A copy letter from Eden District Municipality to DEADP, dated 9 June 2005 	
CL 5. Verify records of public participation meeting as held regarding proposed project. Such include attendance register, concerns/comments as documented, communication records.	G.1.2 G.1.3	Scoping Report/EIA exemption application was presented to PwC. This includes details of public meeting, attendees, comments, advertisement.	Cleared

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
CL 6. Include the job titles of employees mentioned in the PDD with their names for future reference.	D 5.2	Job titles of all individuals mentioned in PDD will be included in PDD.	Cleared
CL 7. Volume of biogas produced: Verify the average, maximum and minimum values and the procedures for determining it. Verify the gas composition. What is the potential future changes in composition? Obtain daily figures (if available, along with historic 5-year trends). Determine the consistency in flow rates and prediction on duration for future operation. Reliability of gas composition as stated by Paul de Mattos. Obtain copies of such reports, lab accreditation, extent of historical data as used in obtaining composition.	E.1.3 A.2.3	<p>Verified on site by Brian Hayes.</p> <p>Martin Kruse and Charles Liebenberg clarified and agreed that the following figures used in the financial model are correct:</p> <ul style="list-style-type: none"> - gas flow rate of 1900 m³/hr - gas composition 57% methane <p>Calculations in PDD will be amended accordingly.</p>	<p>As per site observations and digester performance records, the following:</p> <ul style="list-style-type: none"> - No gas flow monitoring is currently being done (meters are not functional) However, calculated gas flow indicates an average of approximately 1600 m³/hour (Not normalised gas flow, but calculated at approximately 35°C.)

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
			<ul style="list-style-type: none"> - The concern is that the calculated flow rate is well below the value of 2055 m³/h (at 21°C) as used in the baseline calculations. - It should be noted that the calculated values are not necessarily accurate, and furthermore, that the evaluation by De Mattos is only a once-off calculated value, based on the specific flow conditions over a short period of time (not necessarily representative).

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
			<ul style="list-style-type: none"> - Gas Composition: From digester data (31 Jan'01 to 31 Oct'05), it was noted that the average gas compositions are different to those as used in the baseline calculations (Methane of $\pm 54\%$ vs the 59% as used in the baseline calculations). <p>Revised emission estimate considered conservative</p> <p>Issue cleared</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
CL 8. Consistency of effluent in respect to quantity and quality. Assess historical as well as predicted future scenario (in context of potential changes to plant, operating time-frames etc.). Furthermore, are there any potential changes to effluent plant operation?	A.2.3	<p>Conclude gas supply agreement.</p> <p>PetroSA has published 2013 as committed gas supply.</p> <p>Project financial analysis conducted from 2006 – 2012 for full capital payback. No revenue recognised thereafter.</p> <p>PetroSA produces 7% of South Africa’s liquid fuels (reference: http://www.info.gov.za/aboutsa/minerals.htm), which is produced according to Dept of Minerals & Energy specifications. Therefore, the product & the waste stream are and will remain consistent. The biogas is directly related to the gas-to-liquids process. The reaction water can only be digested according to Dept of Water Affairs & Forestry permits issued to PetroSA.</p>	Cleared

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		<p>From discussions with Carel Steyn of Petro SA, it was indicated that a project is currently being investigated involving the recovery of acetic and propionic acid from the effluent stream. If such stripping process is implemented, it will have significant impact on the effluent quality available for digesting and methane production. This is however a very costly project and there are no regulatory drivers for the recovery. In addition the current cost benefit analysis does not warrant further investigation.</p> <p>Petro SA has not yet taken a decision on this (although it was indicated that this project may not be financially viable). It is anticipated that conclusion on this project will be reached by March 2006.</p>	

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
CL 9. Verify 6.6 kV supply as indicated in the PDD.	A.2.3	<p>From discussions with Ander Claassen of Petro SA (Electrical Manager) the following:</p> <ul style="list-style-type: none"> - The risks associated with electricity supply are negligible. Facilities are in place to handle 6.6 kV. <p>This additional supply would have significant benefit, as it will strengthen and provide more stability.</p>	Cleared
CL 10. Verify the specifications of the Jenbacher engines regarding emissions and efficiency.	A.2.3	<p>Specifications of Jenbacher Engines regarding emissions and efficiency presented to PwC.</p> <p>General specifications: http://www.gepower.com/prod_serv/products/recip_engines/en/downloads/type4_en.pdf </p>	Cleared
CL 11. Obtain clarity on the role of DSM. Will the project apply for DSM funding?	A.3.1 B.2.1 B.2.3	<p>Table references clarify inclusion/exclusion of DSM.</p> <p>Copy of DSM application presented to PwC.</p> <p>DSM subsidy will be clarified in the PDD, including its effect on additionality.</p> <p>Adjusted expected DSM subsidy to 15% from 20% as per Eskom notification in financial model and PDD.</p>	Cleared

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
CL 12. Who financed the project? Obtain evidence of the financier. Is the finance finalised, and when?	B.2.1	<p>Charles Liebenberg:</p> <ul style="list-style-type: none"> - DBSA will most likely provide finance for project (75% of equity); and - Have applied for DSM, which has been approved by ESKOM Capital Investment ($\pm 20\%$ of equity), which in principle has been approved by NER for Board review by February 2006. <p>Adjusted expected DSM subsidy to 15% from 20% as per Eskom notification in financial model and PDD.</p>	Cleared
CL 13. Assess the contract between PetroSA and MethCap. Aspects to evaluate include ownership, legal requirements, etc.	B.2.1	<p>At present, an MOU exists between Petro SA and MethCap. However, the specific HSE requirements (Petro SA requirements) have not yet been communicated and formalised into an agreement. (An "Access Agreement" is in the process of being developed.)</p> <p>PetroSA is still uncertain as to the operating definition of MethCap (either as a contractor or a separate operating entity). This needs to be clarified as part of the specific site conduct and responsibility requirements.</p>	Cleared

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		<p>MethCap SPV 1 will be classified as an independent contractor for the duration of the project. This will apply to all the MethCap SPV1 appointed contractors and sub-contractors during both construction and operation.</p> <p>All contractors undergo a compulsory induction informing them of the Health and Safety Regulations they are subject to during their tenure on the site. Non-compliance leads to immediate dismissal from the site. During construction the appointed contractor will be contractually responsible for ensuring compliance of its employees and sub-contractors to PetroSA's Health & Safety Policy & Procedures. During operation the appointed operator will be responsible for the compliance of its staff to PetroSA's Health & Safety Policy & Procedures.</p>	

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		<p>MethCap SPV1, its sub-contractors, the project, representatives or agents shall, for the duration of comply with all the relevant occupational health and safety legislation incl. the Occupational Health and Safety Act No 85, 1993, Mine Health & Safety Act No 29, 1996, Minerals and Petroleum Resources Development Act No 28, 2004.</p> <p>MethCap SPV1 will ensure that its operations comply with PetroSA's Environmental Management Plan and that such Environmental Management Plan has been updated to include the project activities as required by the ROD.</p> <p>The project assets will be owned by MethCap SPV1 and the land will be leased from PetroSA.</p> <p>MethCap SPV1 will be allowed access to its site to conduct project activities as defined.</p> <p>Refer also to draft Monitoring Plan.</p>	
CL 14. Verify that all the tables in the PDD are in the required format.	General	Table E.2. in PDD amended to required format.	Cleared

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
CL 15. Obtain copy of the Scoping Report and verify commitments as stipulated therein as well as ROD.	G.1.3 A.3.4	Charles Liebenberg will supply such documentation during meeting on 18 January. Subject to PetroSA standards – will be captured in contractual agreement. Letter from PetroSA to confirm that MethCap employees will be treated as contractors when on site and will comply with Health & Safety Regulations.	Cleared
CL 16. Obtain summary of the comments received during Stakeholder consultation and minutes of relevant meetings.	G.1.1	Required documentation provided as evidence to PwC.	Cleared
CL 17. Is a Power Generation Licence required from the National Energy Regulator? APPA licence?	A.3.4	Charles Liebenberg: Licence has been conditionally approved, and should be finalised by end of January 2006. In the process of application under APPA. <u>Generation Licence:</u> Application submitted, conditionally approved, should be finalised by end January 2006. <u>APPA:</u> Application submitted.	Cleared
CL 18. Procedure for flaring of excess gas during non availability of the engines.	D.5.4	Existing flaring facility will be utilised.	Cleared

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
CL 19. Need to substantiate load factor of 85%.	A.2.3	<p>Charles Liebenberg: A maintenance agreement has been finalised with GE (General Electric), who will act as generator maintenance contractor (Such agreement state a $\pm 92\%$ output availability).</p> <p>Signing imminent.</p> <p>PetroSA operates on 3 x 8hour shifts and has a planned shutdown every 3 years.</p> <p>GE Jenbacher guarantees availability of 92% which will be confirmed in the Preventive and Corrective Maintenance Agreement.</p> <p>GE Jenbacher's availability factor takes into account scheduled and corrective maintenance and overhauls.</p>	Cleared

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		<p>Email dated 25.1.06 from Carel Steyn, Commercial Manager PetroSA, confirms plant online times:</p> <ul style="list-style-type: none"> - overall site availability 90%; - wastewater treatment plant; and availability 100%. <p>(Wastewater treatment plant cannot be stopped and started as a normal process unit, a large water storage facility provides feed during short outages).</p> <p>Based on the above availability factors, MethCap SPV1 have deducted a further 1 month for unscheduled outages of refinery/generator to get to a conservative load factor of 85%.</p>	
CL 20 Verify the power supply agreement between MethCap and PetroSA – 10-year agreement.	D.5.1	<p>Such agreement has not yet been finalised but is in progress.</p> <p>MethCap SPV1 will enter into a 15-year Power Purchase Agreement with PetroSA. Negotiations are underway and the commercial terms of the agreement are to be concluded.</p> <p>Important aspects that will be addressed in the contract include:</p> <ul style="list-style-type: none"> - obligations of PetroSA & MethCap - events of default by PetroSA & MethCap SPV1 	Cleared

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		<ul style="list-style-type: none"> - remedies - operation and maintenance of the biogas to energy power plant - measuring systems - compensation, payment and billing - payment disputes - ownership of CERs - insurance - dispute resolution 	
CL 21. What is the possibility that PetroSA will close down sooner than expected?	C.1.1	Gas availability: Published figure of 2013.	Cleared

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
CL 22. Review the contract between MethCap and a maintenance company for the maintenance of all the Jenbacher engines.	D.5.6	<p>MethCap SPV1 will enter into a Preventive and Corrective Maintenance Agreement with GE Jenbacher. Commercial terms have been agreed.</p> <p>Based on the fact that GE Jenbacher have installed in excess of 4200MW of gas engines globally, they contractually guarantee availability of 8 030 hours per annum (92%) with penalties for non-achievement.</p> <p>GE Jenbacher monitors continuous performance and output of the engines via the DIA.NE system.</p> <p>Periodic maintenance will be undertaken by GE Jenbacher under contract with MethCap SPV 1.</p> <p>Important aspects that are addressed in the contract include:</p> <ul style="list-style-type: none"> - obligations of GE Jenbacher including maintenance, overhauls, insurance, availability, remote diagnosis; - obligations of MethCap SPV1; - price; - availability guarantee; - maintenance schedules; and - technical instructions. <p>Also refer to the draft Monitoring Plan.</p>	Cleared

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
CL 23. Review procedures for training of personnel.	D.5.3	Refer the draft Monitoring Plan and the GE Jenbacher training programme outline. Operation by local GE agent, although training will be provided for in Austria by Genbacher	Cleared
CL 24. Review procedures for monitoring and reporting as well as records handling and data adjustments.	D.5.7 D.5.8 D.5.9	Procedures documented in the Monitoring Plan.	Cleared
CL 25. Review the internal audit schedule as well as project performance.	D.5.10 D.5.10	Procedures documented in the Monitoring Plan.	Cleared
CL 26. Flaring emissions vs Jenbacher emissions assumed equal for baseline calculations.	B.2.2	Flare combustion efficiency: PetroSA do not have readily available information on the combustion efficiency of the flare stack. Reference was therefore made to the US-EPA's emissions factors developed and maintained by the Office of Air Quality Planning and Standards (OAQPS). http://www.epa.gov/ttn/chief/ap42 These emission-estimating tools have been developed and supported for use by Federal State and local agencies, consultants and industry, estimating air emissions from various sources. In South Africa, it was used by Sasol in the Air Quality Impact Assessment for the proposed natural gas conversion of Sasol One Plant	Cleared

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		<p>http://w3.sasol.com/natural_gas/Environment/SCI_Conversion/Spec%2520R Documentation of emission factors and calculations used to estimate air emissions can be found in 'Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources, (AP-42)'</p> <p>The completeness of combustion in an industrial flare is governed by flame temperature, residence time in the combustion zone, turbulent mixing of the components to complete the oxidation reaction, and the available oxygen for free-radical formation. The combustion process is complete if all organic compounds are converted to carbon dioxide and water.</p> <p>Since flares do not lend themselves to traditional emission testing techniques, only a few attempts have been made to characterise flare emissions. Recent US-EPA tests using propylene as flare gas indicated that efficiencies of 98% could be achieved when burning an offgas with at least 11 200kJ/m³. The test also indicated that variations in incoming gas-flow rates had no effect on combustion efficiency. http://www.epa.gov/ttnchie1/ap42/ch13/final/c13s05.pdf</p>	

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		<p>GE Jenbacher engine combustion efficiency: In respect of emissions, GE Jenbacher work according to the standard TS Luft and their combustion efficiency of CH₄ in particular is 98.5%, i.e. the exhaust gas CH₄ content is 800ppm. Refer to the GE Jenbacher J420 GS-A21 Energy Balance: Exhaust Gas and Pollutant Emissions.</p>	
CL 27. Clarify calibration procedures for the measurement equipments. Ensure consistency between calibration periods status reported in the PDD and monitoring plan	D 5.5 D 5.6 D 5.7	<p>Only the Alstom meter will be calibrated. The DIA.NE.WIN system associated with the Jenbacher engine will only be used for indicative purposes An laboratory accredited to ISO17025 will be chosen for calibration of the Alstom meter. Monitoring plan has been corrected.</p>	Cleared

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