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# Validation Report

## VALIDATION OF THE CDM-PROJECT: USE OF WASTE GAS AT NAMAKWA SANDS IN SOUTH AFRICA

REPORT No. 600500168

**14<sup>th</sup> December 2012**

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**Subject:** Validation of the CDM Project Use of waste gas at Namakwa Sands in South Africa

**Accredited TÜV SÜD Unit:**

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Environmental Technology  
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INDIA

**Project Participant(s):**

Exxaro Resources Ltd (client)  
Roger Dyason Road  
Exxaro Corporate Centre  
Pretoria West  
Gauteng  
South Africa-0183

**Project Site(s):**

Namakwa Sands, Saldanha Bay Local Municipality,  
West Coast District Municipality in the Western Cape.  
Latitude: 32°57'43" S  
Longitude: 18°02'39" E

**Applied Methodology / Version:** ACM0012/ Version 4.0

**Scope(s):** 1, 4  
**Technical Area(s):** 1.1, 4.3

**First PDD Version (GSP):**

PDD version date: 11-11-2010  
Version No.: 02  
Starting Date of GSP 18-11-2010

**Final PDD version:**

PDD version date: 13-11-2012  
Version No.: 09

**Estimated Annual Emission Reduction:** 84,432 tCO<sub>2</sub>e

**Assessment Team Leader:**

Nikunj Agarwal<sup>1</sup>

**Assessment Team Members:**

Supratik Dutta<sup>1</sup>

**Technical Review:**

Robert Mitterwallner,  
Agrafiotis, Georgios<sup>#</sup>  
Ali Bukhari, Syed Mahmood<sup>2</sup>

<sup>1</sup> Covered Technical Area (TA) during site audit

<sup>2</sup> Technical Expert (TA.1.1.)

<sup>#</sup>Financial Expertise

|  |  |
|--|--|
| <b>Technical Experts:</b><br><br>Habbu, Ajit<br>Wei, Jianquan  |  |
| <b>Summary of the Validation Opinion:</b><br><br><input checked="" type="checkbox"/> The review of the project design documentation and the subsequent follow-up interviews have provided TÜV SÜD with sufficient evidence for the determination of the project's fulfilment of all stated criteria. In our opinion, the project meets all relevant UNFCCC requirements for the CDM. Therefore, TÜV SÜD recommends the project for registration by the CDM Executive Board if the letters of approval of all Parties involved will be available before the expiring date of the applied methodology(ies) or the applied methodology version respectively.<br><br><input type="checkbox"/> The review of the project design documentation and the subsequent follow-up interviews have not provided TÜV SÜD with sufficient evidence for the determination of the project's fulfilment of all stated criteria. Therefore, TÜV SÜD will not recommend the project for registration by the CDM Executive Board and will inform the project participants and the CDM Executive Board of this decision. |  |

## Abbreviations

|                 |   |
|-----------------|---|
| <b>ACM</b>      | Approved Consolidated Methodology   |
| <b>BM</b>       | Build Margin  |
| <b>CAR</b>      | Corrective Action Request   |
| <b>CDM</b>      | Clean Development Mechanism   |
| <b>CDM EB</b>   | CDM Executive Board   |
| <b>CER</b>      | Certified Emission Reduction  |
| <b>CM</b>       | Combined Margin   |
| <b>CMP</b>      | Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol |
| <b>CR / CL</b>  | Clarification Request   |
| <b>DNA</b>      | Designated National Authority   |
| <b>DOE</b>      | Designated Operational Entity   |
| <b>EF</b>       | Emission Factor   |
| <b>EIA / EA</b> | Environmental Impact Assessment / Environmental Assessment                            |
| <b>ER</b>       | Emission Reduction  |
| <b>FAR</b>      | Forward Action Request  |
| <b>FSR</b>      | Feasibility Study Report  |
| <b>GHG</b>      | GreenHouse Gas(es)  |
| <b>IPCC</b>     | Intergovernmental Panel on Climate Change   |
| <b>IRL</b>      | Information Reference List  |
| <b>IRR</b>      | Internal Rate of Return   |
| <b>KP</b>       | Kyoto Protocol  |
| <b>MP</b>       | Monitoring Plan   |
| <b>NGO</b>      | Non Governmental Organisation   |
| <b>OM</b>       | Operational Margin  |
| <b>PDD</b>      | Project Design Document   |
| <b>PP</b>       | Project Participant   |
| <b>R</b>        | South African Rands ( currency code: ZAR)   |
| <b>TÜV SÜD</b>  | TÜV SÜD South Asia Pvt Ltd  |
| <b>UNFCCC</b>   | United Nations Framework Convention on Climate Change                                 |
| <b>VVM</b>      | Validation and Verification Manual  |

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# 1 INTRODUCTION

## 1.1 Objective

The objective of the validation process is to provide an independent assessment by a third party, a Designated Operational Entity (DOE), of a proposed project activity. The assessment involves the evaluation of the project basis and design identified in the Project Design Document (PDD) using the defined criteria outlined by the registration under the Clean Development Mechanism (CDM). Validation is part of the CDM project cycle and results in a conclusion by the executing DOE on whether or not a project activity is valid to be submitted for registration to the CDM Executive Board (CDM-EB). The ultimate decision on the registration of a proposed project activity rests with the CDM-EB and the Parties involved.

The project addressed in this validation report has been submitted under the following project title:

Use of waste gas at Namakwa Sands in South Africa

## 1.2 Scope

The scope of any assessment is defined by the underlying legislation, regulation and guidance given by relevant entities or authorities. In the case of CDM project activities, the scope is set by:

- The Kyoto Protocol, in particular § 12 and modalities and procedures for the CDM
- Decision 2/CMP1 and Decision 3/CMP.1 (Marrakech Accords)
- Further COP/MOP decisions with reference to the CDM (e.g. decisions 4 – 8/CMP.1)
- Decisions and specific guidance outlined by the EB which are published under <http://cdm.unfccc.int>
- Guidelines for Completing the Project Design Document (CDM-PDD) and the Proposed New Baseline and Monitoring Methodology (CDM-NM)
- Baselines and monitoring methodologies (including GHG inventories)
- Management systems and auditing methods
- Environmental issues relevant to the applicable sectoral scope
- Applicable environmental and social impacts and aspects of CDM project activity
- Sector specific technologies and their applications
- Current technical and operational knowledge of the specific sectoral scope and information on best practice

The validation process is not meant to provide any form of consulting for the project participant (PP). However, stated requests for clarifications, corrective actions, and/or forward actions may provide input for improvement of the project design.

Once TÜV SÜD receives the PDD, it is made publicly available on the UNFCCC website and on TÜV SÜD's website, which initiates a 30 days global stakeholder consultation process (GSP). In special circumstances, such as when a project design changes, the GSP may need to be repeated. Information on the PDDs is presented on page 1 of this report.

The purpose of a validation is to demonstrate compliance or non-compliance of the project with all stated and valid CDM requirements. Additionally, the purpose of validation is to enable the registration of CDM projects, which is only a part of the total CDM project cycle.

## 2 VALIDATION METHODOLOGY

The project assessment is based on the “Clean Development Mechanism Validation and Verification Manual” (version 1.2) and is conducted using standard auditing techniques to assess the correctness of the information provided by the project participants. Before the assessment begins, members of the team covering the technical scope(s), sectoral scope(s), and relevant host country experience for evaluating the CDM project activity are appointed. Once the project is made available for the stakeholder consultation process, members of the team carry out the desk review, follow-up actions, resolution of issues identified, and the preparation of the validation report. The prepared validation report and other supporting documents then undergo an internal quality control by the CB “Environment and Energy” before being submitted to the CDM-EB.

In order to ensure transparency, assumptions must be clear and stated explicitly and background material must also be referenced. TÜV SÜD has developed a methodology-specific protocol customized for the project. The protocol demonstrates, in a transparent manner, the project criteria (requirements), discussion on each criterion by the assessment team, and the results from validating the identified criteria.

The validation protocol serves the following purposes:

- To organize the details and provision of clarifications on the requirements of which a CDM project is expected to meet
- To elucidate how a particular requirement has been validated as well as to document the results of the validation and any adjustments made to the project design document.

The validation protocol consists of three tables. The different columns in these tables are described in the tables below.

| Validation Protocol Table 1: Conformity of Project Activity and PDD   |  |   |   |  |
|---|--|---|---|--|
| Checklist Topic / Question  | Reference  | Comments  | PDD in GSP  | Final PDD  |
| <i>The checklist is organised in sections following the arrangement of the applied PDD version. Each section is then subdivided. The lowest level constitutes a checklist question / criterion.</i> | <i>The section gives reference to documents in which the answer to the checklist question or item is found in case the comment refers to</i> | <i>The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is used to explain the conclusions reached. In some cases sub-checklists are applied indicating yes/no decisions on the compliance with the stated criterion. Any <b>Request</b> has to</i> | <i>The section is used to present conclusions based on the assessment of the first PDD version. The PDD is either acceptable based on evidence provided (<input checked="" type="checkbox"/>) or a <b>Corrective Action Request (CAR)</b> is issued due to non-compliance with the checklist question (See below). <b>Clarification Request (CR)</b> is used when the validation team has identified a need for further clarification. <b>Forward Action Request</b> is issued to</i> | <i>Conclusions are presented in the same manner based on the assessment of the final PDD version and further documents including assumptions presented in the documentation.</i> |

|   | <i>documents other than the PDD.</i>  | <i>be substantiated within this column.</i>  | <i>highlight issues related to project implementation that require review during the first verification.</i>  |   |
|---|---|--|---|---|
| <b>Validation Protocol Table 1: Conformity of CDM Programme of Activities</b>   |   |  |   |   |
| <b>Checklist Topic / Question</b>   | <b>Reference</b>  | <b>Comments</b>  | <b>GSP</b>  | <b>Final</b>  |
| <i>The checklist is organised in sections following the arrangement of the applied PoA-DD version. Each section is then sub-divided. The lowest level constitutes a checklist question / criterion.</i> | <i>The section gives reference to documents in which the answer to the checklist question or item is found in case the comment refers to documents other than the PoA-DD.</i> | <i>The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is used to explain the conclusions reached. In some cases sub-checklists are applied indicating yes/no decisions on the compliance with the stated criterion. Any <b>Request</b> has to be substantiated within this column.</i> | <i>The section is used to present conclusions based on the assessment of the first PoA-DD version. The PoA-DD is either acceptable based on evidence provided (<input checked="" type="checkbox"/>) or a <b>Corrective Action Request (CAR)</b> is issued due to non-compliance with the checklist question (See below). <b>Clarification Request (CR)</b> is used when the validation team has identified a need for further clarification. <b>Forward Action Request</b> is issued to highlight issues related to project implementation that require review during the first verification.</i> | <i>Conclusions are presented in the same manner based on the assessment of the final PoA-DD version and further documents including assumptions presented in the documentation.</i> |

In case it is found that the project activity does not meet the CDM requirements, more detailed information on this decision is presented in Table 3.

| <b>Validation Protocol Table 3: Unresolved Corrective Action and Clarification Requests</b> |                                   |  |
|---|-----------------------------------|--|
| <b>Clarifications and corrective action requests</b>  | <b>Id. of CAR/CR</b>              | <b>Explanation of the Conclusion for Denial</b>  |
| <i>Referenced request if final conclusions from table 2 resulted in a denial.</i>           | <i>Identifier of the Request.</i> | <i>Detailed explanation of why the project is considered non-compliant with a criterion and a clear reference to the criterion</i> |

The completed validation protocol is enclosed in Annex 1.



## 2.1 Appointment of the Assessment Team

According to the technical scopes and experiences in the sectoral or national business environment, TÜV SÜD has composed a project team in accordance with the appointment rules of the TÜV SÜD certification body “Environment and Energy”.

The composition of an assessment team has to be approved by the Certification Body (CB) to assure that the required skills are covered by the team. The CB TÜV SÜD operates the following qualification levels for team members that are assigned by formal appointment rules:

- Assessment Team Leader (ATL);
- Validator (VAL);
- Validator Trainee (T);
- Technical Experts (TE).

It is required that the sectoral scope(s) and the technical area(s) linked to the methodology and project have to be covered by the assessment team.

### Assessment Team:

| Name            | Qualification | Coverage of scope | Coverage of technical area | Coverage of financial aspect | Host country experience |
|-----------------|---------------|-------------------|----------------------------|------------------------------|-------------------------|
| Nikunj Agarwal* | ATL           | ☑                 | ☑ (1.1)                    | ☑                            | ☑                       |
| Supratik Dutta* | VAL           | ☑                 | -                          | ☑                            | ☑                       |
| Habbu, Ajit     | TE            | ☑                 | ☑ (1.1)                    | ☑                            | -                       |
| Wei, Jianquan   | TE            | ☑                 | ☑ (4.3)                    | ☑                            | -                       |

\*Covered Technical Area (TA) during site audit

**Validation team on site:** Nikunj Agarwal, Supratik Dutta

Technical Reviewer:

- Robert Mitterwallner
- Agrafiotis, Georgios
- Ali Bukhari, Syed Mahmood<sup>1</sup>

## 2.2 Review of Documents

The PDD for the GSP was submitted to the DOE in November 2010. The PDD and additional background documents related to the project design and baseline have been reviewed to verify the correctness, credibility, and interpretation of the presented information. Furthermore, a cross-check between information provided and information from other sources has been done as an initial step of the validation process. A complete list of all documents and evidence material reviewed is attached as annex 2 to this report.

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<sup>1</sup> Technical Expert (TA.1.1.)

## 2.3 Follow-up Interviews

During 13/12/2010 to 14/12/2010, TÜV SÜD performed interviews, telephone conferences, and physical site inspections with project stakeholders to confirm relevant information, and to resolve issues identified in the first document review. The following table provides a list of all persons interviewed in this process.

### Persons Interviewed:

| Name                | Organisation                                |
|---------------------|---|
| Sachin Thakurpersad | Exxaro Resources Ltd.                       |
| Brian van Oerle     | Prana Energy (Pty) Ltd                      |
| Ereena Knan         | Exxaro Resources Ltd. ( Metallurgy Student) |
| Riaan Smit          | Exxaro Resources Ltd                        |
| Katie Ross          | Promethium Carbon (PTY) LTD. (Consultant)   |
| Robbie Louw         | Promethium Carbon (PTY) LTD. (Consultant)   |

## 2.4 Cross-check

During the validation process the team has made reference to available information related to similar projects or technologies as the CDM project activity. Project documentation has also been reviewed against the approved methodology/ies applied to confirm the appropriateness of formulae and correctness of calculations.

## 2.5 Resolution of Clarification and Corrective Action Requests

The objective of this phase of the validation is to resolve the requests for corrective actions, clarifications, and any other outstanding issues which need to be clarified for TÜV SÜD's conclusion on the project design. The CARs and CRs raised by TÜV SÜD are resolved during communication between the client and TÜV SÜD. To guarantee the transparency of the validation process, the concerns raised and responses that have been given are documented in more detail in the validation protocol in Annex 1.

The final PDD version submitted November 2012 serves as the basis for the final assessment presented. Additional changes to the project during the validation process are not considered to be significant with respect to the main CDM objectives. The two CDM main objectives are the reduction of anthropogenic GHG emissions and the contribution of sustainable development to the host country.

## 2.6 Internal Quality Control

Internal quality control is the final step of the validation process and is conducted by the CB "Environment and Energy" which checks the final documentation, which includes the final validation report and all necessary documents. The completion of the quality control indicates that each submitted report has been approved by the CB Committee. In projects where one of the CB Committee members is part of the assessment team, the approval is given by the rest of the committee.

After confirmation by the PP, the validation opinion and relevant documents are submitted to the EB through the UNFCCC web-platform.

### **3 SUMMARY**

The assessment work and the main results are described below in accordance with the VVM reporting requirements. The reference documents indicated in this section and Annex 1 are stated in Annex 2 of this report.

#### **3.1 Approval**

The project participant is Exxaro Resources Limited of South Africa. The host Party South Africa meet the requirements to participate in the CDM.

The DNA of the South Africa has issued a Letter of Approval (LoA) (IRL 94) on 1<sup>st</sup> March 2012 authorizing Exxaro Resources Limited as a project participant. TÜV SÜD received that letter from the project participant directly and considers the provided letters as authentic.

Furthermore, after checking the provided LoA, TÜV SÜD confirms that the letter refer to the precise proposed CDM project activity title in line with the title in the PDD “Use of waste gas at Namakwa Sands in South Africa”.

Letters also indicate that participating Party is a Party to the Kyoto Protocol, and that the participation in the “Use of waste gas at Namakwa Sands in South Africa” project is voluntary. The South African LoA also confirms that the proposed CDM project activity contributes to the sustainable development of South Africa (host country). Based on the information given in the letter, TÜV SÜD considers the approval as unconditional with respect to these items.

LoA has been issued by the DNA, Department of Energy, Republic of South Africa. TÜV SÜD therefore considers that the requirements of VVM (§§ 45-49) have been met.

The LoA does not refer to a specific version of the PDD or validation report. The corresponding references included to LoA, PDD and validation report are consistent.

#### **3.2 Participation**

The participants of the project activity have been approved by the corresponding Party, which is confirmed by the issued LoA.

The means of validation used are similar to the ones described in Section 3.1, specifically in regard to the approval process of the project activity.

#### **3.3 Project design document**

The PDD is compliant with relevant form and guidance as provided by UNFCCC.

The most recent version of the PDD form was used.

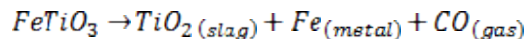
TÜV SÜD considers that the guidelines for the completion of the PDD in their most recent version have been followed. Relevant information was provided by the participants in the applicable PDD sections. Completeness was assessed through the protocol included in Annex 1.

### 3.4 Project description

The following description of the project as per PDD was verified during the on-site audit:

Smelting operation occurs in Direct Current (DC) arc furnaces for smelting operation at Exxaro Resources Ltd owned Exxaro TSA Sands (Pty) Ltd smelter (referred to from this point on as Namakwa Sands). The smelting process comprises the carbonaceous reduction of ilmenite to produce titania slag with a TiO<sub>2</sub> and iron (Fe) with a carbon content.

The main reaction in the furnace can be summarized as:



The carbon monoxide (CO) gas is formed in gas cleaning section of the process as a result of the presence of the carbon in the reductant. If the reductant contains volatile hydrocarbons, as is the case at Namakwa Sands, hydrogen (H<sub>2</sub>) gas is also formed. This CO and H<sub>2</sub> gas is referred to as furnace off-gas. Currently, the majority of the furnace off-gas is cleaned and then flared. The cleaned gas can be routed to the gasholder for use in the preheating of ilmenite. Excess gas is flared to the atmosphere. Cleaning of the gas prior to flaring is required to reduce the particulate emissions from the flares. The project utilizes this cleaned furnace off gas for electricity generation.

The electricity will be generated through 8 combustion engines which will be installed at the same time. Eight combustion engines will be installed at the project site. The output of the each combustion engine will be 1698 KW and total 13.6 MW power will be generated in the project activity from 8 combustion engines. According to section A.4.3 of the PDD, the project only involves electricity generation. The generated electricity will be utilized to meet the requirement for the manufacturing facility of Namakwa sands (project site) and thus it will substitute imported electricity from Eskom who is the electricity provider in the Southern Africa and connected with South African Power Pool (SAPP grid). The estimated emission reduction will be 84, 432 tCO<sub>2</sub>e per year.

Also, according to the published PDD, a portion of the previously flared waste gas will be combusted and fed into slag dryer and will replace the light fuel oil which is currently combusted and providing heat into the slag dryer through the burner. The waste gas will be going to be combusted in a burner and then it will be used directly as a process heat source. However, according to ACM0012, version.03.2 ( used in the published PDD), the heat source of the baseline process will come from fossil fuel based steam boiler but slag dryer is receiving heat through the burner. The project proponent has removed the use of waste gas for thermal energy generation from the project activity to avoid the any applicability problem in the project. Even same thermal energy portion of the process has not considered in the project activity after updating it as per ACM0012, version.04. Further, waste gas are using for process heating and not for heat reaction. Hence, all options regarding heat generation are not applicable and not discussed.

The information presented in the PDD on the technical design is consistent with the actual planning and implementation of the project activity confirmed in the following ways:

- A review and cross check of data and information (see annex 2).
- An on-site visit with relevant stakeholder and personnel with knowledge of the project in attendance. In case of doubt, further cross checks through additional interviews were conducted.
- A review of information related to similar projects or technologies which have been used to validate the accuracy and completeness of the project description.

In conclusion, TÜV SÜD confirms that the project description, as included in the PDD, is sufficiently accurate and complete in order to comply with the requirements of the para 64 (b), VVM (version.1.2) .

### 3.5 Baseline and monitoring methodology

#### 3.5.1 Applicability of the selected methodology

Compliance with each applicability condition as listed in the chosen baseline and monitoring methodology ACM0012 Version 04 and relevant tools

- Tool to calculate the emission factor for an electricity system (Version 02.2.1)
- Tool for the demonstration and assessment of additionality (Version 06)
- Tool to determine the remaining lifetime of equipment (Version 01)
- Tool to calculate baseline, project and/or leakage emissions from electricity consumption (Version 01)

| Applicability Criteria   | Project Case (as per PDD)  | Auditor's Conclusion  |
|--|--|---|
| <p>The consolidated methodology is applicable to project activities implemented in an existing or Greenfield facility converting waste energy carried in identified WECM stream(s) into useful energy. The WECM stream may be an energy source for:</p> <ul style="list-style-type: none"> <li>• Generation of electricity;</li> <li>• Cogeneration;</li> <li>• Direct use as a process heat source;</li> <li>• Generation of heat in element processes;</li> <li>• Generation of mechanical energy; or</li> <li>• Supply of heat of reaction with or without process heating</li> </ul> | <p>The waste energy will be used as an energy source for the generation of electricity at Namakwa Sands, an existing heavy minerals mining and beneficiation facility.</p>   | <p>The project utilizes the waste furnace off gas from the existing smelting operation at Namakwa Sands for electricity generation. In the absence of the project activity waste energy from smelting operation would be flared into the atmosphere. This has been checked by DOE during on site audit.</p> <p><input checked="" type="checkbox"/></p> <p>(IRL 14, IRL 46, IRL 80 and IRL 81)</p> |
| <p>In the absence of the project activity, the WECM stream:</p> <p>a) Would not be recovered and therefore would be flared, released to atmosphere, or remain unutilized in the absence of the project activity at the existing or Greenfield project facility; or</p> <p>b) Would be partially recovered, and the unrecovered portion of WECM stream would be flared, vented</p>  | <p>Point (a) is applicable.</p> <p>In the absence of the project activity, Namakwa Sands would continue its current operation – the furnace off-gas (to be used in the project activity) would have been flared. The flaring of the waste gas prior to the project activity is demonstrated by an energy balance of the relevant sections of the plant. This is in accordance with Annex 2 of the applied methodology.</p> | <p>The waste gas was previously flared and not been used as an energy source in the Namakwa plant. Hence point (a) is applicable for the project activity. This has been demonstrated by the project proponent through energy balance of the Namakwa plant.</p> <p><input checked="" type="checkbox"/></p> <p>(IRL 14, IRL 46, IRL 80 and IRL 81)</p>   |

|  |   |  |
|--|---|--|
| or remained unutilised at the existing or Greenfield project facility  |   |  |
| <p>The methodology is applicable under the following conditions:</p> <ol style="list-style-type: none"> <li>For project activities which recover waste pressure, the methodology is applicable where waste pressure is used to generate electricity only and the electricity generated from waste pressure is measurable;</li> <li>Regulations do not require the project facility to recover and/or utilize the waste energy prior to the implementation of the project activity;</li> <li>The methodology is applicable to both Greenfield and existing waste energy generation facilities. If the production capacity of the project facility is expanded as a result of the project activity, the added production capacity must be treated as a Greenfield facility;</li> <li>Waste energy that is released under abnormal operation (for example, emergencies, shut down) of the project facility shall not be included in the emission reduction calculations.</li> </ol> | <ol style="list-style-type: none"> <li>Waste pressure will not be used to generate electricity at Namakwa Sands.</li> <li>According to a document published by the National Energy Regulator of South Africa (NERSA), furnace off gases are normally flared into the atmosphere or burnt in an open flame without fully utilising the energy contained in them. This shows that it is common practice in South Africa to flare the furnace off gas. This common practice is due to the fact that there is no legislation that requires facilities like Namakwa Sands to recover and/or utilise the waste energy.</li> <li>This project activity is implemented at an existing waste energy generation facility. The production capacity of Namakwa Sands will not increase as a result of the project activity.</li> <li>The waste gas released under abnormal operation of the plant will not be included in the emission reduction calculations.</li> </ol> | <ol style="list-style-type: none"> <li>Waste pressure is not involved in the project activity so same will not be used to generate electricity, This has been checked by DOE with electricity study report of the project activity and physical inspection during site audit. (IRL 18)</li> <li>Project proponent has been submitted National Energy Regulator of South Africa (NERSA) document which says that it is common practice in South Africa to flare the furnace off gas. As same practice is common in South Africa therefore it can be understood that there is no legislation that requires facilities like Namakwa Sands to recover and/or utilise the waste energy. (IRL 88)</li> <li>Project activity is being implemented at an existing waste energy generation facility of Namakwa Sands. There is no capacity expanding in the existing smelting operation at Namakwa Sands. (IRL 18).</li> <li>The waste gas released under abnormal conditions will not be accounted for emission reduction calculations. (IRL 9, IRL 10, IRL 11 and IRL 48)</li> </ol> <p>Applicability is justified</p> <p><input checked="" type="checkbox"/></p> |
| Project activities improving the WECM recovery may (i) capture and utilise a larger  | This is not relevant. A WECM stream is not partially recovered in the absence of the  | The project facility does not have multiple waste gas streams that can be used   |

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| quantity of WECM stream as compared to the historical situation in existing facility, or capture and utilise a larger quantity of WECM stream as compared to a 'reference waste energy generating facility'; and/or (ii) apply more energy efficient equipment to replace/modify/expand waste energy recovery equipment, or implement a more energy efficient equipment than the 'reference waste energy generating facility'. | CDM project activity to supply the heat of reaction.  | interchangeably therefore this applicability criteria is not relevant for project activity.<br><input checked="" type="checkbox"/><br>Applicability is justified<br>(IRL 14, and IRL 18)  |
| The methodology is not applicable to the cases where a WECM stream is partially recovered in the absence of the CDM project activity to supply the heat of reaction, and the recovery of this WECM stream is increased under the project activity to replace fossil fuels used for the purpose of supplying heat of reaction.  | This is not relevant. A WECM stream is not partially recovered in the absence of the CDM project activity to supply the heat of reaction.         | WECM stream was not partially recovered in the absence of the CDM project activity to supply the heat of reaction. This has been checked by DOE with P&ID Diagram of the Namakwa Sands plant. Hence methodology is applicable for the project activity.<br><input checked="" type="checkbox"/><br>Applicability is justified<br>( IRL 13) |
| This methodology is also not applicable to project activities where the waste gas/heat recovery project is implemented in a single-cycle power plant (e.g. gas turbine or diesel generator) to generate power. However, the projects recovering waste energy from single cycle and/or combined cycle power plants for the purpose of generation of heat only can apply this methodology.                                       | The project activity is implemented in an ilmenite smelter (not a single-cycle power plant), and therefore this methodology is applicable.        | The project activity will be implemented combustion engines to generate power and not a single-cycle power plant. This has been checked by DOE during on site audit.<br>Applicability is justified<br><input checked="" type="checkbox"/><br>(IRL 44,IRL 45, IRL 48 and IRL 80)   |
| The emission reduction credits can be claimed up to the end of the lifetime of the waste energy generation equipment. The remaining lifetime of the  | The waste energy generation equipment in this project is two closed, DC-arc furnaces. In accordance with version 01 of the 'Tool to determine the | The waste gas is generating from two DC arc furnaces of the Namakwa Sands plant. According to the applicability condition and option (b) of 'Tool   |



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| equipment should be determined using the latest version of the 'Tool to determine the remaining lifetime of equipment'.   | remaining lifetime of equipment', option (b) was selected to determine the remaining lifetime of the furnaces. An independent expert, with relevant experience in evaluating the remaining lifetime equipment, assessed the furnaces at Namakwa Sands to have a remaining lifetime of 28 years <sup>1</sup> , which far exceeds the end of the crediting period. <sup>2</sup> .   | to determine the remaining lifetime of equipment', project proponent has submitted independent expert (i.e. J.H. Selby consultant to the Minerals Industry) letter which is confirming that life cycle of the furnaces is 17 years from 2008 and it can be extended up to 28 years by inclusion of various ore reserves and immediate stockpiles. Also, provided latest life-of-mine plan which also confirms that two furnaces at the smelter site in Saldanha will remain in operation at full production levels until at least the year 2032. This has been confirmed by the onsite Chief Electrical Engineer as well.<br><br>All above cases life time of the furnaces or smelter plan is more than the crediting period of the project.<br><br><input checked="" type="checkbox"/><br><br>Applicability is justified (IRL 89) |
| The extent of use of waste energy from the waste energy generation facilities in the absence of the CDM project activity will be determined in accordance with the procedures provided in Annex 1 (for Greenfield project facilities) and in Annex 2 (for existing project facilities) to this methodology. | The extent of use of waste energy in the absence of the CDM project activity was determined using an energy balance at Namakwa Sands, as per the guidance provided for existing facilities in Annex 2 of the methodology. The energy balance proves that the furnace off-gas that is recovered in the project activity was previously flared, and was not a source of energy before the implementation of the project activity. | The extent of use of waste energy from the waste energy generation facilities in the absence of the CDM project activity has been determined in accordance with the procedures provided in Annex 2 (for existing project facilities) of the applied methodology. The waste gas was previously flared and not being used as an energy source in the Namakwa plant. This has been demonstrated by the project proponent through energy balance of the Namakwa plant. <input checked="" type="checkbox"/>   |

<sup>1</sup> According to a letter received on 06/03/2012 from an independent expert, regarding the Namakwa Sands furnaces life.

<sup>2</sup> As per a letter received on 23/01/2012 from the onsite Chief Electrical Engineer, regarding the Namakwa Sands smelter life.



|   |  |  |
|---|--|--|
|   |  | Applicability is justified<br>(IRL 14, IRL 46, IRL 80 and IRL 81)  |
| In addition, the applicability conditions included in the tools referred to above apply | All applicability conditions in the applied tools are satisfied. | All applicability conditions of the applied tools are satisfied by project activity.<br><input checked="" type="checkbox"/><br>Applicability is justified<br>(IRL 3,4,5) |

The methodology-specific protocol, included in Annex 1, documents the assessment process. The results of the compliance check as well as relevant evidence are detailed in the protocol and the information reference list.

TÜV SÜD confirms that the chosen baseline and monitoring methodology is applicable to the project activity.

Emission sources, not addressed by the applied methodology and expected to contribute more than 1% of the overall expected average annual emission reductions, have not been identified.

### 3.5.2 Project boundary

The project boundary was assessed considering the information gathered from the physical site inspection, interviews, and secondary evidence received on the design of the project.

The project boundary includes the facility where waste gas generated and the facility where electricity is generated in the Namakwa Plant.

Relevant documents assessed to confirm the project boundary are the following:

- Basis assessment report (IRL 80)
- Environment Authorisation for the Namakwa Sands Cogeneration project from the environmental affairs, Republic of South Africa (IRL 71)
- Feasibility Study Report of the project (IRL 45)

Details and/or observations are listed in Annex 1.

Therefore, TÜV SÜD confirms that the identified boundary, the selected sources, and gases as documented in the PDD are justified for the project activity and are fully in line with the requirements set by the applied methodology.

### 3.5.3 Baseline identification

The PDD defines the following baseline scenario:

W1 condition talks about direct waste gas released into the atmosphere which is not appropriate waste energy scenario for project activity because according to the Registration certificate of the Namakwa sands issued by Department of Environmental affairs and Tourism, Republic of South Africa (IRL 92), Namakwa sands need to be cleaned the furnace off gases before releasing to atmosphere therefore plant is releasing the furnace off gases after proper incineration to fulfil the criteria of the above registra-

tion certificate. It has further been checked with P&ID Diagram of the Namakwa Sands plant (IRL 45) feasibility study report (IRL 45). As the Namakwa Sands plant is releasing the furnace off gases after proper incineration as described above therefore W 2 is the appropriate waste energy scenario for the project activity. Option W3 is excluded because waste energy cannot be sold as an energy source to neighbouring steel mill because significant safety risk is involved in the transportation of the waste gas as carbon monoxide and hydrogen present in the gas. This has been verified with the memorandum between project proponents and CLS consulting services (Pty) Ltd. for the construction of the pipeline for the project (IRL 35). Also, no other potential user/buyer of waste gas as the neighbouring plant is using coal as a source of energy in their process because it is cheaper as well as waste gases contains carbon monoxide and hydrogen which can't be used directly in their plant process therefore Namakwa Sands is flaring the gases from the commissioning of the plant (IRL 18, IRL 45 and IRL 92). Option W4 waste energy scenario can't be the baseline scenario for the project activity as low calorific value (IRL 33, IRL 45 and IRL 46) of the furnace off-gas makes it difficult to meet the energy demand of Namakwa Sands. Project proponent requires 60 MW of energy to meet their electricity requirement of the furnaces (refer to documents (IRL 10) and (IRL 11) for furnace specifications) and the investment cost to generate power from low calorific gases at ilmenite smelters are high as well as same technology is not very common in the South Africa as per published article and project details available on unfccc site (IRL 32 and IRL 91). . Option W5 become a realistic and credible alternative because Namakwa Sands uses a portion of its WECM to dry anthracite. Also, there are no barriers or capital investment require as flaring of the waste gas (where heat will extract) is already available in the existing process. Namakwa Sands has the capacity to recover a portion of the WECM for heat application. Option W6 is not applicable as electricity price is lower as compared to electricity generation through low calorific value waste gas (IRL 33 and IRL 65).

Option P10 (power from the grid) are correctly considered. Apart of P10 power generation options, others (P1, P2, P3, P4,P5, P7, P9 and P12) are excluded due to a variety of reasons as non-existence of renewable sources, the project is not cogeneration, legal requirements prohibits the erection of fossil fired plants with this capacity. Renewable option is not available and this was confirmed by observation of the auditor on-site and verified with A Synthesis Report on Biomass Energy Consumption and Availability in South Africa- A Report Prepared by ProBEC, Dr Oliver Damm and Ralph Triebel LHA Management Consultants (IRL47) .P11 refers to power generation from the waste energy in lower efficiency or lower recovery captive power plant. It is not applicable as lower efficient captive power plant or lower recovery is not a financial feasible option according to the electricity study report (IRL 18). Though thermal portion of the project was the part of the project activity. However, same has not been considered in the project boundary of the final PDD. Since the current project does not involve any cogeneration process therefore it is not applicable. Options P6, P7 P8 and P10 refer to existing power generating equipment and since there is no existing equipment prior to the implementation of the project, these options are not applicable.

P1 is not an appropriate scenario for project activity as without the registration of the project as a CDM, the project would not be feasible as demonstrated in the barriers under additionality of the project activity. P10 is applicable power scenerio for the project as Namakwa plant could have imported the power from Eskom without facing any barriers.

From above analysis, the ideal baseline scenario is 1 with a combination of baseline scenario P10 and waste energy is W 2 and W5 and baseline situation is 1 according to matrix table 2 "Combinations of baseline scenarios applicable under different project situations to which this methodology is applicable" of the version 04 of the methodology ACM0012.

According to the published PDD, a portion of the previously flared waste gas will be combusted and fed into slag dryer and will replace the light fuel oil which is currently combusted and providing heat into slag dryer through the burner. The waste gas will be going to be combusted in a burner and then it will be

used directly as a process heat source. However, according to ACM0012, version 03.2 ( used in the published PDD), the heat source of the baseline process will come from fossil fuel based steam boiler but the slag dryer is receiving heat through the burner. The project proponent has removed the use of waste gas for thermal energy generation from the project activity to avoid the any applicability problem in the project. Even the heat portion of the process has not considered in the project activity after updating it as per ACM0012, version 04. Further, waste gas is using for process heating and not for heat reaction. This has been checked by DOE during on-site audit. Hence, all options regarding heat generation are not applicable and not discussed.

All options regarding mechanical energy are not applicable and hence not discussed.

The information presented in the PDD has been validated by an initial document review of all data. Further confirmation has been made based on the on-site visit and a review of information from similar projects and/or technologies. The sources referenced in the PDD have been quoted correctly. The information was verified against credible sources, such as the following:

- Basis assessment report (IRL 80)
- Environment Authorisation for the Namakwa Sands Cogeneration project from the environmental affairs, Republic of South Africa (IRL 71)
- Gas data report of Namakwa Sands Plant (IRL 46)
- Feasibility Study Report of the project (IRL 45)

The above information has been further confirmed by ADC (Pty) Ltd. (ECSA no. 20030135) confirmation letter on the plant data used for the calculation energy balance (IRL 81) and an article on cogeneration ( Author: E.S. Schubert and RGottschling) (IRL 69)

TÜV SÜD has determined that no reasonable alternative scenario has been excluded.

Based on the validated assumptions used for project activity calculations, TÜV SÜD considers that the identified baseline scenario is reasonable.

Taking the definition of the baseline scenario into account, TÜV SÜD confirms that all relevant CDM requirements, including relevant and/or sectoral policies and circumstances, have been identified correctly in the project PDD.

A verifiable description of the baseline scenario has been included in the PDD.

In regard to item 87 of VVM (version.1.2.), TÜV SÜD confirms the following statements:

- (a) All the assumptions and data used by the project participants are listed in the PDD, including their references and sources;
- (b) All documentation used is relevant for establishing the baseline scenario and correctly quoted and interpreted in the PDD;
- (c) Assumptions and data used in the identification of the baseline scenario are justified appropriately, supported by evidence, and can be deemed reasonable;
- (d) Relevant national and/or sectoral policies and circumstances are considered and listed in the PDD;
- (e) The approved baseline methodology has been correctly applied to identify the most reasonable baseline scenario, and the identified baseline scenario reasonably represents what would occur in the absence of the proposed CDM project activity.

### 3.5.4 Algorithm and/or formulae used to determine emission reductions

TÜV SÜD has assessed the calculations of project emissions, baseline emissions, leakage, and emission reductions. Corresponding calculations have been carried out based on calculation spreadsheets. The parameters and equations presented in the PDD, as well as other applicable documents, have been compared with the information and requirements presented in the methodology and respective tools. An equation comparison has been made to ensure consistency between all the formulae presented in the calculation files and in the PDD, methodology, and tools.

The assumptions and data used to determine the emission reductions are listed in the PDD and all the sources have been checked.

Based on the information reviewed it is confirmed that the sources used are correctly quoted and interpreted in the PDD.

The values presented in the PDD are considered reasonable based on the documentation and references reviewed and the results of the interviews.

The baseline methodology has been applied correctly according to requirements.

The estimate of the baseline emissions is considered correct as the calculations have been reproduced by the audit team with the attainment of the same results.

Detailed information on the validation of the parameters used in the equations are found in Annex 1. The algorithms for the determination of the baseline, project, and leakage are discussed in the following sections.

#### 3.5.4.1 Baseline Emissions

Baseline scenario of the project activity is 1 as per above baseline analysis.

*Calculation of baseline emissions from electricity  $BE_{Elec,y}$  that it displaced by the project activity as per methodology and considering that only one recipient (i.e., Namakwa sands plant) and one source (i.e., the South African Power Pool (SAPP)) the baseline emissions from electricity that it displaced by the project activity, have been calculated by PPs based on the equation (3) of the applied methodology:*

$$BE_{Elec,y} = f_{cap} \times f_{wcm} \times EG_y \times EF_{Elec,y}$$

It should be noted that  $f_{wcm}$  (fraction of total electricity generated by the project activity using waste energy) has been correctly assumed as 1; based on the description of  $f_{wcm}$  as presented in equation section 3 of applied methodology, it can be confirmed that the approach adopted is valid as the electricity generation is indeed purely from the use of waste energy as could be clearly confirmed in the context of on site visit. Based on the fact that  $f_{wcm}=1$  and no equation (35) of the applied methodology needs to be used for calculation of  $f_{cap}$  as project participants has not measured for the three years prior to the start of the project activity (density, pressure, temperature, enthalpy, etc). In accordance with paragraph 3 on page 29 of ACM0012, if the project activity is implemented in an existing facility where the required data is unavailable therefore Method-2 shall be used as all of the required data used for Method-2 was available.

Also, as indicated in the methodology, Method-2 and equation (38 and 39) was used to calculate the  $f_{cap}$ . Plant data have been used to calculate the  $f_{cap}$ . Further, ADC (Pty) Ltd. (ECSA no. 20030135) (IRL 81) has confirmed that the plant data used for the calculation energy balance is according to the plant records. The value of  $f_{cap}$  for the project activity is taken as the ratio of Quantity of waste energy generated prior to the start of the project activity and Amount of waste energy per unit of product generated by the process (that generates waste energy) in the industrial facility (using plant records).

$EG_y$  = Quantity of electricity supplied to the Namakwa sands which in the absence of the project activity would have been sourced from the South African Power Pool (SAPP) during the year y) corresponds to the figure indicated in electricity bills (IRL 13) and electricity study reports (IRL 18).

The calculation of the baseline emissions followed the procedures described in the methodology ACM0012 version 04. Given that the project only generates power, the baseline emissions results equal to the baseline emissions from electricity.

$EF_{Elec,y}$  = CO<sub>2</sub> emission factor for electricity source displaced due to the project activity, during year y) corresponds to the Southern African Power Pool (SAPP) Grid emission factor which, according to the methodology has been calculated as a Combined Margin Emission Factor ( $EF_{Grid,CM,y}$ ).

The baseline emissions results as the sum of the baseline emissions from electricity and the baseline emissions from thermal energy (both on annual basis). The Southern African Power Pool (SAPP) Grid is considered to be the project boundary.

The operating margin emission factor ( $EF_{OM}$ ) was determined based on the simple OM method. The ex-ante option was chosen for this calculation. The calculation of the build margin emission factor ( $EF_{BM}$ ) was based on the data of 5 most recently power units of the countries connected with SAPP. The emission factor of the thermal power plants was calculated by the proportion of the emissions of coal, gas and oil times the emission factor of the best available coal, gas and oil power plant as defined and provided by the SAPP. The new thermal capacity installation that exceeded 20% in the last years, for which data was available, was finally assessed with this factor.

The value of the combined margin emission factor ( $EF_{CM}$ ) was determined using the weighted average of the  $EF_{BM}$  and  $EF_{OM}$  using the default values of the factors as described in the methodology (i.e. 0.5 for each emissions factor).

It was understood at the site audit that there is no emission factor value publicly available or issued by any government agency in South Africa. Therefore, project has calculated grid emission factor of the project activity according to the guidance given in the "Tool to calculate the emission factor for an electricity system" (Version 02.2.1).

As clarified above that Southern African Power Pool (SAPP) grid is considered to be the project boundary as project proponent will replace the Eskom power which is connected with South African power pool. However, in SAPP, apart from the Eskom utility of South Africa, grid utility of the countries like Namibia (NamPower), Zimbabwe (ZESA), Zambia (Zesco), Mozambique (EDM), Botswana (BPC), Democratic Republic of Congo (SNEL), Swaziland and Lesotho (LEC) are also connected.

According to the requirement of the "Tool to calculate the emission factor for an electricity system" (Version 02.2.1), Operating Margin (OM), Build Margin (BM) and Combined Margin (CM) has been calculated by the project proponent on the power plants connected to SAPP grid.

The value used in the emission factor has been verified by DOE as per following publicly available references

|                  |       | Source  |
|------------------|-------|---|
| $EF_{grid,OM,y}$ | 1.011 | a) Namibia (NamPower)<br>Republikein, <i>Namibia's power is in your hands; Use it wisely</i> , April 2008, <a href="http://www.republikein.com.na/fileadmin/pdf/2008/nampower.pdf">www.republikein.com.na/fileadmin/pdf/2008/nampower.pdf</a> |
|                  |       | b) South Africa (Eskom)<br>Eskom Holdings Limited, 2009, <i>Eskom Annual Report 2009</i> , <a href="http://www.eskom.co.za/annreport09/">http://www.eskom.co.za/annreport09/</a>  |
|                  |       | c) South Africa (Eskom)<br>Eskom Website (data used for 2005; latest available),  |

|                         |                    | <a href="http://www.eskom.co.za/live/content.php?Item_ID=4226&amp;Revision=en%2F0">http://www.eskom.co.za/live/content.php?Item_ID=4226&amp;Revision=en%2F0</a><br>d) Zimbabwe (ZESA)<br>UNFCCC website (data used from previous project),<br><a href="http://unfccc.int/kyoto_mechanisms/aij/activities_implemented_jointly/items/1886.php">http://unfccc.int/kyoto_mechanisms/aij/activities_implemented_jointly/items/1886.php</a><br>e) Zimbabwe (ZESA)<br>UNFCCC website (data used from previous project),<br><a href="http://unfccc.int/kyoto_mechanisms/aij/activities_implemented_jointly/items/1886.php">http://unfccc.int/kyoto_mechanisms/aij/activities_implemented_jointly/items/1886.php</a><br>f) 2006 IPCC Guidelines for National Greenhouse Gas Inventories  |             |                    |           |         |      |  |         |      |  |         |      |  |        |      |   |
|-------------------------|--------------------|---|-------------|--------------------|-----------|---------|------|--|---------|------|--|---------|------|--|--------|------|---|
| EF <sub>grid,BM,y</sub> | 1.062              | <p>The commissioning date information of the power plant of ZESA and NamPower has been verified with the following references</p> <table border="1"> <thead> <tr> <th>Power Plant</th><th>Commissioning Date</th><th>Reference</th></tr> </thead> <tbody> <tr> <td>Ruacana</td><td>1977</td><td>NamPower,<br/><a href="http://www.nampower.com.na/pages/ruacana.asp">http://www.nampower.com.na/pages/ruacana.asp</a></td></tr> <tr> <td>Paratus</td><td>1976</td><td>NamPower,<br/><a href="http://www.nampower.com.na/pages/paratus.asp">http://www.nampower.com.na/pages/paratus.asp</a></td></tr> <tr> <td>Van Eck</td><td>1979</td><td>NamPower,<br/><a href="http://www.nampower.com.na/pages/van-eck.asp">http://www.nampower.com.na/pages/van-eck.asp</a></td></tr> <tr> <td>Hwange</td><td>1984</td><td>Power plants around the world, Coal-fired power plants in Africa, November 2009,<br/><a href="http://www.industcards.com/st-coal-africa.htm">http://www.industcards.com/st-coal-africa.htm</a></td></tr> </tbody> </table> <p>The commissioning dates for the Eskom and power plants has been verified with the following Eskom weblink<br/> Eskom Holdings Limited, 2010, CDM Calculations, General Information,<br/> <a href="http://www.eskom.co.za/live/content.php?Item_ID=4226&amp;Revision=en/0">http://www.eskom.co.za/live/content.php?Item_ID=4226&amp;Revision=en/0</a></p> | Power Plant | Commissioning Date | Reference | Ruacana | 1977 | NamPower,<br><a href="http://www.nampower.com.na/pages/ruacana.asp">http://www.nampower.com.na/pages/ruacana.asp</a> | Paratus | 1976 | NamPower,<br><a href="http://www.nampower.com.na/pages/paratus.asp">http://www.nampower.com.na/pages/paratus.asp</a> | Van Eck | 1979 | NamPower,<br><a href="http://www.nampower.com.na/pages/van-eck.asp">http://www.nampower.com.na/pages/van-eck.asp</a> | Hwange | 1984 | Power plants around the world, Coal-fired power plants in Africa, November 2009,<br><a href="http://www.industcards.com/st-coal-africa.htm">http://www.industcards.com/st-coal-africa.htm</a> |
| Power Plant             | Commissioning Date | Reference   |             |                    |           |         |      |  |         |      |  |         |      |  |        |      |   |
| Ruacana                 | 1977               | NamPower,<br><a href="http://www.nampower.com.na/pages/ruacana.asp">http://www.nampower.com.na/pages/ruacana.asp</a>  |             |                    |           |         |      |  |         |      |  |         |      |  |        |      |   |
| Paratus                 | 1976               | NamPower,<br><a href="http://www.nampower.com.na/pages/paratus.asp">http://www.nampower.com.na/pages/paratus.asp</a>  |             |                    |           |         |      |  |         |      |  |         |      |  |        |      |   |
| Van Eck                 | 1979               | NamPower,<br><a href="http://www.nampower.com.na/pages/van-eck.asp">http://www.nampower.com.na/pages/van-eck.asp</a>  |             |                    |           |         |      |  |         |      |  |         |      |  |        |      |   |
| Hwange                  | 1984               | Power plants around the world, Coal-fired power plants in Africa, November 2009,<br><a href="http://www.industcards.com/st-coal-africa.htm">http://www.industcards.com/st-coal-africa.htm</a>   |             |                    |           |         |      |  |         |      |  |         |      |  |        |      |   |
| W <sub>OM</sub>         | 0.500              | Default value of the methodology  |             |                    |           |         |      |  |         |      |  |         |      |  |        |      |   |
| W <sub>BM</sub>         | 0.500              | Default value of the methodology  |             |                    |           |         |      |  |         |      |  |         |      |  |        |      |   |



|   |       |  |
|---|-------|--|
| $EF_{GRID,CM,Y}$<br>(combined<br>margin (CM)<br>emission<br>factor) | 1.036 |  |
|---|-------|--|

The emission factor estimated for project activity in the final PDD is 1.036 tCO<sub>2</sub>/MWh.

Apart from above, project proponent have submitted a spread sheet of the emission factor, the calculation of the emission factor has been verified by DOE and found that same is accordance with the steps given in According to the requirement of the "Tool to calculate the emission factor for an electricity system" (Version 02.2.1).

Further, DOE has verified that below South African projects have been registered in the last two years with the following grid emission factors:

Project 4728: 1.01 tCO<sub>2</sub>e/MWh  
 Project 3677: 1.02 tCO<sub>2</sub>e/MWh  
 Project 2692: 1.02 tCO<sub>2</sub>e/MWh  
 Project 1665: 1.021 tCO<sub>2</sub>e/MW  
 Project 5692: 0.9737 tCO<sub>2</sub>e/ MWh

Except Project no. 5692, rest of other emission factor of the projects are within 2% of the project activity. It is not possible to understand the reason of difference emission factors of the project activity as there are no publicly or single source data is available in South Africa/SAPP

The emission factor of the project no. 5692 is less because project proponent was considered South Africa's Eskom grid as a project boundary and only the same grid data had used to calculate the emission factor. However, as according to the requirement of the "Tool to calculate the emission factor for an electricity system" (Version 02.2.1), all power plants data connected to the selected grid of the project need to be considered in the emission factor calculation therefore project proponent approach to consider the all power plant data for grid emission factor calculation are appropriate.

### 3.5.4.2 Project Emissions

Electricity consumption amount in the gas cleaning equipments will be accounted as a project emission.

### 3.5.4.3 Leakage Emissions

Not Applicable.

### 3.5.4.4 Emission Reductions

In summary, the calculation of the baseline emissions, project emissions and the emission reductions are considered correct.

### 3.6 Additionality

The additionality of the project has been presented in the PDD by applying the first, second and fourth step as indicated in the “Tool for the demonstration and assessment of additionality” (Version 06.0.0).

The approach used in the PDD has been assessed initially through the document review, during which the following documents were reviewed:

- Project Design Document for CDM project “Use of waste gas at Namakwa Sands in South Africa”(IRL 2)
- Consolidated spread sheet for Investment Analysis, emission reduction and energy balance (IRL 82)

On site, the additionality was discussed principally with Mr. Sachin Thakurpersad of Exxaro Resources Ltd. and documents have been reviewed on-site (see Annex 2).

Finally, the data, rationales, assumptions, justifications, and documentation provided have been verified using local knowledge as well as sectoral and financial expertise. This information was also confirmed through the following documentation:

- Stakeholder meeting presentation comments and response (IRL 43)
- Basis assessment report (IRL 80)
- Environment Authorisation for the Namakwa Sands Cogeneration project from the environmental affairs, Republic of South Africa (IRL 71)
- Feasibility Study Report of the project (IRL 45)

Based on the aforementioned approach, TÜV SÜD confirms that the documentation provided is appropriate for this project.

#### 3.6.1 Prior consideration of the clean development mechanism

The starting date of the project activity is determined by 12.01.2012 when the board had given approval for full capital expenditure for the project activity. In order to corroborate this information, the assessment team has reviewed the following documents:

- Board approval of full capital expenditure of the project on 12.01.2012 (IRL 96)

Board has approved (IRL 96) the full capital expenditure for the project on 12.01.2012 after receiving a draft validation report on 15/12/2011. This approval is in line with board conditional approval on 17.08.2011 (IRL 75) where it stated that the board will give approval on full capital expenditure after receiving a positive validation report from DOE as the revenue from carbon credits has been included in the financial model. As starting date is determined to be 12.01.2012, which is after the GSP; therefore, it is confirmed that the project complies with the requirement.

Additionally the assessment team has cross checked this information with Mr. Sachin Thakurpersad (Business development manager) of Exxaro Resources Ltd (IRL 1).

Additionally, in order to confirm that Project Proponent (PP) have taken real actions to continue the activity as CDM, activities have been reviewed against the documents provided to the DOE and a timeline of events is shown in the table below:

#### Timeline of Project Activity

| Activity                                  | Document  | Auditor conclusion                                      |
|---|---|---|
| Proposal for an evaluation study into the | Proposal date of the evaluation study into the use of furnace off-gas at Namakwa Sands from Promethium Carbon (PTY) LTD., dated on 08.03.2006. (IRL 15) | Verified, PP's first activity for the project activity. |



| Activity  | Document  | Auditor conclusion  |
|---|---|---|
| use of furnace off-gas at Namakwa Sands.  | This document indicates the project owner first step to involved for the project activity and hence could be accepted.  | ☑   |
| Boiler quotation from Babcock Africa Services (Pty) Ltd.  | Quotation from the Babcock Africa Services (Pty) Ltd. for boiler, dated on 24.07.2006 (IRL 16)<br><br>This document indicates the ongoing activity for the project and hence could be accepted.   | Verified. The evidence considered as proof for prior CDM consideration<br><br>☑ |
| Engine quotation from GE Jenbacher.   | Quotation from the GE Jenbacher for the combustion engine, dated on 07.08.2006 (IRL 17)<br><br>This document indicates the ongoing activity for the project and hence could be accepted.  | Verified. The evidence considered as proof for prior CDM consideration<br><br>☑ |
| Promethium Carbon (Pty) Ltd completes prefeasibility study on proposed project activity.                      | Prefeasibility study was completed by Promethium Carbon (Pty) Ltd. on 31.08.2006. (IRL 18)<br><br>This document indicates the ongoing activity for the project and hence could be accepted.   | Verified. The evidence considered as proof for prior CDM consideration<br><br>☑ |
| Exxaro Resources Ltd acquires the Namakwa Sands business  | Namakwa Sands Business was acquired by Exxaro Resources Ltd. dated on 19.01.2007.(IRL 19)<br><br>This document indicates the ongoing activity for the project and hence could be accepted.  | Verified. The evidence considered as proof for prior CDM consideration<br><br>☑ |
| Eskom Transmission feasibility quotation for connection of 9 x 2.097 MVA generators at Namakwa Sands Project. | Eskom Transmission feasibility quotation for connection of 9 x 2.097 MVA generators at Namakwa Sands Project, dated on 16.01.2008 (IRL 20)<br><br>This document indicates the ongoing activity for the project and hence could be accepted. | Verified. The evidence considered as proof for prior CDM consideration<br><br>☑ |
| South African DNA letter of no objection for the Namakwa waste gas utilisation project.                       | No objection letter from South African DNA for the project activity, dated on 04.03.2008 (IRL 21)<br><br>This document indicates the ongoing activity for the project and hence could be accepted.  | Verified. The evidence considered as proof for prior CDM consideration<br><br>☑ |

| Activity   | Document  | Auditor conclusion  |
|--|---|---|
| Memorandum of Understanding between Exxaro Coal (Pty) Ltd (a subsidiary of Exxaro Resources Ltd), Promethium Carbon (Pty) Ltd, and Group Five Energy (Pty) Ltd.                      | <p>Memorandum of Understanding was signed between Exxaro Coal (Pty) Ltd (a subsidiary of Exxaro Resources Ltd), Promethium Carbon (Pty) Ltd, and Group Five Energy (Pty) Ltd. for the project activity, dated on 22.10.2008 (IRL 22)</p> <p>This document indicates the ongoing activity for the project and hence could be accepted.</p> | <p>Verified. The evidence considered as proof for prior CDM consideration</p> <p>☑</p>        |
| Steering committee shows prior consideration of the CDM.   | <p>Minutes of the meeting between Exxaro and Promethium Carbon (PTY) LTD on the CDM opportunities for the project activity., dated on 25.06.2008 (IRL 23)</p> <p>This document indicates the project owner first step to involve CDM revenue in the project activity. and hence could be accepted.</p>                                    | <p>Verified, PP's first activity to involve CDM revenue in the project activity.</p> <p>☑</p> |
| Application notice for a basic assessment for project activity at Namakwa Sands Smelter, Saldanha Bay.   | <p>PP was submitted application notice for a basic assessment for the project activity at the Namakwa sands, dated on 22.10.2008 (IRL 24)</p> <p>This document indicates the ongoing activity for the project and hence could be accepted.</p>  | <p>Verified. The evidence considered as proof for prior CDM consideration</p> <p>☑</p>        |
| A Background Information Document (BID) is released for a 30-day public comment period in order to provide interested and affected parties an opportunity to comment on the proposed | <p>A Background Information Document (BID) was on 06.11.2008 released for 30-day public comment period. (IRL 25)</p> <p>This document indicates the ongoing activity for the project and hence could be accepted.</p>   | <p>Verified. The evidence considered as proof for prior CDM consideration</p> <p>☑</p>        |

| Activity   | Document   | Auditor conclusion   |
|--|--|--|
| project.   |  |  |
| Request submitted to the Department of Environmental Affairs & Development Planning (DEA&DP) for an extension to the submission timeframe for the final basic assessment report. | <p>A request was submitted to the Department of Environmental Affairs &amp; Development Planning (DEA&amp;DP) for an extension to the submission timeframe for the final basic assessment report, dated on 03.03.2010 (IRL 27).</p> <p>This document indicates the ongoing activity for the project and hence could be accepted.</p> | <p>Verified. The evidence considered as proof for prior CDM consideration</p> <p>☑</p>         |
| Notice of prior consideration submitted to the UNFCCC and South African DNA  | Prior consideration form was submitted to the South African DNA, dated on 31.08.2010 (IRL 6 and IRL 7)   | <p>Verified. The evidence considered as proof for on-going, CDM related activity.</p> <p>☑</p> |
| Web hosting of PDD for GSP   | <p>GSP Start date 18.11.2010</p> <p><a href="http://cdm.unfccc.int/Projects/Validation/DB/AI93C0C9UI9N/SD1OO5PDKQ7ESOCNLN/view.html">http://cdm.unfccc.int/Projects/Validation/DB/AI93C0C9UI9N/SD1OO5PDKQ7ESOCNLN/view.html</a></p>  | <p>Verified. The evidence considered as proof for on-going, CDM related activity.</p> <p>☑</p> |

This confirms that the project complies with the requirements to demonstrate the prior consideration of the CDM.

### 3.6.2 Identifications of alternatives

The output of the project is electricity.

The list of alternatives to supply the above mentioned output presented in the PDD. The remaining alternatives presented do include all plausible scenarios taking into account the local and sectoral situations for the mentioned outputs. The list of alternatives is therefore considered complete.

### 3.6.3 Investment analysis

The project proponent has carried out an investment analysis based on the capital expenditure, revenue generation, CER revenue, operating & maintenance cost of the power plant, insurance cost, major rebuild cost and fair value at the end of life of the project equipment. As per paragraph 15 of "Guidance on the Assessment of Investment Analysis" (version 05), project proponent has chosen default return on equity values as provided in Appendix A of the guidance. However, as project falls under both sectoral scopes 1 and 4, according to the guidance sectoral scope 1 comes under Group 1 and scope 4 in Group

2, therefore project proponent has taken average value 11.4% between group 1 and group 2 in the IRR calculation of the project activity. However, according to paragraph 7 of Appendix A of this guidance, if the investment analysis is carried out in nominal terms, project participants can convert the real term expected return on equity to nominal values by adding the inflation rate. Therefore, the nominal after tax expected return on equity in South Africa is calculated as 15.9% and same is considered as a benchmark for the project activity.

TUV-SUD was convinced of the appropriateness of the calculated benchmark.

The project IRR without CDM revenue has been estimated to be nominal value -8.6% and real value -12.5% ; which shows that the proposed project is financially not viable without CDM revenue. The values used in the IRR calculation have been verified with the board approval of the full capital expenditure of the project ( IRL 96) and independent auditor confirmation letter on the values of the IRR calculation (IRL 77 and IRL 78). The investment analysis has been performed for 16 years considering annual operational costs, taxes and incentives, total investments and revenue from the power generation with inclusion of fair value of its assets at the end of the assessment period. All the taxes and tax incentives are confirmed to be applied correctly and as per the Income Tax Act of the South Africa (IRL 78).

The project developer has calculated the Internal rate return (IRR) of the project activity according to the standard south African accounting methods (IRL 45, IRL 75, IRL 77, IRL 78 and IRL 96)

TUV-SUD was able to verify the key inputs from the quotation received from the Group Five Engineering and Construction (Pty) Ltd.,(IRL 87) and technical description of combustion engines provided by the GE Jenbacher (IRL 48) for the financial analysis according to the requirements of Para 109 and 111 of the VVM, version 1.2 in following manner. As per para 111 of the VVM, it was confirmed with the minutes of the board meeting (IRL 45) that the above documents the basis of the decision to proceed with the investment in the project.

Following the guidance on the assessment of investment analysis (EB62, Annex 5), the input values for the investment and benchmark analysis have been validated as follows:

| Particulars | Details | Source | Auditor Conclusion |
|-------------|---------|--------|--------------------|
|-------------|---------|--------|--------------------|

|   |   |   |  |
|---|---|---|--|
| Capital expenditure of the project              | R241,601,340 (input values excluding inflationary escalation)<br>R252,329,010 (including inflationary escalation) | Quotation for the construction of the project activity received from the Group Five Engineering and Construction (Pty) Ltd. (IRL 87)      | <input checked="" type="checkbox"/><br>Independent auditor firm Auro Group (Pty) Ltd. has confirmed that the quotation values of Group Five Engineering and Construction (Pty) Ltd. has been considered for the capital cost of the project during board approval time. (IRL 77) |
| Non financial (Development) cost                | R9,300,000  | Operational expenditure budget for the project activity received from the Prana energy, Exxaro Resources Ltd. (IRL 57)                    | <input checked="" type="checkbox"/><br>The supportive documentation was checked by the DOE and found that value is correct.  |
| Fair Value of the equipments (Euro)             | 150,000   | Fair Value confirmation mail for the combustion engine from GE Jenbacher. (IRL 55)  | <input checked="" type="checkbox"/><br>The value can be accepted as it was based on a 2010 quote which was relevant at the time when validation started. This value has been escalated with the inflation rate as appropriate.   |
| Average electricity generation amount (Mwh/yr.) | 86,463  | Technical specification of the combustion engine. (IRL 48)  | <input checked="" type="checkbox"/><br>Figure will be generated from 8 combustion engines and same has been Cross checked with the gas volume data of the Namka Sands (IRL 50 and IRL 81)  |
| Oil cost (Per litre)                            | R29.68  | The mentioned price is based on the quotation received from Engen Petroleum Limited. (IRL 87)<br>Further, project proponent has submitted | <input checked="" type="checkbox"/><br>Figure cross checked with the confirmation letter received from the Prana energy on an operating expenditure  |

|  |   |   |  |
|--|---|---|--|
|  |   | mail communication of the field Engineer at Engen Petroleum LTD, who has confirmed on 26 October 2011 that the oil price for Mobil Pegasus 705 was R34.84 per litre (3,484.00 / 100) at that time. This quoted price is higher than the price of R29.68 that was used in the financial model. The 2008 oil price is therefore conservative. | budget for the project Activity.   |
| Preventive Maintenance Contract (yearly) | <p>€12.95/unit/operating hour.</p> <p>The annual calculated value, by using the above mentioned €12.95, is:</p> <p>Year 1: R2,806,033<br/> Year 2: R8,775,273<br/> Year 3: R10,242,088<br/> Year 4: R11,185,423<br/> Year 5: R12,043,878<br/> Year 6: R12,880,262<br/> Year 7: R13,760,899<br/> Year 8: R14,713,589<br/> Year 9: R15,617,609<br/> Year10: R16,590,859<br/> Year 11: R17,499,160<br/> Year 12: R18,587,587<br/> Year 13: R19,726,392<br/> Year 14: R20,819,219<br/> Year 15: R22,106,580<br/> Year 16: R23,469,678</p> | Operational expenditure budget for the project activity received from prana energy. (IRL 57).   | <input checked="" type="checkbox"/><br>DOE has checked and verified that price is only for electricity generation as per the project description |
| Corrective Maintenance Contract (yearly) | <p>€4.20/unit/operating hour</p> <p>The annual calculated value, by using the above mentioned €4.20, is:</p> <p>Year 1: R910,065<br/> Year 2: R2,846,034<br/> Year 3: R3,321,758</p>  | Operational expenditure budget for the project activity received from prana energy (IRL 57)   | <input checked="" type="checkbox"/><br>DOE has checked and verified that price is only for electricity generation as per the project description |

|                                  |   |   |  |
|----------------------------------|---|---|--|
|                                  | Year 4: R3,627,705<br>Year 5: R3,906,123<br>Year 6: R4,177,382<br>Year 7: R4,462,994<br>Year 8: R4,771,975<br>Year 9: R5,065,171<br>Year 10: R5,380,819<br>Year 11: R5,675,403<br>Year 12: R6,028,406<br>Year 13: R6,397,749<br>Year 14: R6,752,179<br>Year 15: R7,169,701<br>Year 16: R7,611,788   |   |  |
| Insurance costs                  | R528,185 per year<br><br>The annual calculated value, by using the above mentioned R528,185, is:<br>Year 1: R575,135<br>Year 2: R601,016<br>Year 3: R628,062<br>Year 4: R656,325<br>Year 5: R685,860<br>Year 6: R716,723<br>Year 7: R748,976<br>Year 8: R782,680<br>Year 9: R817,900<br>Year 10: R854,706<br>Year 11: R893,168<br>Year 12: R933,360<br>Year 13: R975,361<br>Year 14: R1,019,253<br>Year 15: R1,065,119<br>Year 16: R1,113,049 | Operational expenditure budget for the project activity received from prana energy (IRL 57) | <input checked="" type="checkbox"/><br><br>DOE has checked and verified that price is only for electricity generation as per the project description   |
| Plant maintenance cost (Monthly) | R424,973 per month  | Operational expenditure budget for the project activity received from prana energy (IRL 57) | <input checked="" type="checkbox"/><br><br>DOE has checked and verified that price is only for electricity generation as per the project description   |
| Holding Company Costs (yearly)   | R3,595,085  | Operational expenditure budget for the project activity received from prana energy (IRL 57) | These holding company costs relate to the staff costs for the personnel that manage the project. These personnel are employed by the holding company. The project developer therefore used the terminology |

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|   |   |  | <p>holding costs. The term holding costs in this instance can also be referred to as managing costs.</p> <p>It can be confirmed with section 11a of the South African Income Tax Act that states that expenses incurred to derive income, should be deductible.</p> <p>Further, DOE has checked and verified that the cost is only for electricity generation as per the project description</p> <input checked="" type="checkbox"/> |
| Site operating indirect cost (Yearly)   | R4,870,200  | Operational expenditure budget for the project activity received from prana energy (IRL 57)                                | <input checked="" type="checkbox"/><br>DOE has checked and verified that price is only for electricity generation as per the project description   |
| Inflation rate in south Africa          | 2010: 3.2%<br>2011: 4.2%<br>2012 onwards: 4.5%<br>(average between 3% and 6%) | An article on indication of South African inflationary targets (IRL 58)  | <input checked="" type="checkbox"/><br>The supportive documentation was checked by the DOE and found that value is correct.  |
| Emission Factor (tCO <sub>2</sub> /MWh) | 1.036   | Grid emission factor for south Africa (Version.04) prepared by Promethium Carbon (PTY) LTD. (IRL 72)                       | <input checked="" type="checkbox"/><br>The supportive documentation was checked by the DOE and found that value is correct.  |
| CO <sub>2</sub> content for furnace 1   | 73.0%   | Namakwa Sands Plant- Volume, Flow Rate and calorific Value Calculation from R& D Department of the Namakwa Sands. (IRL 50) | <input checked="" type="checkbox"/><br>The supportive documentation was checked by the DOE and found that value is correct.  |
| CO <sub>2</sub> content for furnace 2   | 75.5%   | Namakwa Sands Plant- Volume, Flow  | <input checked="" type="checkbox"/>  |



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|  |        | Rate and calorific Value Calculation from R& D Department of the Namakwa Sands. (IRL 50)                                   | The supportive documentation was checked by the DOE and found that value is correct.  |
| H <sub>2</sub> content for furnace 1                       | 14.5%  | Namakwa Sands Plant- Volume, Flow Rate and calorific Value Calculation from R& D Department of the Namakwa Sands. (IRL 50) | <input checked="" type="checkbox"/><br>The supportive documentation was checked by the DOE and found that value is correct. |
| H <sub>2</sub> content for furnace 2                       | 16.5%  | Namakwa Sands Plant- Volume, Flow Rate and calorific Value Calculation from R& D Department of the Namakwa Sands. (IRL 50) | <input checked="" type="checkbox"/><br>The supportive documentation was checked by the DOE and found that value is correct. |
| Jenbacher efficiency (kWhr/kWhr)                           | 2.65   | Technical specification of the combustion gas engine from GE Jenbacher. <sup>1</sup> (IRL 48)                              | <input checked="" type="checkbox"/><br>The supportive documentation was checked by the DOE and found that value is correct. |
| Jenbacher guaranteed output (MW)                           | 1.698  | Technical specification of the combustion gas engine from GE Jenbacher. (IRL 48)   | <input checked="" type="checkbox"/><br>The supportive documentation was checked by the DOE and found that value is correct. |
| Calorific value CO (GJ/ton of CO)                          | 10.112 | Namakwa Sands Plant- Volume, Flow Rate and calorific Value Calculation from R& D Department of the Namakwa Sands. (IRL 50) | <input checked="" type="checkbox"/><br>The supportive documentation was checked by the DOE and found that value is correct. |
| Calorific value H <sub>2</sub> (GJ/ton of H <sub>2</sub> ) | 120.9  | Namakwa Sands Plant- Volume, Flow Rate and calorific Value Calculation from R& D Department of the Namakwa Sands. (IRL 50) | <input checked="" type="checkbox"/><br>The supportive documentation was checked by the DOE and found that value is correct. |

<sup>1</sup> . Each unit is designed for the potential of cogeneration, additional equipment will need to be installed in order for this to be possible (common gas exhaust, heat exchanger, etc). Namakwa Sands will only use these units for electricity generation; no waste heat from the engines will be recovered.

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| Specific volume of CO (NM <sup>3</sup> /kg)             | 0.80   | Namakwa Sands Plant- Volume, Flow Rate and calorific Value Calculation from R& D Department of the Namakwa Sands. (IRL 50) | <input checked="" type="checkbox"/><br>The supportive documentation was checked by the DOE and found that value is correct.                      |
| Specific volume of H <sub>2</sub> (NM <sup>3</sup> /kg) | 11.12  | Namakwa Sands Plant- Volume, Flow Rate and calorific Value Calculation from R& D Department of the Namakwa Sands. (IRL 50) | <input checked="" type="checkbox"/><br>The supportive documentation was checked by the DOE and found that value is correct.                      |
| Corporate tax rate                                      | 28%  | Taxation in South Africa 2010/11, prepared by the South African Revenue service (SARS). (IRL 67)                           | <input checked="" type="checkbox"/><br>The supportive documentation was checked by the DOE and found that value is correct.                      |
| Tax allowance   | Year1: 50%,<br>Year 2: 30%<br>Year 3: 30%  | Letter from Mac Murray Aldum Inc, (Registered auditors in South Africa with practice number 950890). (IRL 78)              | <input checked="" type="checkbox"/><br>The supportive documentation was checked by the DOE and found that values are correct.                    |
| Power factor  | 0.99   | Operational expenditure budget for the project activity received from prana energy (IRL 57)                                | <input checked="" type="checkbox"/><br>DOE has checked and verified that price is only for electricity generation as per the project description |
| Electricity price (R/MW/hr)                             | 2011: R368/MW/hr<br>2012: R464/MW/hr<br>2013: R484/MW/hr<br>2014: R506/MW/hr<br>2015: R529/MW/hr<br>2016: R555/MW/hr<br>2017: R583/MW/hr<br>2018: R612/MW/hr<br>2019: R643/MW/hr<br>2020: R675/MW/hr<br>2021: R709/MW/hr<br>2022: R744/MW/hr<br>2023: R782/MW/hr<br>2024: R821/MW/hr<br>2025: R862/MW/hr<br>2026: R905/MW/hr<br>2027: R950/MW/hr | Eskom price forecast and cost of the electricity for Namakwa smelter (IRL 64 and 65)                                       | <input checked="" type="checkbox"/><br>The supportive documentation was checked by the DOE and found that values are correct.                    |

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| Electricity price for high and low demand season | Various rates for peak, standard and off-peak times during the high demand season and the low demand season. Refer the rows 199 to 204 in CDM financial analysis sub sheet of the spread sheet for Investment Analysis, emission reduction and energy balance, prepared by Exxaro Resources Ltd.(IRL # 82) | Electricity tariffs charges published by Eskom, the National Power Utility (IRL# 98) and Eskom data on the cost of the electricity for Namakwa smelter (IRL# 65) | <input checked="" type="checkbox"/><br>The supportive documentation was checked by the DOE and found that values are correct.  |
| Network access charge (KVA)                      | R6.72/kVA  | Eskom data on cost of the electricity for Namakwa smelter (IRL# 65)  | <input checked="" type="checkbox"/><br>The supportive documentation was checked by the DOE and found that value is correct.  |
| Distribution Network Demand Charge (KVA)         | R12.73/kVA   | Eskom data on cost of the electricity for Namakwa smelter (IRL# 65)  | <input checked="" type="checkbox"/><br>The supportive documentation was checked by the DOE and found that value is correct.  |
| Transmission Network Charge (KVA)                | R3.45/kVA  | Eskom data on cost of the electricity for Namakwa smelter (IRL# 65)  | <input checked="" type="checkbox"/><br>The supportive documentation was checked by the DOE and found that value is correct.  |
| CER Price  | 2011: €10.13<br>2012: €11.31<br>2013: €12.48<br>2014: €13.64<br>2015: €14.79<br>2016: €15.92<br>2017: €17.05<br>2018: €18.16<br>2019: €19.27<br>2020: €20.37   | Price forecast given by the CDM consultant (Promethium Carbon's) of the project.   | <input checked="" type="checkbox"/><br>CER price value can be accepted as values are higher as well as conservative as compared to the current CER price in the internal market. This has been checked by DOE<br><a href="https://www.theice.com/emissions.jhtml">https://www.theice.com/emissions.jhtml</a> . |
| Oil consumption (liter per operating hour)       | 0.95   | confirmation letter received from the prana energy on operational expenditure budget for the project activity (IRL 57)   | <input checked="" type="checkbox"/><br>DOE has checked and verified that price is only for electricity generation as per the project description   |

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| Engine availability                          | 95%  | Technical specification of the combustion gas engine from GE Jenbacher (IRL 48) and Maintenance procedure and draft contract received from GE Jenbacher for the combustion gas engine (IRL 29) | <input checked="" type="checkbox"/><br>The supportive documentation was checked by the DOE and found that values are correct.                    |
| Number of engine                             | 2013 onwards:<br>8 engines                                       | Memorandum of the investment review committee of Exxaro Resources Ltd. on the finalization for the feasibility study for the Namakwa Sands project (IRL 47)                                    | <input checked="" type="checkbox"/><br>The supportive documentation was checked by the DOE and found that values are correct.                    |
| Planned maintenance availability             | 1,888 hours of down-time per Gen Set &<br>60,000 operating hours | Maintenance procedure and draft contract received from GE Jenbacher for the combustion gas engine (IRL 29)   | <input checked="" type="checkbox"/><br>The supportive documentation was checked by the DOE and found that values are correct.                    |
| Major rebuild costs:                         |  |  |  |
| Cost per unit                                | €420,000   | Operational expenditure budget for the project activity received from prana energy (IRL 57)  | <input checked="" type="checkbox"/><br>DOE has checked and verified that price is only for electricity generation as per the project description |
| Site work per unit                           | R100,000   | Operational expenditure budget for the project activity received from prana energy (IRL 57)  | <input checked="" type="checkbox"/><br>DOE has checked and verified that price is only for electricity generation as per the project description |
| Off-loading and transport costs from Austria | R178,340 per unit  | Operational expenditure budget for the project activity received from prana energy (IRL 57)  | <input checked="" type="checkbox"/><br>DOE has checked and verified that price is only for electricity generation as per the project description |

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| Euro inflation                                       | 2010 onwards: 2.5%  | European economics website that indicate the European inflation (IRL 59).                   | <input checked="" type="checkbox"/><br>The supportive documentation was checked by the DOE and found that values are correct. |
| Currency exchange rate: US\$ 1 = South African Rands | 2011: 7.85<br>2012: 8.20<br>2013: 9.02<br>2014: 9.84<br>2015: 10.13<br>2016: 10.43<br>2017: 10.74<br>2018: 11.05<br>2019: 11.38<br>2020: 11.71<br>2021: 12.06<br>2022: 12.41<br>2023: 12.78<br>2024: 13.15<br>2025: 13.54<br>2026: 13.94<br>2027: 14.35 | financial indicators which Exxaro uses for financial analysis                               | <input checked="" type="checkbox"/><br>The supportive documentation was checked by the DOE and found that values are correct. |
| Currency exchange rate: Euro 1 = US\$                | 2011: 1.24<br>2012: 1.31<br>2013: 1.37<br>2014: 1.43<br>2015: 1.48<br>2016: 1.51<br>2017: 1.53<br>2018: 1.55<br>2019: 1.57<br>2020: 1.58<br>2021: 1.59<br>2022: 1.59<br>2023: 1.60<br>2024: 1.61<br>2025: 1.61<br>2026: 1.62<br>2027: 1.63              | financial indicators which Exxaro uses for financial analysis                               | <input checked="" type="checkbox"/><br>The supportive documentation was checked by the DOE and found that values are correct. |
| Development costs (EOS JDA)                          | R6,600,000  | Operational expenditure budget for the project activity received from prana energy (IRL 57) | <input checked="" type="checkbox"/><br>The supportive documentation was checked by the DOE and found that value is correct.   |
| Development and start-up costs                       | R2,700,000  | Operational expenditure budget for the project activity received from prana energy (IRL 57) | <input checked="" type="checkbox"/><br>The supportive documentation was checked by the DOE and found that value is correct.   |

Project cost for this project activity:

| <b>COST OF THE PROJECT</b> | <b>South African Rand</b> | <b>Source</b>  | <b>Auditor Conclusion</b>   |
|----------------------------|---------------------------|--|---|
| Civil Construction         | R12,305,365               | Quotation for the construction of the project activity received from the Group Five Engineering and Construction (Pty) Ltd. (IRL 87) | <input checked="" type="checkbox"/><br>The supportive documentation was checked by the DOE, and found that values are correct. Further, DOE has checked the same values with the Independent auditor firm Auro Group (Pty) Ltd. who has confirmed that the quotation values of Group Five Engineering and Construction (Pty) Ltd. has been considered for the capital cost of the project during board approval time. |
| SMP Construction           | R23,830,581               |  |   |
| E&I construction           | R28,364,245               |  |   |
| Gen Set from GE Jenbacher  | R93,903,639               |  |   |
| PMT Activities             | R43,897,510               |  |   |
| Contingency                | R30,000,000               |  |   |
| <b>TOTAL</b>               | <b>R232,301,340</b>       |  | (IRL 77)  |

Project proponent has calculated benchmark of the project according to paragraph 15 of the 'Guidelines on the assessment of investment analysis' (Version 05), the values in the table in appendix A may also be used, as a simple default option, if a company internal benchmark is used. This project activity falls under both project categories 'Group 1' (10.9%) and 'Group 2' (11.9%) as ACM0012 is written for sectoral scopes 1 (Energy Industries) and 4 (Manufacturing Industries).

The project proponent has taken average benchmark between project categories 'Group 1' and 'Group 2', making the real after tax expected return on equity in South Africa 11.4%. The nominal value after tax is 15.9%.

The project IRR without CDM revenue has been estimated to be nominal value -8.6% and real value -12.5% as compared to benchmark determined for the project activity is 15.9% (Nominal value after tax

for expected return on equity) It has been confirmed that IRR calculation has been determined as per guidelines provided in Annex-5 of EB-62.

It must be noted that the IRR of the nominal after tax cash flows of the project is -8.6%, so the use of either a Group 1 or Group 2 default benchmark does not impact on the additionality of the project.

**Sensitivity Analysis:** The Guidance on assessment of investment analysis requires the robustness of the conclusion arrived at to be proved through a sensitivity analysis by varying the critical assumptions to a reasonable variation ( $\pm 10\%$ ). The project developer has identified generation and project cost as the most critical assumptions. Accordingly, sensitivity analysis has been conducted to analyse the impact of a change in (a) generation cost by 10% and (b) project cost by 10% on the profitability of the project activity. The sensitivity analysis calculation has been demonstrated in the IRR spread sheet and would not cross the benchmark value of the project activity.

|                                |               |   |       |       |   |
|--------------------------------|---------------|---|-------|-------|---|
| Base case                      |               | -8.6%   |       |       | Comments  |
| Benchmark                      |               | 15.9% (according to paragraph 7 of Appendix A of this guidance, if the investment analysis is carried out in nominal terms, project participants can convert the real term expected return on equity to nominal values by adding the inflation rate. Therefore, the nominal after tax expected return on equity in South Africa is calculated as 15.9 %.) |       |       |   |
| Variable Parameter             |               | -10%  | 0%    | +10%  |   |
| Capital expenditure escalation | ex-escalation | -7.8%   | -8.6% | -9.3% | <p>As per PP's argument, the capital expenditures primarily comprise of the cost of development, development and startup cost, civil works, SMP construction, E&amp;I construction, Gen set supply PMT activities and contingencies. The cost of plant and machinery is unlikely to experience a downward trend owing to the increasing trend in prices of iron, steel, cement as well as labour. Further, the cost of land and buildings is also only expected to increase due to the rising inflation in the country. Thus, taking these factors into consideration, a decrease in capital cost is not envisaged.</p> <p>However, an extreme case of a decrease in capital cost in tune of 10% has been considered for the analysis. DOE agrees with the argument put forth by the project proponent.</p> |

|  |        |       |        |   |
|--|--------|-------|--------|---|
| <b>GE Preventative Maintenance Cost Escalation</b> | -6.8%  | -8.6% | -10.6% | The project IRR does not cross the benchmark of 15.9% even with 10% increase in the amount of the maintenance contract.   |
| <b>Electricity generated escalation</b>            | -16.1% | -8.6% | -3.5%  | The energy generation has been referred from technical specification of the GE Jenbacher of the project activity.<br><br>However, an extreme case of an increase of 10% in PLF has also been considered for the analysis. But the sensitivity analysis demonstrates that the project IRR is still below the benchmark of 15.9%.<br><br>DOE agrees with the argument put forth by the project proponent. |
| <b>Electricity price escalation</b>                | -16.1% | -8.6% | -3.5%  | The electricity price has been taken from the electricity bill of the Namakwa Sands.<br><br>However, an extreme case of an increase of 10% in electricity price has also been considered for the analysis. But the sensitivity analysis demonstrates that the project IRR is still below the benchmark of 15.9%.<br><br>DOE agrees with the argument put forth by the project proponent.                |

The sensitivity analysis was analyzed in detail and TUV SUD confirms that the underlying assumptions, parameters and chosen values are appropriate and that the calculations have been performed correctly.

The financial calculation has been further verified by independent auditor firms [IRL 77 and IRL 78] as well as project proponent has been submitted a board approval letter which confirming that project was approved by the board members after considered CDM revenue. All the calculation files were checked and no mistakes have been found. Hence it can be confirmed that the calculations are correct.

The financial calculations have been verified as per 114 (c) of VVM (version.1.2) and no mistakes have been found.

### 3.6.4 Barrier analysis

The barrier analysis has been skipped.

### 3.6.5 Common practice analysis

The region for the common practice analysis has been defined as South Africa. Project proponent has been verified the common practice analysis according to the Annex 12 of EB 63 "Guidelines on Common Practice" (Version 01.1)".

In accordance with the guideline, the common practice was determined through the following 4 steps:



**Step 1: Calculate applicable output range as +/-50% of the design output or capacity of the proposed project activity.**

In step 1, Projects from the region with similar size i.e. 6.8 – 20.4 MW (–50% and 50% of the proposed project) and with the same technology have been correctly identified.

**Step 2: Identify all plants that deliver the same output or capacity**

The region for the common practice analysis has been defined as South Africa. According to the guidance, need to identify the similar capacity of the plant in the South Africa. It has been understood (IRL 52) that only three smelting plants are currently operating in South Africa i.e. Richards Bay Minerals, Namakwa Sands and KZN Sands therefore these three smelters are only plants which are currently generating ilmenite furnace off gas in South Africa. This has been checked by DOE with the report on ilmenite smelting: the basics prepared by P.C. Pistorius (IRL 32)

According to the UNFCCC website (IRL 91), the Richards Bay Minerals project is currently under CDM validation but commercial operation still not started. So,  $N_{all}$  can be excluded for this plant according to the Annex 12 of EB 63 “Guidelines on Common Practice’ (Version 01.1)”.

KZN Sands which is owned by Exxaro Resources Ltd have a similar smelting operation like Namakwa Sands and flares furnace off gas. However, do not have waste heat recovery process like project activity therefore  $N_{all}$  can be excluded in this plant also.

As per above analysis, ,  $N_{all} = 0$

**Step 3: identify plants that apply different technologies**

As  $N_{all}$  is equal or zero according to the above analysis therefore this step is not applicable.

**Step 4: Calculate the factor**

$$F = 1 - \frac{N_{diff}}{N_{all}}$$

As mentioned above, in South Africa, currently 3 smelting plants are in operation. However, it was identified that same technologies are being used in these smelting plants therefore no different technologies with same output has been identified in the South Africa so  $N_{diff}$  can be considered zero.

Since  $N_{all} = N_{diff} = 0$  as demonstrated in step 2 and 3, therefore it can be considered that technology of the project activity is not common practice in the host country and same is also full filling the following conditions:

- (a) The factor F is greater than 0.2
- (b)  $N_{all} - N_{diff}$  is greater than 3.

In conclusion, it is clearly demonstrated that the project is not a likely baseline scenario. .

### 3.7 Monitoring plan

The monitoring plan presented in the PDD complies with the requirements of the applicable methodology. The assessment team has verified all parameters in the monitoring plan against the requirements of the methodology and no deviations relevant for the project activity have been found in the plan.

The monitoring procedures have been checked by the assessment team through document review and interviews with the relevant personnel. The parameters to be monitored in accordance with the applied methodology have been discussed with the PPs as follows:

- For determination of baseline emissions:
  - (a) The quantity of waste gas used for electricity generation will be monitored continuously with differential pressure flow meters.
  - (b) The Quantity of electricity supplied to Namakwa Sands will be monitored continuously using electricity meter.
  - (c) The Quantity of electricity consumed by the project from the grid will be monitored continuously using electricity meter.
  - (d) The average technical transmission and distribution losses will be sourced from Eskom's annual report
  - (e) The hours of abnormal operation at Namakwa Sands will be recorded daily and aggregated annually.
  - (f) As the electricity generation from the project activity is purely from use of waste gas therefore the fraction  $f_{wcm}$  is taken as 1. The waste gas will be used for electricity generation (IRL 18). Thus, metering the amount of waste gas or the amount of energy contained in the waste heat which is relevant in the context of calculation of  $f_{wcm}$  will be monitored continuously using flow meter. Also, in the context of  $f_{cap}$ , it could be validated that waste energy generated in project year  $y$  is the same or less than that generated in year base year (IRL 81 and IRL 82).
  - (g) The project activity generates electricity only and does not involve the generation of mechanical energy. Therefore metering the amount of mechanical energy is not applicable to the project activity.
  - (h) Monitored parameters such as density, pressure, temperature, enthalpy, etc are required to calculate  $f_{cap}$  according to the Method-1 of applied methodology ACM0012, Version 4 but these parameters weren't monitored in the three years before the start of the project. Therefore, according to the page 31 of ACM0012, version.04, method-2, "If three-year historical data is not available, the manufacturer's data for the facility shall be used to estimate the amount of waste energy the facility generates per unit of product. The product is produced by the process that generates waste energy (departmental process or process of the entire project facility, whichever is more justified and accurate). If any modification is carried out by the project proponent or if the manufacturer's data is not available for an assessment, this should be carried out by independent qualified/certified external process experts such as a chartered engineer on a conservative quantity of waste energy generated by the project facility per unit of product manufactured by the process generating waste energy.", An independent agency was hired to assess the amount of waste energy Namakwa Sands generated per unit of product to fulfilling the condition of the Method-2. Project proponent has submitted independent agency ADC (Pty) Ltd.(who is affiliated with the Engineering Council of South Africa (ECSA) (registration number 20030135) letter ( IRL 81) which has confirmed that the quantity of waste energy generated per unit of product is calculated according to the applied methodology. The value of  $f_{cap}$  for the project activity is taken as the ratio of Quantity of waste energy generated prior to the start of the project activity and Amount of waste energy per unit of product generated by the process (that generates waste energy) in the industrial facility (using plant records). Hence, the conditions for using Method-2 have been met.

Therefore the monitoring parameters are in accordance with ACM0012 version 4. Hence it is expected that the PPs will be able to implement the monitoring plan and the emission reductions achieved can be reported ex-post and verified (IRL 11, IRL 12, IRL 38 and IRL 40).

### **3.8 Sustainable development**

The LoA of the host country presented a statement that the project contributes to the sustainable development of the host party.

### **3.9 Local stakeholder consultation**

Stakeholder consultation process has been carried out in accordance with the National Environmental Management Act, 1998, Chapter 5, Section 24. and following activities has been done :

- Background Information Document (BID) for the proposed project activity was released for 30 day public comment period (IRL 25)
- A regular Saldanha Bay Forum was held on 19/11/2008
- An open day was held at the Skilpadsaal in Vredenburg on 20/11/2008 (IRL 26) .
- The relevant local stakeholders have been invited via news paper advertisement, onsite notices letter and comments on 06.11.2008.( IRL 43)

The assessment team has reviewed the documentation in order to validate the inclusion of relevant stakeholders. Team local expertise has confirmed that the communication method used to invite the stakeholders is appropriate. The summary of comments presented in the PDD has been verified with the documentation of the stakeholder consultation and has been found to be complete.

Comments presented by the local stakeholders have been taken into account by the PP and has been verified with information obtained during interviews.

Hence, the local stakeholder consultation has been performed adequately according to the CDM requirements.

### **3.10 Environmental impacts**

A initial environmental screening report (IRL 44) was prepared by the Strategic Environmental Focus (Pty) Ltd. to understand the requirement of the environment compliances National Environmental Management Act, 1998 (Act No. 107 of 1998) [NEMA], and the EIA Regulations of 2006 (Government Notice No's R385, 386 and 387 of 2006) for the project activity. The screening report has identified the requirement to conduct a basic assessment study to comply the national regulations as capacity (13.6 MW) of the project activity falls between over 10 MW but below 20 MW. The basic assessment study was conducted by Arcus Gibb (Pty) Ltd (IRL 80) and based on that environmental authorization for the project from the environmental affairs, Republic of South Africa (IRL 71) has been received. The assessment team has reviewed the documentation of the presented information. The document (IRL 44, IRL 71 and IRL 80) confirms the correctness of the approach used by the PPs. In conclusion, the PPs has followed the requirements of the host country with regard to addressing environmental impacts.

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

TÜV SÜD published the project documents on the UNFCCC website and invited comments by affected Parties, stakeholders, and non-governmental organisations during a 30 day period.

All key information gathered is presented in the table below.

##### GSP Comments

|  |                            |
|--|----------------------------|
| <b>website:</b><br><a href="http://cdm.unfccc.int/Projects/Validation/DB/AI93C0C9UI9NSD1OO5PDKQ7ESOCLNL/view.html">http://cdm.unfccc.int/Projects/Validation/DB/AI93C0C9UI9NSD1OO5PDKQ7ESOCLNL/view.html</a> |                            |
| <b>Starting date of the global stakeholder consultation process:</b><br>18/11/2010   |                            |
| <b>Comment submitted by:</b><br>None   | <b>Issues raised:</b><br>- |
| <b>Response by TÜV SÜD:</b><br>-   |                            |

## 5 VALIDATION OPINION

TÜV SÜD has performed a validation of the following proposed CDM project activity:

Use of waste gas at Namakwa Sands in South Africa

Standard auditing techniques have been used for the validation of the project. A methodology-specific protocol for the project has been prepared to conduct the validation process in a transparent and comprehensive manner.

The review of the project design documentation, subsequent follow-up interviews, and further verification of references have provided TÜV SÜD with sufficient evidence to determine the fulfilment of stated criteria in the protocol. In the opinion of TÜV SÜD, the project meets all relevant UNFCCC requirements for the CDM if the underlying assumptions do not change. TÜV SÜD recommends the project for registration by the CDM Executive Board.

An analysis, as provided by the applied methodology, demonstrates that the proposed project activity is not a likely baseline scenario. Emission reductions attributable to the project are additional to any that would occur in the absence of the project activity. Considering that the project will be implemented as designed, the project is likely to achieve the estimated amount of annual emission reductions of 84,432 tCO<sub>2</sub>e and a total estimated of 844,320 tCO<sub>2</sub>e as specified within the final PDD version.

The validation has been performed following the requirements of the latest version of the CDM VVM and on the basis of the contractual agreement. The single purpose of this report is its use during the registration process as part of the CDM project cycle. Based on the work described in this report, nothing has come to our attention that causes us to believe that any project component or issue has not been covered by the validation process.

Pune, 14/12/2012



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Certification Body "Environment and Energy"  
TÜV SÜD South Asia Pvt Ltd



South Asia

## **Annex 1**

### **Validation Protocol**

## Validation Protocol

Project Title: Usage of waste gas at Namakwa Sands in South Africa.

Date of Completion: 14-12-2012

Number of Pages: 1 of 112



| CHECKLIST TOPIC / QUESTION   | Ref.  | COMMENTS  | PDD in GSP                          | Final PDD                           |
|--|---|---|-------------------------------------|-------------------------------------|
| <b>A. General description of project activity</b>  |   |   |                                     |                                     |
| <b>A.1. Title of the project activity</b>  |   |   |                                     |                                     |
| A.1.1. Does the used project title clearly enable to identify the unique CDM activity?       | 2,3,5                                       | Yes, project title clearly enables to identify the energy source and location of the project activity.  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| A.1.2. Are there any indication concerning the revision number and the date of the revision? | 2,3,5                                       | The available PDD is indicated as version 02, dated 11/11/2010  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| A.1.3. Is this consistent with the time line of the project's history?                       | 2,3,5                                       | Yes   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| <b>A.2. Description of the project activity</b>  |   |   |                                     |                                     |
| A.2.1. Is the description delivering a transparent overview of the project activities?       | 2,3,5, 10, 11,13, 15, 16, 17, 31,45, 72, 83 | <p>The project is located in the smelting plant of the Namakwa Sands. Project will utilise the furnace off gas which obtaining in the smelting operation for electricity generation. The electricity will be consumed within the Namakwa Sands plant.</p> <p><b><u>Corrective Action Request No.1.</u></b></p> <p>More transparency is required on following points of the project activity under section A.2.:</p> <p>(a) Current status of the project activity which would include expected commissioning date of the project activity.</p> <p>(b) Generation equipments capacity of the project activity</p> <p>(c) Amount of electricity units and</p> <p>(d) Amount of emission reduction in the project activity</p> <p><b><u>Corrective Action Request No.2.</u></b></p> <p>Project Proponent needs to ensure that name of "Exxaro resources Ltd" is being consistent throughout PDD.</p> <p><b><u>Clarification Request No. 1.</u></b></p> | CAR CR                              | <input checked="" type="checkbox"/> |

Table 1 is applicable to ACM0012, ver 4

## Validation Protocol

Project Title: Usage of waste gas at Namakwa Sands in South Africa.

Date of Completion: 14-12-2012

Number of Pages: 2 of 112



| CHECKLIST TOPIC / QUESTION | Ref. | COMMENTS  | PDD in GSP | Final PDD |
|----------------------------|------|---|------------|-----------|
|                            |      | <p>PDD stated that the smelting operation consists of two closed DC arc furnaces which currently operating at 25 MW and 35 MW. However, also stated that plans are in place to upgrade these furnaces to 27 MW and 38 MW respectively. Are 27 MW and 38MW furnaces parts of any new expansion plan of project proponent and will project activity receive furnace off gases from these furnaces? Project Proponent needs to clarify the same with supportive.</p> <p>Also, provide the supportive to verify the base process of the project activity.</p> <p><b><u>Clarification Request No. 2.</u></b></p> <p>PDD stated "<i>the emission factor for electricity sourced from grid is 1.04 tCO<sub>2</sub>/MWh</i>". Project Proponent needs to clarify the source of this statement. .</p> <p><b><u>Clarification Request No. 3.</u></b></p> <p>PDD stated "<i>all power plant within the Southern African Power Pool (SAPP)</i>". However, it has been noticed during the site visit that the power has been imported from "Eskom". Project Proponent needs to clarify who is the electricity supplier of project proponent with supportive?</p> <p><b><u>Clarification Request No. 4.</u></b></p> <p>Project Proponent needs to provide the supportives which can demonstrate that project proponent is importing power in the plant from SAAP grid.</p> <p><b><u>Clarification Request No. 5.</u></b></p> <p>As per the PDD, Project proponent will import the generation equipment from developed country. However, the name of the country is not defined and it is not clear whether the country does</p> |            |           |

Table 1 is applicable to ACM0012, ver 4



## Validation Protocol

Project Title: Usage of waste gas at Namakwa Sands in South Africa.

Date of Completion: 14-12-2012

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| CHECKLIST TOPIC / QUESTION | Ref. | COMMENTS   | PDD in GSP | Final PDD |
|----------------------------|------|--|------------|-----------|
|                            |      | <p>fall under annex-1 or non annex country. Project Proponent needs to clarify the same.</p> <p>Further, who is the internal combustion equipment supplier? Project Proponent needs to clarify.</p> <p><b><u>Clarification Request No. 6.</u></b></p> <p>PDD stated <i>"The project aims to be the first-of-its-kind registered CDM project activity to operate the selected internal combustion engines on such low calorific gas at a smelter"</i>. Project proponent needs to provide the supportive document which can confirm that process involved in the project activity is the first-of-its-kind in the host country.</p> <p><b><u>Clarification Request No. 7.</u></b></p> <p>PDD sated <i>"The project will also contribute to foreign reserve earnings for South Africa via carbon credit sales revenue"</i>. How this statement relevant to project activity as a project is claiming carbon credits to remove the barriers which coming due to use of the environmentally friendly technologies in the project ? Project Proponent needs to clarify</p> <p><b><u>Clarification Request No. 8.</u></b></p> <p>PDD stated <i>"In early months of 2008. South Africa's electricity generators and supplier (eskom) carried out planned electricity supply interaptions"</i>. Project Proponent needs to elaborate further the meaning of this statement in context of project activity.</p> <p>Also, PP needs to ensure that the the creations of jobs in the project activity are in line with the Saldanha Bay Municipality Integrated Development Plan (IDP) for 2006-2011, Project Proponent needs to provide the supportive evidence for the same.</p> |            |           |

## Validation Protocol

Project Title: Usage of waste gas at Namakwa Sands in South Africa.

Date of Completion: 14-12-2012

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| CHECKLIST TOPIC / QUESTION  | Ref.                       | COMMENTS   | PDD in GSP                          | Final PDD                           |
|---|----------------------------|--|-------------------------------------|-------------------------------------|
| A.2.2. What proofs are available demonstrating that the project description is in compliance with the actual situation or planning?                       | 2,3,9, 5,13,3 1,45, 71, 80 | The planning is described in the feasibility report. The project activity will generate electricity after utilising of waste furnace off gas. The following documents have been verified on site for the project activity<br>- Feasibility study report<br>- Basic assessment report<br>- Environment Authorization from the environmental affairs, Republic of South Africa | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| A.2.3. Is the information provided by these proofs consistent with the information provided by the PDD?   | 2,3,5, 9,13,3 1,45         | Yes, the information provided with proofs is consistent with information presented in the PDD.   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| <b>A.3. Project participants</b>  |                            |  |                                     |                                     |
| A.3.1. Is the form required for the indication of the project participants correctly applied?   | 2,3,5                      | The form is correctly applied. Exxaro Resources Ltd. is considered as project participant.<br><b><u>Clarification Request No. 9.</u></b><br>Project Proponent needs to provide the Letter Of Approval (LOA) for the project activity.  | CR                                  | <input checked="" type="checkbox"/> |
| A.3.2. Is the participation of the listed entities or Parties confirmed by each one of them?  | 2,3,5                      | Yes  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| A.3.3. Is all information on participants / Parties provided consistent with the details provided by further chapters of the PDD (in particular annex 1)? | 2,3,5                      | Yes, the information in section A.3 is consistent with that provided in Annex I of the PDD.  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |

## Validation Protocol

Project Title: Usage of waste gas at Namakwa Sands in South Africa.

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| CHECKLIST TOPIC / QUESTION  | Ref.                   | COMMENTS  | PDD in GSP                          | Final PDD                           |
|---|------------------------|---|-------------------------------------|-------------------------------------|
| <b>A.4. Technical description of the project activity</b>   |                        |   |                                     |                                     |
| <b>A.4.1. Location of the project activity</b>  |                        |   |                                     |                                     |
| A.4.1.1. Does the information provided on the location of the project activity allow for a clear identification of the site(s)?   | 2,3,5, 71              | Yes, the location of the project is mentioned in the PDD.   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| A.4.1.2. How is it ensured and/or demonstrated, that the project proponents can implement the project at this site (ownership, licenses, contracts etc.)?                 | 2,3,5, 9,36,4 5,71     | The following documents demonstrating that the project proponent is implementing the project at the site<br>- Feasibility study report<br>- Basic assessment report<br>- Environment Authorization from the environmental affairs, Republic of South Africa. .                                | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| <b>A.4.2. Category(ies) of project activity</b>   |                        |   |                                     |                                     |
| A.4.2.1. To which category(ies) does the project activity belonging to? Is the category correctly identified and indicated?   | 3,4,5                  | The project falls into scope 1- Energy Industries and scope-4 Manufacturing industries  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| <b>A.4.3. Technology to be employed by the project activity</b>   |                        |   |                                     |                                     |
| A.4.3.1. Does the technical design of the project activity reflect current good practices?  | 2,3,5, 9,36,4 5,71, 83 | As per feasibility study report, the technical design of the project activity reflects current good practice. However, Project Proponent needs to refer CR comment given in below section A.4.3.2.  | CAR                                 | <input checked="" type="checkbox"/> |
| A.4.3.2. Does the description of the technology to be applied provide sufficient and transparent input/ information to evaluate its impact on the greenhouse gas balance? | 2,3,5, 9,36,4 5,71, 83 | Yes, the project activity comprises the recovering and utilization of waste gas to generate electricity for the substitution of grid supplied electricity mainly from fossil fuels fired plants. There is no doubt that this technology will reduce the GHG emissions significantly. However, | CAR<br>CR                           | <input checked="" type="checkbox"/> |

Table 1 is applicable to ACM0012, ver 4

## Validation Protocol

Project Title: Usage of waste gas at Namakwa Sands in South Africa.

Date of Completion: 14-12-2012

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| CHECKLIST TOPIC / QUESTION  | Ref.   | COMMENTS   | PDD in GSP                          | Final PDD                           |
|---|--------|--|-------------------------------------|-------------------------------------|
|   |        | <p><b><u>Corrective Action Request No.3.</u></b></p> <ul style="list-style-type: none"> <li>Project Proponent needs to include a process flow diagram of the project activity including equipment position in the process.</li> <li>Also, indicate the manufacturer name with technical details of the furnace . Provide the supportive to verify the same and indicated gas composition details of the furnace off gas.</li> <li>Further, provide the supportive to verify the mentioned volume of gas availability details and ensure that the volume amount should be average of last 3 years of gas available value.</li> <li>Furthermore, thermal process of the project activity is not clearly described in section A.4.3 of the PDD. Project Proponent needs to include.</li> </ul> <p><b><u>Clarification Request No. 10.</u></b></p> <p>PDD stated "<i>Test engine(s) from alternative technology suppliers may also be installed at the start of the project activity in order to evaluate the performance of the technology</i>". It is not clear to DOE what is the relevancy of this statement in the project activity? Will project proponent go other alternative technology in near future? Project Proponent needs to clarify.</p> <p>Project proponent needs to include the CAR 1 points in the PDD. Also, Project Proponent needs to refer CR 1 comment.</p> |                                     |                                     |
| A.4.3.3. Does the implementation of the project activity require any technology transfer from annex-I-countries to the host country(ies)? | 2,3,5  | Project Proponent needs to refer CAR and CR comment given in section A.4.3.2.  | CAR<br>CR                           | <input checked="" type="checkbox"/> |
| A.4.3.4. Is the technology implemented by the pro-  | 2,3,5, | It is expected that the technology would be implemented in the   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |

## Validation Protocol

Project Title: Usage of waste gas at Namakwa Sands in South Africa.

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| CHECKLIST TOPIC / QUESTION   | Ref.                   | COMMENTS   | PDD in GSP                          | Final PDD                           |
|--|------------------------|--|-------------------------------------|-------------------------------------|
| ject activity environmentally safe?  | 71                     | project activity is environmentally safe.  |                                     |                                     |
| A.4.3.5. Is the information provided in compliance with actual situation or planning?  | 2,3,5, 9,36,4 5,71, 83 | As per description given in the feasibility report, the information provided in the PDD is in compliance with the actual situation and planning.   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| A.4.3.6. Does the project use state of the art technology and / or does the technology result in a significantly better performance than any commonly used technologies in the host country? | 2,3,5, 45,83           | Yes, the information provided within PDD is in compliance with the actual situation and planning.  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| A.4.3.7. Is the project technology likely to be substituted by other or more efficient technologies within the project period?   | 2,3,5 48,83            | No as equipment purchased is new with an expected operational lifetime of 15 years.  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| A.4.3.8. Does the project require extensive initial training and maintenance efforts in order to be carried out as scheduled during the project period?                                      | 2,5,34 37,38, 83       | It was understood from the supportive documents checked on the site that the equipments supplier will provide the training and maintenance. However,<br><b><u>Clarification Request No. 11.</u></b><br>Project Proponent needs to ensure that the submitted supportive on training and maintenance procedure is the document of the equipment supplier for the project activity. | CR                                  | <input checked="" type="checkbox"/> |
| A.4.3.9. Is information available on the demand and requirements for training and maintenance?   | 2,5,34 37,38           | Project Proponent needs to refer CR comment given in section A.4.3.8.  | CR                                  | <input checked="" type="checkbox"/> |
| A.4.3.10. Is a schedule available for the implementation of the project and are there any  | 2,5,34                 | Project Proponent needs to refer above CAR comment given in  | CAR                                 | <input checked="" type="checkbox"/> |

Table 1 is applicable to ACM0012, ver 4

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Project Title: Usage of waste gas at Namakwa Sands in South Africa.

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| CHECKLIST TOPIC / QUESTION  | Ref.             | COMMENTS   | PDD in GSP                          | Final PDD                           |
|---|------------------|--|-------------------------------------|-------------------------------------|
| risks for delays?   | 37,38            | section A.2.   |                                     |                                     |
| <b>A.4.4. Estimated amount of emission reductions over the chosen crediting period</b>  |                  |  |                                     |                                     |
| A.4.4.1. Are the figures provided consistent with other data presented in the PDD?  | 2,3,5, 83        | Yes, figures are provided consistent with other data presented in the PDD  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| <b>A.4.5. Public funding of the project activity</b>  |                  |  |                                     |                                     |
| A.4.5.1. Is the information provided on public funding provided in compliance with the actual situation or planning as available by the project participants? | 2,3,5 40, 53, 83 | According to the financial documents reviewed by DOE there is no public funding in the project activity.   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| A.4.5.2. Is all information provided consistent with the details given in the remaining chapters of the PDD (in particular annex 2)?                          | 2,3,5 40, 53, 83 | Yes  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| <b>B. Application of a baseline and monitoring methodology</b>  |                  |  |                                     |                                     |
| <b>B.1. Title and reference of the approved baseline and monitoring methodology</b>   |                  |  |                                     |                                     |
| B.1.1 Are reference number, version number, and title of the baseline and monitoring methodology clearly indicated?   | 2,3,4, 83        | The approved methodology ACM0012 (version 04) is used, including tool to calculate the emission factor for an electricity system (version02.2.1)and Tool for the Demonstration and Assessment of Additionality (Version 06.0.0).   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| B.1.2. Is the applied version the most recent one and / or is this version still applicable?  | 2,3,4, 83        | Yes, the applied version 04 was the most recent one at the time of PDD webhosting and site visit. However, the project proponent need to revise the project according to the latest version 04 of the ACM0012 as version 3.2 of the methodology is now not valid for request for registration submission.<br><b><u>Corrective Action Request No.4.</u></b> | CAR                                 | <input checked="" type="checkbox"/> |

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| CHECKLIST TOPIC / QUESTION   | Ref.        | COMMENTS  | PDD in GSP                          | Final PDD                           |                                 |    |                      |    |                      |    |     |                                     |
|--|-------------|---|-------------------------------------|-------------------------------------|---------------------------------|----|----------------------|----|----------------------|----|-----|-------------------------------------|
|  |             | Project proponent should have revised the project according to version 04 of ACM0012 as version 3.2 is not valid for request for registration submission.   |                                     |                                     |                                 |    |                      |    |                      |    |     |                                     |
| B.1.3. Does the methodology refer to the following tools with its latest approved versions?<br><br>1) Tool to calculate the emission factor for an electricity system.<br><br>2) Tool for the demonstration and assessment of additionality.   | 2,3,4, 5,83 | Yes   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |                                 |    |                      |    |                      |    |     |                                     |
| B.2. Justification of the choice of the methodology and why it is applicable to the project activity   |             |   |                                     |                                     |                                 |    |                      |    |                      |    |     |                                     |
| Is the applied methodology considered the most appropriate one?  | 2,3,4, 5,83 | As per description given in the PDD and submitted feasibility report, the applied methodology used in the project activity seems most appropriate one. However,<br><br>Also refer CAR comment given in section B.1.2.   | CAR                                 | <input checked="" type="checkbox"/> |                                 |    |                      |    |                      |    |     |                                     |
| B.2.1. Criterion 1:<br>The consolidated methodology is applicable to project activities implemented in an existing or Greenfield facility converting waste energy carried in identified WECM stream(s) into useful energy. The WECM stream may be an energy source for:<br><ul style="list-style-type: none"><li>• Generation of electricity;</li><li>• Cogeneration;</li><li>• Direct use as a process heat source;</li></ul> | 2,3,4, 5,83 | <table><tr><th>Applicability checklist</th><th>Yes / No</th></tr><tr><td>Criterion discussed in the PDD?</td><td>No</td></tr><tr><td>Compliance provable?</td><td>No</td></tr><tr><td>Compliance verified?</td><td>No</td></tr></table><br><br><b>Corrective Action Request No.5.</b> | Applicability checklist             | Yes / No                            | Criterion discussed in the PDD? | No | Compliance provable? | No | Compliance verified? | No | CAR | <input checked="" type="checkbox"/> |
| Applicability checklist  | Yes / No    |   |                                     |                                     |                                 |    |                      |    |                      |    |     |                                     |
| Criterion discussed in the PDD?  | No          |   |                                     |                                     |                                 |    |                      |    |                      |    |     |                                     |
| Compliance provable?   | No          |   |                                     |                                     |                                 |    |                      |    |                      |    |     |                                     |
| Compliance verified?   | No          |   |                                     |                                     |                                 |    |                      |    |                      |    |     |                                     |

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| CHECKLIST TOPIC / QUESTION  | Ref. | COMMENTS  | PDD in GSP | Final PDD |
|---|------|---|------------|-----------|
| <ul style="list-style-type: none"><li>• Generation of heat in element processes;</li><li>• Generation of mechanical energy; or</li></ul> Supply of heat of reaction with or without process heating |      | <p>Project activity will utilize furnace off gas for electricity generation and for material heating purpose in the dryer. However, it is not transparently described under which energy source criteria (Co-generation, generation of electricity, direct use of process heat, generation of heat in the element process).</p> <p>Also refer CAR comment given in section B.1.2.</p> |            |           |

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| CHECKLIST TOPIC / QUESTION   | Ref.        | COMMENTS  |                         | PDD in GSP | Final PDD                       |    |                      |    |                      |    |  |     |                                     |
|--|-------------|---|-------------------------|------------|---------------------------------|----|----------------------|----|----------------------|----|--|-----|-------------------------------------|
|  |             |   |                         |            |                                 |    |                      |    |                      |    |  |     |                                     |
| B.2.2. Criterion 2:In the absence of the project activity, the WECM stream:<br>a) Would not be recovered and therefore would be flared, released to atmosphere, or remain unutilized in the absence of the project activity at the existing or Greenfield project facility; or<br>b) Would be partially recovered, and the unrecovered portion of WECM stream would be flared, vented or remained unutilised at the existing or Greenfield project facility.   | 2,3,4, 5,83 | <table><tr><td>Applicability checklist</td><td>Yes / No</td></tr><tr><td>Criterion discussed in the PDD?</td><td>No</td></tr><tr><td>Compliance provable?</td><td>No</td></tr><tr><td>Compliance verified?</td><td>No</td></tr></table><br>Also refer CAR comment given in section B.1.2. | Applicability checklist | Yes / No   | Criterion discussed in the PDD? | No | Compliance provable? | No | Compliance verified? | No |  | CAR | <input checked="" type="checkbox"/> |
| Applicability checklist  | Yes / No    |   |                         |            |                                 |    |                      |    |                      |    |  |     |                                     |
| Criterion discussed in the PDD?  | No          |   |                         |            |                                 |    |                      |    |                      |    |  |     |                                     |
| Compliance provable?   | No          |   |                         |            |                                 |    |                      |    |                      |    |  |     |                                     |
| Compliance verified?   | No          |   |                         |            |                                 |    |                      |    |                      |    |  |     |                                     |
| B.2.3. Criterion 3: Project activities improving the WECM recovery may (i) capture and utilise a larger quantity of WECM stream as compared to the historical situation in existing facility, or capture and utilise a larger quantity of WECM stream as compared to a ‘reference waste energy generating facility’; and/or (ii) apply more energy efficient equipment to replace/modify/expand waste energy recovery equipment, or implement a more energy efficient equipment than the ‘reference waste energy generating facility’. | 2,3,4, 5,83 | <table><tr><td>Applicability checklist</td><td>Yes / No</td></tr><tr><td>Criterion discussed in the PDD?</td><td>No</td></tr><tr><td>Compliance provable?</td><td>No</td></tr><tr><td>Compliance verified?</td><td>No</td></tr></table><br>Also refer CAR comment given in section B.1.2. | Applicability checklist | Yes / No   | Criterion discussed in the PDD? | No | Compliance provable? | No | Compliance verified? | No |  | CAR | <input checked="" type="checkbox"/> |
| Applicability checklist  | Yes / No    |   |                         |            |                                 |    |                      |    |                      |    |  |     |                                     |
| Criterion discussed in the PDD?  | No          |   |                         |            |                                 |    |                      |    |                      |    |  |     |                                     |
| Compliance provable?   | No          |   |                         |            |                                 |    |                      |    |                      |    |  |     |                                     |
| Compliance verified?   | No          |   |                         |            |                                 |    |                      |    |                      |    |  |     |                                     |

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|--|------------|---|-------------------------|------------|---------------------------------|----|----------------------|----|----------------------|----|-----|---|
|  |            |   |                         |            |                                 |    |                      |    |                      |    |     |   |
| B.2.4. Criterion 4:<br>The methodology is applicable under the following conditions:<br><br>1. For project activities which recover waste pressure, the methodology is applicable where waste pressure is used to generate electricity only and the electricity generated from waste pressure is measurable;<br><br>2. Regulations do not require the project facility to recover and/or utilize the waste energy prior to the implementation of the project activity;<br><br>3. The methodology is applicable to both Greenfield and existing waste energy generation facilities. If the production capacity of the project facility is expanded as a result of the project activity, the added production capacity must be treated as a Greenfield facility.<br><br>4. Waste energy that is released under abnormal operation (for example, emergencies, shut down) of the project facility shall not be included in the emission reduction calculations | 2,3,4,5,83 | <table><tr><td>Applicability checklist</td><td>Yes / No</td></tr><tr><td>Criterion discussed in the PDD?</td><td>No</td></tr><tr><td>Compliance provable?</td><td>No</td></tr><tr><td>Compliance verified?</td><td>No</td></tr></table><br>Also refer CAR comment given in section B.1.2. | Applicability checklist | Yes / No   | Criterion discussed in the PDD? | No | Compliance provable? | No | Compliance verified? | No | CAR | ☑ |
| Applicability checklist  | Yes / No   |   |                         |            |                                 |    |                      |    |                      |    |     |   |
| Criterion discussed in the PDD?  | No         |   |                         |            |                                 |    |                      |    |                      |    |     |   |
| Compliance provable?   | No         |   |                         |            |                                 |    |                      |    |                      |    |     |   |
| Compliance verified?   | No         |   |                         |            |                                 |    |                      |    |                      |    |     |   |
| B.2.5. Criterion 5<br>If multiple waste gas streams are available in the project facility and can be used interchangeably for various applications as part of the energy sources in the facility, the recovery of any waste gas stream,  | 2,3,4,5,83 | <table><tr><td>Applicability checklist</td><td>Yes / No</td></tr><tr><td>Criterion discussed in the PDD?</td><td>No</td></tr><tr><td>Compliance provable?</td><td>No</td></tr><tr><td>Compliance verified?</td><td>No</td></tr></table><br>Also refer CAR comment given in section B.1.2. | Applicability checklist | Yes / No   | Criterion discussed in the PDD? | No | Compliance provable? | No | Compliance verified? | No | CAR | ☑ |
| Applicability checklist  | Yes / No   |   |                         |            |                                 |    |                      |    |                      |    |     |   |
| Criterion discussed in the PDD?  | No         |   |                         |            |                                 |    |                      |    |                      |    |     |   |
| Compliance provable?   | No         |   |                         |            |                                 |    |                      |    |                      |    |     |   |
| Compliance verified?   | No         |   |                         |            |                                 |    |                      |    |                      |    |     |   |

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|--|-------------|---|-------------------------|------------|---------------------------------|----|----------------------|----|----------------------|----|--|-----|-------------------------------------|
| which would be totally or partially recovered in the absence of the project activity, shall not be reduced due to the implementation of CDM project activity. For such situations, the guidance provided in Annex 3 shall be followed  |             |   |                         |            |                                 |    |                      |    |                      |    |  |     |                                     |
| B.2.6. <u>Criterion 6</u><br>The methodology is not applicable to the cases where a WECM stream is partially recovered in the absence of the CDM project activity to supply the heat of reaction, and the recovery of this WECM stream is increased under the project activity to replace fossil fuels used for the purpose of supplying heat of reaction.   | 2,3,4, 5,83 | <table><tr><td>Applicability checklist</td><td>Yes / No</td></tr><tr><td>Criterion discussed in the PDD?</td><td>No</td></tr><tr><td>Compliance provable?</td><td>No</td></tr><tr><td>Compliance verified?</td><td>No</td></tr></table> <p>Also refer CAR comment given in section B.1.2.</p> | Applicability checklist | Yes / No   | Criterion discussed in the PDD? | No | Compliance provable? | No | Compliance verified? | No |  | CAR | <input checked="" type="checkbox"/> |
| Applicability checklist  | Yes / No    |   |                         |            |                                 |    |                      |    |                      |    |  |     |                                     |
| Criterion discussed in the PDD?  | No          |   |                         |            |                                 |    |                      |    |                      |    |  |     |                                     |
| Compliance provable?   | No          |   |                         |            |                                 |    |                      |    |                      |    |  |     |                                     |
| Compliance verified?   | No          |   |                         |            |                                 |    |                      |    |                      |    |  |     |                                     |
| B.2.7. <u>Criterion 7:</u><br>This methodology is also not applicable to project activities where the waste gas/heat recovery project is implemented in a single-cycle power plant (e.g. Gas turbine or diesel generator) to generate power. However, the projects recovering waste energy from single cycle and/or combined cycle power plants for the purpose of generation of heat only can apply this methodology. | 2,3,4, 5,83 | <table><tr><td>Applicability checklist</td><td>Yes / No</td></tr><tr><td>Criterion discussed in the PDD?</td><td>No</td></tr><tr><td>Compliance provable?</td><td>No</td></tr><tr><td>Compliance verified?</td><td>No</td></tr></table> <p>Also refer CAR comment given in section B.1.2.</p> | Applicability checklist | Yes / No   | Criterion discussed in the PDD? | No | Compliance provable? | No | Compliance verified? | No |  | CAR | <input checked="" type="checkbox"/> |
| Applicability checklist  | Yes / No    |   |                         |            |                                 |    |                      |    |                      |    |  |     |                                     |
| Criterion discussed in the PDD?  | No          |   |                         |            |                                 |    |                      |    |                      |    |  |     |                                     |
| Compliance provable?   | No          |   |                         |            |                                 |    |                      |    |                      |    |  |     |                                     |
| Compliance verified?   | No          |   |                         |            |                                 |    |                      |    |                      |    |  |     |                                     |
| B.2.8. <u>Criterion 8:</u><br>The emission reduction credits can be claimed up to the end of the lifetime of the waste energy generation equipment. The remaining lifetime   | 2,3,4, 5,83 | <table><tr><td>Applicability checklist</td><td>Yes / No</td></tr><tr><td>Criterion discussed in the PDD?</td><td>No</td></tr><tr><td>Compliance provable?</td><td>No</td></tr><tr><td>Compliance verified?</td><td>No</td></tr></table>   | Applicability checklist | Yes / No   | Criterion discussed in the PDD? | No | Compliance provable? | No | Compliance verified? | No |  | CAR | <input checked="" type="checkbox"/> |
| Applicability checklist  | Yes / No    |   |                         |            |                                 |    |                      |    |                      |    |  |     |                                     |
| Criterion discussed in the PDD?  | No          |   |                         |            |                                 |    |                      |    |                      |    |  |     |                                     |
| Compliance provable?   | No          |   |                         |            |                                 |    |                      |    |                      |    |  |     |                                     |
| Compliance verified?   | No          |   |                         |            |                                 |    |                      |    |                      |    |  |     |                                     |

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|--|--------------|---|-------------------------|-------------------------------------|--|-----|----------------------------------|----|---|----|-----------------------------------|-------------------------------------|-----|-------------------------------------|
| of the equipment should be determined using the latest version of the 'Tool to determine the remaining lifetime of equipment'.   |              | Also refer CAR comment given in section B.1.2.  |                         |                                     |  |     |                                  |    |   |    |                                   |                                     |     |                                     |
| B.2.9. <u>Criterion 9:</u><br>The extent of use of waste energy from the waste energy generation facilities in the absence of the CDM project activity will be determined in accordance with the procedures provided in Annex 1 (for Greenfield project facilities) and in Annex 2 (for existing project facilities) of the methodology. | 2,3,4, 5,83  | <table><tr><td>Applicability checklist</td><td>Yes / No</td></tr><tr><td>Criterion discussed in the PDD?</td><td>No</td></tr><tr><td>Compliance provable?</td><td>No</td></tr><tr><td>Compliance verified?</td><td>No</td></tr></table><br>Also refer CAR comment given in section B.1.2.   | Applicability checklist | Yes / No                            | Criterion discussed in the PDD?          | No  | Compliance provable?             | No | Compliance verified?                    | No | CAR                               | <input checked="" type="checkbox"/> |     |                                     |
| Applicability checklist  | Yes / No     |   |                         |                                     |  |     |                                  |    |   |    |                                   |                                     |     |                                     |
| Criterion discussed in the PDD?  | No           |   |                         |                                     |  |     |                                  |    |   |    |                                   |                                     |     |                                     |
| Compliance provable?   | No           |   |                         |                                     |  |     |                                  |    |   |    |                                   |                                     |     |                                     |
| Compliance verified?   | No           |   |                         |                                     |  |     |                                  |    |   |    |                                   |                                     |     |                                     |
| B.2.10. <u>Criterion 10:</u><br>In addition, the applicability conditions included in the tools referred to above apply  |              | <table><tr><td>Applicability checklist</td><td>Yes / No</td></tr><tr><td>Criterion discussed in the PDD?</td><td>No</td></tr><tr><td>Compliance provable?</td><td>No</td></tr><tr><td>Compliance verified?</td><td>No</td></tr></table><br>Also refer CAR comment given in section B.1.2.   | Applicability checklist | Yes / No                            | Criterion discussed in the PDD?          | No  | Compliance provable?             | No | Compliance verified?                    | No | CAR                               | <input checked="" type="checkbox"/> |     |                                     |
| Applicability checklist  | Yes / No     |   |                         |                                     |  |     |                                  |    |   |    |                                   |                                     |     |                                     |
| Criterion discussed in the PDD?  | No           |   |                         |                                     |  |     |                                  |    |   |    |                                   |                                     |     |                                     |
| Compliance provable?   | No           |   |                         |                                     |  |     |                                  |    |   |    |                                   |                                     |     |                                     |
| Compliance verified?   | No           |   |                         |                                     |  |     |                                  |    |   |    |                                   |                                     |     |                                     |
| B.3. Description of the sources and gases included in the project boundary   |              |   |                         |                                     |  |     |                                  |    |   |    |                                   |                                     |     |                                     |
| B.3.1. Which facilities are included in the geographical extent of the project boundary?   | 2,3,4, 5, 83 | Yes, the PDD includes a flow diagram of the project boundary, delineating the project activity based on the description provided in section A.4.3.  |                         | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/>      |     |                                  |    |   |    |                                   |                                     |     |                                     |
| B.3.2. Source: electricity generation, grid or captive source<br>Description of Source: main emission<br>Gas(es): CO <sub>2</sub><br>Type: Baseline Emissions  | 2,3,4, 5, 83 | <table><tr><td>Boundary checklist</td><td>Yes / No</td></tr><tr><td>Source and gas(es) discussed in the PDD?</td><td>Yes</td></tr><tr><td>Inclusion / exclusion justified?</td><td>No</td></tr><tr><td>Explanation / Justification sufficient?</td><td>No</td></tr><tr><td>Consistency with monitoring plan?</td><td>No</td></tr></table> | Boundary checklist      | Yes / No                            | Source and gas(es) discussed in the PDD? | Yes | Inclusion / exclusion justified? | No | Explanation / Justification sufficient? | No | Consistency with monitoring plan? | No                                  | CAR | <input checked="" type="checkbox"/> |
| Boundary checklist   | Yes / No     |   |                         |                                     |  |     |                                  |    |   |    |                                   |                                     |     |                                     |
| Source and gas(es) discussed in the PDD?   | Yes          |   |                         |                                     |  |     |                                  |    |   |    |                                   |                                     |     |                                     |
| Inclusion / exclusion justified?   | No           |   |                         |                                     |  |     |                                  |    |   |    |                                   |                                     |     |                                     |
| Explanation / Justification sufficient?  | No           |   |                         |                                     |  |     |                                  |    |   |    |                                   |                                     |     |                                     |
| Consistency with monitoring plan?  | No           |   |                         |                                     |  |     |                                  |    |   |    |                                   |                                     |     |                                     |

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| CHECKLIST TOPIC / QUESTION   | Ref.         | COMMENTS  | PDD in GSP         | Final PDD |  |     |                                  |    |   |    |                                   |    |     |   |
|--|--------------|---|--------------------|-----------|--|-----|----------------------------------|----|---|----|-----------------------------------|----|-----|---|
|  |              | <b><u>Corrective Action Request No.6.</u></b><br>Project Proponent needs to justify the reasons where gases and sources are excluded from the table.<br>Also refer CAR comment given in section B.1.2.  |                    |           |  |     |                                  |    |   |    |                                   |    |     |   |
| B.3.3. Source: fossil fuel consumption in element process for thermal energy<br>Description of Source: main emission<br>Gas(es): CO2<br>Type: Baseline Emissions | 2,3,4, 5, 83 | <table><tr><td>Boundary checklist</td><td>Yes / No</td></tr><tr><td>Source and gas(es) discussed in the PDD?</td><td>Yes</td></tr><tr><td>Inclusion / exclusion justified?</td><td>No</td></tr><tr><td>Explanation / Justification sufficient?</td><td>No</td></tr><tr><td>Consistency with monitoring plan?</td><td>No</td></tr></table><br>Project Proponent needs to refer CAR comment in section B.3.2. | Boundary checklist | Yes / No  | Source and gas(es) discussed in the PDD? | Yes | Inclusion / exclusion justified? | No | Explanation / Justification sufficient? | No | Consistency with monitoring plan? | No | CAR | ☑ |
| Boundary checklist   | Yes / No     |   |                    |           |  |     |                                  |    |   |    |                                   |    |     |   |
| Source and gas(es) discussed in the PDD?   | Yes          |   |                    |           |  |     |                                  |    |   |    |                                   |    |     |   |
| Inclusion / exclusion justified?   | No           |   |                    |           |  |     |                                  |    |   |    |                                   |    |     |   |
| Explanation / Justification sufficient?  | No           |   |                    |           |  |     |                                  |    |   |    |                                   |    |     |   |
| Consistency with monitoring plan?  | No           |   |                    |           |  |     |                                  |    |   |    |                                   |    |     |   |
| B.3.4. Source: fossil fuel consumption in cogeneration plant<br>Description of Source: main emission<br>Gas(es): CO2<br>Type: Baseline Emissions                 | 2,3,4, 5, 83 | <table><tr><td>Boundary checklist</td><td>Yes / No</td></tr><tr><td>Source and gas(es) discussed in the PDD?</td><td>No</td></tr><tr><td>Inclusion / exclusion justified?</td><td>No</td></tr><tr><td>Explanation / Justification sufficient?</td><td>No</td></tr><tr><td>Consistency with monitoring plan?</td><td>No</td></tr></table><br>Project Proponent needs to refer CAR comment in section B.3.2.  | Boundary checklist | Yes / No  | Source and gas(es) discussed in the PDD? | No  | Inclusion / exclusion justified? | No | Explanation / Justification sufficient? | No | Consistency with monitoring plan? | No | CAR | ☑ |
| Boundary checklist   | Yes / No     |   |                    |           |  |     |                                  |    |   |    |                                   |    |     |   |
| Source and gas(es) discussed in the PDD?   | No           |   |                    |           |  |     |                                  |    |   |    |                                   |    |     |   |
| Inclusion / exclusion justified?   | No           |   |                    |           |  |     |                                  |    |   |    |                                   |    |     |   |
| Explanation / Justification sufficient?  | No           |   |                    |           |  |     |                                  |    |   |    |                                   |    |     |   |
| Consistency with monitoring plan?  | No           |   |                    |           |  |     |                                  |    |   |    |                                   |    |     |   |
| B.3.5. Source: Generation of steam used in the flaring process,<br>Description of Source: main emission<br>Gas(es): CO2<br>Type: Baseline Emissions              | 2,3,4, 5, 83 | <table><tr><td>Boundary checklist</td><td>Yes / No</td></tr><tr><td>Source and gas(es) discussed in the PDD?</td><td>No</td></tr><tr><td>Inclusion / exclusion justified?</td><td>No</td></tr><tr><td>Explanation / Justification sufficient?</td><td>No</td></tr><tr><td>Consistency with monitoring plan?</td><td>No</td></tr></table>  | Boundary checklist | Yes / No  | Source and gas(es) discussed in the PDD? | No  | Inclusion / exclusion justified? | No | Explanation / Justification sufficient? | No | Consistency with monitoring plan? | No | CAR | ☑ |
| Boundary checklist   | Yes / No     |   |                    |           |  |     |                                  |    |   |    |                                   |    |     |   |
| Source and gas(es) discussed in the PDD?   | No           |   |                    |           |  |     |                                  |    |   |    |                                   |    |     |   |
| Inclusion / exclusion justified?   | No           |   |                    |           |  |     |                                  |    |   |    |                                   |    |     |   |
| Explanation / Justification sufficient?  | No           |   |                    |           |  |     |                                  |    |   |    |                                   |    |     |   |
| Consistency with monitoring plan?  | No           |   |                    |           |  |     |                                  |    |   |    |                                   |    |     |   |

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|--|--------------|--|----------|------------|-----------|
|  |              | Project Proponent needs to refer CAR comment to section B.3.2. |          |            |           |
| B.3.6. Source: Fossil fuel consumption for the supply of process heat and/or reaction heat, Description of Source: main emission Gas(es): CO2 Type: Baseline Emissions | 2,3,4, 5, 83 | Boundary checklist   | Yes / No | CAR        | ☑         |
|  |              | Source and gas(es) discussed in the PDD?                       | No       |            |           |
|  |              | Inclusion / exclusion justified?                               | No       |            |           |
|  |              | Explanation / Justification sufficient?                        | No       |            |           |
|  |              | Consistency with monitoring plan?                              | No       |            |           |
|  |              | Project Proponent needs to refer CAR comment in section B.3.2  |          |            |           |
| B.3.7. Source: supplemental fossil fuel consumption at the project plant Description of Source: main emission Gas(es): CO2 Type: Project Emissions                     | 2,3,4, 5, 83 | Boundary checklist   | Yes / No | CAR        | ☑         |
|  |              | Source and gas(es) discussed in the PDD?                       | Yes      |            |           |
|  |              | Inclusion / exclusion justified?                               | No       |            |           |
|  |              | Explanation / Justification sufficient?                        | No       |            |           |
|  |              | Consistency with monitoring plan?                              | No       |            |           |
|  |              | Project Proponent needs to refer CAR comment in section B.3.2. |          |            |           |
| B.3.8. Source: supplemental electricity consumption Description of Source: main emission Gas(es): CO2 Type: Project Emissions  | 2,3,4, 5, 83 | Boundary checklist   | Yes / No | CAR        | ☑         |
|  |              | Source and gas(es) discussed in the PDD?                       | Yes      |            |           |
|  |              | Inclusion / exclusion justified?                               | No       |            |           |
|  |              | Explanation / Justification sufficient?                        | No       |            |           |
|  |              | Consistency with monitoring plan?                              | No       |            |           |
|  |              | Project Proponent needs to refer CAR comment in section B.3.2. |          |            |           |
| B.3.9. Source: Electricity import to replace captive electricity, which was generated using waste  | 2,3,4, 5, 83 |  |          | ☑          | ☑         |
|  |              | Boundary checklist   | Yes / No |            |           |

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|---|------------------|--|----------|------------|-----------|
| gas in absence of project activity<br>Gas(es): CO2<br>Type: Only in case captive electricity in the baseline is replaced by import electricity  |                  | Source and gas(es) discussed in the PDD?   | NA       |            |           |
|   |                  | Inclusion / exclusion justified?   | NA       |            |           |
|   |                  | Explanation / Justification sufficient?  | NA       |            |           |
|   |                  | Consistency with monitoring plan?  | NA       |            |           |
| B.3.10. Source: Energy consumption for gas cleaning<br>Description of Source: only in case waste gas cleaning is required and leads to emissions related to the energy requirement of the cleaning<br>Gas(es): CO2<br>Type: Project Emissions | 2,3,4, 5, 83     | Boundary checklist   | Yes / No | CR         | ☑         |
|   |                  | Source and gas(es) discussed in the PDD?   | No       |            |           |
|   |                  | Inclusion / exclusion justified?   | No       |            |           |
|   |                  | Explanation / Justification sufficient?  | No       |            |           |
|   |                  | Consistency with monitoring plan?  | No       |            |           |
|   |                  | <b>Clarification Request No. 12.</b><br>Project Proponent needs to clarify why gas source emissions from cleaning of gas description of the Source: only in case waste gas cleaning is required and leads to emissions related to the energy requirement of the cleaning" is not part of the project activity? |          |            |           |
| B.3.11. Do the spatial and technological boundaries as verified on-site comply with the discussion provided by / indication included to the PDD?  | 2,3,4, 5, 83     | Yes  |          | ☑          | ☑         |
| <b>B.4. Description of how the baseline scenario is identified and description of the identified baseline scenario</b>  |                  |  |          |            |           |
| B.4.1. Have all technically feasible baseline scenario alternatives to the project activity been identified and discussed by the PDD? Why   | 2,3,5, 45, 47,83 | Baseline options and combinations which should be considered:  |          | CAR<br>CR  | ☑         |
|   |                  | Defined and discussed in PDD?  | Yes / No |            |           |

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|--|---|---|--|--|---|-----------|----|---|--|----------|----|---|-----|-----------|---|
| can this list be considered as being complete (Step 1)?  |   | <table><tr><td colspan="2">waste energy generation facility(ies) where the waste energy is generated where waste energy is generated</td><td>No</td></tr><tr><td colspan="2">Recipient facility (ies) where the energy is consumed</td><td>No</td></tr></table> <p><b>Clarification Request No. 13.</b><br/>Project proponent shall justify realistic and credible baseline alternatives in context of project activity scenerios.<br/>Also refer CAR comment given in section B.1.2.</p> |  |  | waste energy generation facility(ies) where the waste energy is generated where waste energy is generated |           | No | Recipient facility (ies) where the energy is consumed |  | No       |    |   |     |           |   |
| waste energy generation facility(ies) where the waste energy is generated where waste energy is generated  |   | No  |  |  |   |           |    |   |  |          |    |   |     |           |   |
| Recipient facility (ies) where the energy is consumed  |   | No  |  |  |   |           |    |   |  |          |    |   |     |           |   |
| B.4.2. Does the project identify correctly and exclude those options not in line with regulatory or legal requirements?  | 2,45,3,5,47,83  | Project Proponent needs to refer above CR comment in section B.4.1.   |  |  | CR  | ☑         |    |   |  |          |    |   |     |           |   |
| B.4.3. Have applicable regulatory or legal requirements been identified?   | 2,45,3,5,47,83  | Project Proponent needs to refer above CR comment in section B.4.1.   |  |  | CR  | ☑         |    |   |  |          |    |   |     |           |   |
| B.4.4. Does the project participants exclude base-line options that depend on fuels (used for generating heat and/or power), that are not available at the project site? | 2,45,3,5,47,83  | Project Proponent needs to refer above CR comment in section B.4.1.   |  |  | CR  | ☑         |    |   |  |          |    |   |     |           |   |
| B.4.5. Have all realistic and credible alternatives been discussed for the use of waste gas and the exclusion of options justified (Step 1, W1 – 6)?                     | 2,3,5,45,47,83  | <table><tr><td colspan="3">Alternative(s) may include, inter alia:</td></tr><tr><td colspan="2">Categories</td><td>Yes / No</td></tr><tr><td>W1</td><td>WECM is directly vented to atmosphere without incineration;</td><td>Yes</td></tr></table>   |  |  | Alternative(s) may include, inter alia:   |           |    | Categories  |  | Yes / No | W1 | WECM is directly vented to atmosphere without incineration; | Yes | CAR<br>CR | ☑ |
| Alternative(s) may include, inter alia:  |   |   |  |  |   |           |    |   |  |          |    |   |     |           |   |
| Categories   |   | Yes / No  |  |  |   |           |    |   |  |          |    |   |     |           |   |
| W1   | WECM is directly vented to atmosphere without incineration; | Yes   |  |  |   |           |    |   |  |          |    |   |     |           |   |

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|--|----------|---|---|-----|------------|-----------|
|  |          | W2  | WECM is released to the atmosphere after incineration or waste heat is released to the atmosphere or waste pressure energy is not utilized;   | Yes |            |           |
|  |          | W3  | Waste energy is sold as an energy source;   | Yes |            |           |
|  |          | W4  | Waste energy is used for meeting energy demand at the recipient facility  | Yes |            |           |
|  |          | W5  | A portion of quantity or energy of WECM is recovered for generation of heat and/or electricity and/or mechanical energy, while the rest of the waste energy produced at the project facility is flared/released to the atmosphere/ unutilised | Yes |            |           |
|  |          | W6  | All the waste gas produced at the industrial facility is captured and used for export electricity generation or steam.  | Yes |            |           |
|  |          | <b><u>Clarification Request No. 14.</u></b><br>PDD stated under W3 condition that a neighbouring steel mill was the potential buyer and given four reasons on how supply of gas to neighbouring steel mill was not possible. Project Proponent needs to provide the supportive to verify the these reasons.<br>Also refer CAR comment given in section B.1.2. |   |     |            |           |
| B.4.6. Have all realistic and credible alternatives been discussed for power generation and the exclusion of options justified (Step 1, P1 | 2,5,45 , | Alternative(s) may include, inter alia:   |   |     | CAR CR     | ☑         |

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|----------------------------|--------|------------|--|------------|-----------|
| – 12)?                     | 47, 83 | Categories |  | Yes / No   |           |
|                            |        | P1         | Proposed project activity not undertaken as a CDM project activity;  | Yes        |           |
|                            |        | P2         | On-site or off-site existing fossil fuel fired cogeneration plant;   | Yes        |           |
|                            |        | P3         | On-site or off-site Greenfield fossil fuel fired cogeneration plant  | No         |           |
|                            |        | P4         | On-site or off-site existing renewable energy based cogeneration plant;                                    | Yes        |           |
|                            |        | P5         | On-site or off-site Greenfield renewable energy based cogeneration plant                                   | No         |           |
|                            |        | P6         | On-site or off-site existing fossil fuel based existing identified captive power plant;                    | Yes        |           |
|                            |        | P7         | On-site or off-site existing identified/ renewable energy or other waste energy based captive power plant; | Yes        |           |
|                            |        | P8         | On-site or off-site Greenfield fossil fuel based captive plant   | No         |           |
|                            |        | P9         | On-site or off-site Greenfield renewable energy or other waste energy based captive plant                  | No         |           |
|                            |        | P10        | Sourced from grid-connected power plants;  | Yes        |           |

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|---|------|----------|--|-----|------------|-----------|
|   |      | P11      | Existing captive electricity generation using waste energy (if project activity is captive generation using waste energy, this scenario represents a captive generation with lower efficiency or lower recovery than the project activity.); | Yes |            |           |
|   |      | P12      | Existing cogeneration using waste energy but at a lower efficiency or lower recovery   | Yes |            |           |
| <b><u>Corrective Action Request No.7.</u></b><br>PDD stated " The availability of these fossil fuels is also limited. For example, natural gas and coal are not available in the vicinity of the proposed project activity (Western Cape Province)." Project Proponent needs to indicate the source which can support this statement. |      |          |  |     |            |           |
| <b><u>Clarification Request No. 15.</u></b><br>PDD stated " biomass not readily available in the vicinity of the proposed project activity". Provide the supportive to verify this statement.   |      |          |  |     |            |           |
| <b><u>Clarification Request No. 16.</u></b><br>PDD stated " The renewable energies employed would probably be wind, solar, hydro or waste energy. The production of electricity from these energies would be more expensive than purchasing it from the grid." Provide the supportive to verify this statement.                       |      |          |  |     |            |           |
| <b><u>Clarification Request No. 17.</u></b>   |      |          |  |     |            |           |

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|--|--|--|------------|-----------|----------|----|---|-----|----|--|-----|----|---|----|----|---|-----|----|--|----|----|--|-----|----|---|----|----|--|-----|--------|-------------------------------------|
|  |  | PDD stated under P12 " Cogeneration with a lower efficiency than the project activity does not make this alternative financially feasible" Project Proponent needs to elaborate why cogeneration with lower efficiency option is not feasible option? .<br>Also refer CAR comment given in section B.1.2.  |            |           |          |    |   |     |    |  |     |    |   |    |    |   |     |    |  |    |    |  |     |    |   |    |    |  |     |        |                                     |
| B.4.7. Have all realistic and credible alternatives been discussed for heat generation and the exclusion of options justified (Step 1, H1 – 14)? | 2,3,5, 83  | <div>Alternative(s) may include, inter alia:</div> <table><tr><th colspan="2">Categories</th><th>Yes / No</th></tr><tr><td>H1</td><td>Proposed project activity not undertaken as a CDM project activity;</td><td>Yes</td></tr><tr><td>H2</td><td>On-site or off-site existing fossil fuel based cogeneration plant;</td><td>Yes</td></tr><tr><td>H3</td><td>On-site or off-site Greenfield fossil fuel based cogeneration plant</td><td>No</td></tr><tr><td>H4</td><td>On-site or off-site existing renewable energy based cogeneration plant;</td><td>Yes</td></tr><tr><td>H5</td><td>On-site or off-site Greenfield renewable energy based cogeneration plant</td><td>No</td></tr><tr><td>H6</td><td>An existing fossil fuel based element process;</td><td>Yes</td></tr><tr><td>H7</td><td>A new fossil fuel based element process</td><td>No</td></tr><tr><td>H8</td><td>An existing or new renewable energy or other waste energy based boilers;</td><td>Yes</td></tr></table> | Categories |           | Yes / No | H1 | Proposed project activity not undertaken as a CDM project activity; | Yes | H2 | On-site or off-site existing fossil fuel based cogeneration plant; | Yes | H3 | On-site or off-site Greenfield fossil fuel based cogeneration plant | No | H4 | On-site or off-site existing renewable energy based cogeneration plant; | Yes | H5 | On-site or off-site Greenfield renewable energy based cogeneration plant | No | H6 | An existing fossil fuel based element process; | Yes | H7 | A new fossil fuel based element process | No | H8 | An existing or new renewable energy or other waste energy based boilers; | Yes | CAR CR | <input checked="" type="checkbox"/> |
| Categories   |  | Yes / No   |            |           |          |    |   |     |    |  |     |    |   |    |    |   |     |    |  |    |    |  |     |    |   |    |    |  |     |        |                                     |
| H1   | Proposed project activity not undertaken as a CDM project activity;      | Yes  |            |           |          |    |   |     |    |  |     |    |   |    |    |   |     |    |  |    |    |  |     |    |   |    |    |  |     |        |                                     |
| H2   | On-site or off-site existing fossil fuel based cogeneration plant;       | Yes  |            |           |          |    |   |     |    |  |     |    |   |    |    |   |     |    |  |    |    |  |     |    |   |    |    |  |     |        |                                     |
| H3   | On-site or off-site Greenfield fossil fuel based cogeneration plant      | No   |            |           |          |    |   |     |    |  |     |    |   |    |    |   |     |    |  |    |    |  |     |    |   |    |    |  |     |        |                                     |
| H4   | On-site or off-site existing renewable energy based cogeneration plant;  | Yes  |            |           |          |    |   |     |    |  |     |    |   |    |    |   |     |    |  |    |    |  |     |    |   |    |    |  |     |        |                                     |
| H5   | On-site or off-site Greenfield renewable energy based cogeneration plant | No   |            |           |          |    |   |     |    |  |     |    |   |    |    |   |     |    |  |    |    |  |     |    |   |    |    |  |     |        |                                     |
| H6   | An existing fossil fuel based element process;                           | Yes  |            |           |          |    |   |     |    |  |     |    |   |    |    |   |     |    |  |    |    |  |     |    |   |    |    |  |     |        |                                     |
| H7   | A new fossil fuel based element process                                  | No   |            |           |          |    |   |     |    |  |     |    |   |    |    |   |     |    |  |    |    |  |     |    |   |    |    |  |     |        |                                     |
| H8   | An existing or new renewable energy or other waste energy based boilers; | Yes  |            |           |          |    |   |     |    |  |     |    |   |    |    |   |     |    |  |    |    |  |     |    |   |    |    |  |     |        |                                     |

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|--|-------------|---|---|----------|------------|-----------|
|  |             | H9  | A new renewable energy or other waste energy based element process to supply heat | No       |            |           |
|  |             | H10   | Any other source such as district heat;   | Yes      |            |           |
|  |             | H11   | Other heat generation technologies (e.g. heat pumps or solar energy);             | Yes      |            |           |
|  |             | H12   | Steam/ Process heat generation from waste energy, but with lower efficiency;      | Yes      |            |           |
|  |             | H13   | Cogeneration with waste energy, but at a lower efficiency.                        | Yes      |            |           |
|  |             | H14   | On-site fossil fuel consumption to supply heat                                    | No       |            |           |
|  |             | <b><u>Clarification Request No. 18.</u></b><br>PDD stated under H6 "Namakwa Sands does not generate any other waste gas so other waste energy would need to be imported. This would require a significant capital investment" Provide the supportive to verify this statement.<br>Also, is a waste energy import possible at plant location? Project Proponent needs to elaborate this point.<br>Also refer above CR comments and CAR comment given in section B.1.2. |   |          |            |           |
| B.4.8. Have all realistic and credible alternatives been discussed for mechanical energy generation and the exclusion of options justified (Step 1, M1 – 5)? | 2,3,4, 5,83 | Categories  |   | Yes / No | ☑          | ☑         |
|  |             | M1  | The proposed project activity is not undertaken as a CDM project activity         | NA       |            |           |

Table 1 is applicable to ACM0012, ver 4

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|---|-------------|--|---|----|------------|-------------------------------------|
|   |             | M2   | Steam produced by existing or new fossil fuel based boilers driving mechanical turbines.                            | NA |            |                                     |
|   |             | M3   | Steam produced by existing or new renewable energy or other waste energy based boilers driving mechanical turbines. | NA |            |                                     |
|   |             | M4   | Waste gas pressure based mechanical energy generation.  | NA |            |                                     |
|   |             | M5   | Electrical motors are used as motive power to generate mechanical energy.   | NA |            |                                     |
|   |             |  |   |    |            |                                     |
| B.4.9. Has a baseline scenario matrix been developed?   | 2,3,4, 5,83 | <b><u>Corrective Action Request No.8.</u></b><br>Project has not justified baseline scenario thorough matrix approach required as per applied methodology. Project Proponent needs to justify. |   |    | CAR        | <input checked="" type="checkbox"/> |
| B.4.10. Has the fuel been identified and justified which were used in the baseline scenario (Step 2)? | 2,3,4, 5,89 | Project Proponent needs to refer comment in above CAR comment in section B.4.9.  |   |    | CAR        | <input checked="" type="checkbox"/> |

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| CHECKLIST TOPIC / QUESTION   | Ref.                              | COMMENTS   | PDD in GSP                          | Final PDD                           |                                 |  |  |                                 |  |    |    |   |     |  |  |  |  |  |  |  |     |                                     |
|--|-----------------------------------|--|-------------------------------------|-------------------------------------|---------------------------------|--|--|---------------------------------|--|----|----|---|-----|--|--|--|--|--|--|--|-----|-------------------------------------|
| B.4.11. Has the latest approved version of the “Tool for the demonstration and assessment of additionality” been used to eliminate non feasible baseline options (Step 3)?               | 2,3,4, 5,89                       | Yes, The applied version (06) of the “Tool for the demonstration and assessment of additionality” which is latest version.   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |                                 |  |  |                                 |  |    |    |   |     |  |  |  |  |  |  |  |     |                                     |
| B.4.12. Is it demonstrated that the option with the lowest baseline emissions is considered as the most likely baseline scenario, if more than one feasible alternative remain (Step 4)? | 2,3,4, 5,89                       | Project Proponent needs to refer above CAR and CR comments given in section B.4  | CAR<br>CR                           | <input checked="" type="checkbox"/> |                                 |  |  |                                 |  |    |    |   |     |  |  |  |  |  |  |  |     |                                     |
| B.4.13. Follows the identified baseline scenario one of the two project scenarios resulting from combinations of baseline options and scenarios applicable to ACM0012?                   | 2,3,4, 5,89                       | <div>Applicability criteria of ACM0012:</div> <table><tr><td rowspan="2">Baseline Scenario<sup>1</sup></td><td colspan="4">Combination of baseline scenarios</td><td rowspan="2">Description of project activity</td><td rowspan="2"></td></tr><tr><td>Wa</td><td>Po</td><td>H</td><td>Me-</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table> | Baseline Scenario <sup>1</sup>      | Combination of baseline scenarios   |                                 |  |  | Description of project activity |  | Wa | Po | H | Me- |  |  |  |  |  |  |  | CAR | <input checked="" type="checkbox"/> |
| Baseline Scenario <sup>1</sup>   | Combination of baseline scenarios |  |                                     |                                     | Description of project activity |  |  |                                 |  |    |    |   |     |  |  |  |  |  |  |  |     |                                     |
|  | Wa                                | Po   | H                                   | Me-                                 |                                 |  |  |                                 |  |    |    |   |     |  |  |  |  |  |  |  |     |                                     |
|  |                                   |  |                                     |                                     |                                 |  |  |                                 |  |    |    |   |     |  |  |  |  |  |  |  |     |                                     |

<sup>1</sup> In case operation of an existing plant is identified as the baseline scenario, the remaining lifetime of the existing plant shall be larger than the crediting period chosen. Otherwise, the claims of emission reduction are limited up to the lifetime of the existing equipment.

## Validation Protocol

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South Asia

| CHECKLIST TOPIC / QUESTION | Ref. | COMMENTS  |    |    |   |                |  | PDD in GSP | Final PDD |
|----------------------------|------|---|----|----|---|----------------|--|------------|-----------|
|                            |      | Project activity: Separate generation of electricity, mechanical energy or heat   |    |    |   |                | Yes/No   |            |           |
|                            |      | Baseline scenario-1   | W1 | P6 | H | M2, M3, M7, M8 | Situation-1  |            |           |
|                            |      | <ol style="list-style-type: none"> <li>The total or part of waste energy of WECM(s) recovered in the projects is released to atmosphere/flared/unutilised;</li> <li>Mechanical energy is obtained by existing or new electrical motors or steam turbines;</li> <li>The electricity is obtained from a Greenfield or existing identified captive power plant or from the grid;</li> <li>Heat is obtained from a new or existing fossil fuel based element process</li> </ol> | W5 |    |   |                | <ul style="list-style-type: none"> <li>Independent generation of heat, electricity and mechanical energy at project facility;</li> <li>The generation of steam for mechanical energy can be in combination with the generation of steam to meet heat demand</li> </ul> |            |           |
|                            |      |   |    |    |   |                | Situation-2<br>Increasing the recovery of WECM stream(s) (at an ex-  |            |           |

Table 1 is applicable to ACM0012, ver 4



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South Asia

| CHECKLIST TOPIC / QUESTION | Ref. | COMMENTS |  |  |  |  |   |  | PDD in GSP | Final PDD |
|----------------------------|------|----------|--|--|--|--|---|--|------------|-----------|
|                            |      |          |  |  |  |  | isting<br>pro-<br>ject<br>facil-<br>ity;<br>or at<br>a Gree<br>nfiel<br>d fa-<br>cility<br>as<br>com<br>pare<br>d to<br>refer<br>er-<br>ence<br>wast<br>e en-<br>en-<br>ergy<br>gen-<br>erat-<br>ing<br>facil-<br>ity)<br>and/<br>or im-<br>prov-<br>ing<br>the<br>effi-<br>cienc<br>y of<br>en-<br>ergy<br>gen-<br>era-<br>tion<br>or me-<br>chan<br>ical<br>en-<br>ergv |  |            |           |

Table 1 is applicable to ACM0012, ver 4

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|--|-------------|--|-------------------------------------|-------------------------------------|
|  |             | <div> <div>con-<br/>ver-<br/>sion<br/>equi<br/>pme<br/>nt</div> </div> <p>Also refer CAR comment given in section B.1.2.</p> <p>Project Proponent needs to</p> |                                     |                                     |
| <b>B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered CDM project activity (assessment and demonstration of additionality):</b> |             |  |                                     |                                     |
| B.5.1. Has CDM been considered before the starting date of the project activity and which evidence has been delivered?   | 2,3,4, 5,83 | Project Proponent needs to refer the CR comment given the section C.1.1  | CR                                  | <input checked="" type="checkbox"/> |
| B.5.2. In case of applying step 2 / investment analysis of the additionality tool: Is the analysis method identified appropriately (step 2a)?  | 2,3,4, 5,83 | Yes, benchmark analysis option has been chosen to demonstrate the additionality of the project activity.   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| B.5.3. In case of Option I (simple cost analysis): Is it demonstrated that the activity produces no economic benefits other than CDM income?   | 2,3,4, 5,83 | Not Applicable as a project proponent has been chosen option III of additionality tool to demonstrate the project additionality                                | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| B.5.4. In case of Option II (investment comparison analysis): Is the most suitable financial indi-   | 2,3,4, 5,83 | Not Applicable as a project proponent has been chosen option III of additionality tool to demonstrate the project additionality                                | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |

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| CHECKLIST TOPIC / QUESTION   | Ref.                                | COMMENTS  | PDD in GSP | Final PDD                           |
|--|-------------------------------------|---|------------|-------------------------------------|
| cator clearly identified (IRR, NPV, cost benefit ratio, or (levelized) unit cost)?   |                                     |   |            |                                     |
| B.5.5. In case of Option III (benchmark analysis): Is the most suitable financial indicator clearly identified (IRR, NPV, cost benefit ratio, or (levelized) unit cost)? | 2,3,4,5,53,64,65,66,67,73,78,,82,83 | <p><b><u>Clarification Request No. 19.</u></b></p> <p>During site audit it has been observed that the financial closure of the project activity still not be done. Also, the values used for investment analysis are not latest value of the equipment supplier. Project proponent needs to update the investment analysis of the project activity with latest equipment supplier data and shall also provide the supportive to verify this sheet.</p> <p><b><u>Corrective Action Request No.9.</u></b></p> <p>Project Proponent needs to indicate the benchmark value and its source transparently in the PDD.</p> <p><b><u>Corrective Action Request No.10.</u></b></p> <ul style="list-style-type: none"> <li>Project proponent needs to justify sensitive analysis of the project activity in line with EB 51 Annex 58 para 17 &amp; 18..</li> <li>Further, how EURO conversion is being considered a scenario under sensitivity analysis as the same is not directly related to project activity? Project Proponent needs to clarify.</li> </ul> | CAR<br>CR  | <input checked="" type="checkbox"/> |
| B.5.6. In case of Option II or Option III: Is the calculation of financial figures for this indicator correctly done for all alternatives and the project activity?      | 2,3,4,5,53,64,65,66,67,73,78,,82,83 | Project Proponent needs to Project Proponent needs to refer above CAR and CR comment to section B.5.5.  | CAR<br>CR  | <input checked="" type="checkbox"/> |
| B.5.7. In case of Option II or Option III: Is the analysis presented in a transparent manner in-   | 2,3,4,5,53,6                        | Project Proponent needs to refer above CAR and CR comments  | CAR        | <input checked="" type="checkbox"/> |

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|--|---|--|------------|-------------------------------------|
| cluding publicly available proofs for the utilized data?   | 4,65,6<br>6,67,7<br>3,<br>78,,82<br>,83                     | in section B.5.5.  | CR         |                                     |
| B.5.8. In case of applying step 3 (barrier analysis) of the additionality tool: Is a complete list of barriers developed that prevent the different alternatives to occur?           | 2,3,4,<br>5,53,6<br>4,65,6<br>6,67,7<br>3,<br>78,,82<br>,83 | <b><u>Corrective Action Request No.11.</u></b><br>Project proponent needs to further justify barriers of the project activity in line with Annex-13 of EB 50 and also provide the supportive to verify the barriers. | CAR        | <input checked="" type="checkbox"/> |
| B.5.9. In case of applying step 3 (barrier analysis): Is transparent and documented evidence provided on the existence and significance of these barriers?                           | 2,3,4,<br>5,53,6<br>4,65,6<br>6,67,7<br>3,<br>78,,82<br>,83 | Project Proponent needs to refer above CAR of section B.5.8.   | CAR        | <input checked="" type="checkbox"/> |
| B.5.10. In case of applying step 3 (barrier analysis): Is it transparently shown that the execution of at least one of the alternatives is not prevented by the identified barriers? | 2,3,4,<br>5,53,6<br>4,65,6<br>6,67,7<br>3,<br>78,,82<br>,83 | Project Proponent needs to refer above CAR to section B.5.8.   | CAR        | <input checked="" type="checkbox"/> |
| B.5.11. Have other activities in the host country / region similar to the project activity been  | 2,3,4,<br>5,53,6  | <b><u>Corrective Action Request No.12.</u></b><br>Project Proponent needs to include the information about the   | CAR        | <input checked="" type="checkbox"/> |

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|--|---|--|-------------------------------------|-------------------------------------|
| identified and are these activities appropriately analyzed by the PDD (step 4a)?   | 4,65,6<br>6,67,7<br>3,<br>78,,82<br>,83                     | other projects which are similar to the project activity in Step 4a of the PDD   |                                     |                                     |
| B.5.12. If similar activities are occurring: Is it demonstrated that in spite of these similarities the project activity would not be implemented without the CDM component (step 4b)? | 2,3,4,<br>5,53,6<br>4,65,6<br>6,67,7<br>3,<br>78,,82<br>,83 | Project Proponent needs to refer CR comment in section A.2.1.  | CR                                  | <input checked="" type="checkbox"/> |
| <b>B.6. Emissions reductions</b>   |   |  |                                     |                                     |
| <b>B.6.1. Explanation of methodological choices</b>  |   |  |                                     |                                     |
| B.6.1.1. Is it explained how the procedures provided in the methodology are applied by the proposed project activity?  | 2,3,4,<br>5,83  | Yes  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| B.6.1.2. Is every selection of options offered by the methodology correctly justified and is this justification in line with the situation verified on-site?                           | 2,3,4,<br>5,83  | <p><b><u>Corrective Action Request No.13.</u></b></p> <p>Project Proponent needs to justify the <math>f_{cap}</math> value of the project activity in line with the procedure given in method 2 of the applied methodology.</p> <p><b><u>Corrective Action Request No.14.</u></b></p> <p>According to the applied methodology ACM0012 version 04, <math>WS_{i,j}</math> is the fraction of total heat that is used by recipient <math>j</math> in the project that in the absence of the project activity would have been supplied by the <math>i</math>th boiler. However, in base case process heat requirement is meeting by burner not boiler then how the same is</p> | CAR                                 | <input checked="" type="checkbox"/> |

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| CHECKLIST TOPIC / QUESTION  | Ref.        | COMMENTS   | PDD in GSP | Final PDD                           |
|---|-------------|--|------------|-------------------------------------|
|   |             | in line with requirement of applied methodology ? Project Proponent needs to justify.  |            |                                     |
| B.6.1.3. Are the formulae required for the determination of <b>baseline</b> emissions correctly presented, enabling a complete identification of parameter to be used and / or monitored?   | 2,3,4, 5,83 | Project Proponent needs to refer comment in above CAR in section B.6.1.2.  | CAR        | <input checked="" type="checkbox"/> |
| B.6.1.4. If the scenario 1, sub-section a is chosen to calculate the baseline emissions and the electricity generated by the project activity is less than 60 GWh/year:<br>Are the six steps as defined in the “tool for calculation of emission factor for electricity systems” correctly applied and described in the PDD?                  | 2,3,4, 5,83 | Project Proponent needs to refer below CAR comment in section B.6.1.2.   | CAR        | <input checked="" type="checkbox"/> |
| B.6.1.5. Are the formulae required for the determination of <b>project</b> emissions correctly presented, enabling a complete identification of parameter to be used and / or monitored?  | 2,3,4, 5,83 | <b><u>Corrective Action Request No.15.</u></b><br>Incineration process would be done in IC engine through electricity. This electricity should come under project emission calculation. Also, clarify how this electricity would be monitored in the project activity? | CAR        | <input checked="" type="checkbox"/> |
| B.6.1.6. If electricity is purchased from the grid, and the CO <sub>2</sub> emission factor for electricity is determined as the combined margin emission factor according to the “tool to calculate the emission factor for an electricity system”:<br>Are the six steps as defined in this tool correctly applied and described in the PDD? | 2,3,4, 5,83 | Project Proponent needs to refer below CAR comment in section B.6.1.5.   | CAR        | <input checked="" type="checkbox"/> |
| B.6.1.7. Are the formulae required for the determination of <b>emission reductions</b> correctly  | 2,3,4,      | <b><u>Corrective Action Request No.16.</u></b><br>Project Proponent should transparently demonstrate how emis-   | CAR        | <input checked="" type="checkbox"/> |

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| CHECKLIST TOPIC / QUESTION  | Ref.        | COMMENTS   | PDD in GSP     | Final PDD                           |                                 |    |                                |                                     |                                       |    |                            |    |                         |    |                               |    |                                     |    |   |    |                                     |                                     |
|---|-------------|--|----------------|-------------------------------------|---------------------------------|----|--------------------------------|-------------------------------------|---------------------------------------|----|----------------------------|----|-------------------------|----|-------------------------------|----|-------------------------------------|----|---|----|-------------------------------------|-------------------------------------|
| presented?  | 5,83        | sion reduction of heat part of the project activity would be calculated in line with methodology conditions..  |                |                                     |                                 |    |                                |                                     |                                       |    |                            |    |                         |    |                               |    |                                     |    |   |    |                                     |                                     |
| <p><b>B.6.2. Data and parameters that are available at validation:</b><br/> <i>The calculation of baseline emissions (<math>BE_{En,y}</math>) depends on the identified baseline scenario.</i><br/> <i>Scenario 1 represents the situation where the electricity is obtained from a specific existing power plant or from the grid and heat from a fossil fuel based element process.</i><br/> <i>Scenario 2 represents the situation where the recipient plant(s) obtain electricity and/or heat generated by a fossil fuel based existing/new cogeneration plant.</i></p> |             |  |                |                                     |                                 |    |                                |                                     |                                       |    |                            |    |                         |    |                               |    |                                     |    |   |    |                                     |                                     |
| B.6.2.1. Is the list of parameters presented in chapter B.6.2 considered to be complete with regard to the requirements of the applied methodology?   | 2,3,4, 5,83 | <p><b><u>Corrective Action Request No.17.</u></b></p> <p>Project Proponent needs to include the <math>f_{cap}</math>, <math>Q_{WG, y}</math>, <math>Q_{WCM, BL}</math>, <math>Q_{WCM, product}</math>, Emission factor of the grid and electricity imports parameter details in the PDD.</p>   | CAR            | <input checked="" type="checkbox"/> |                                 |    |                                |                                     |                                       |    |                            |    |                         |    |                               |    |                                     |    |   |    |                                     |                                     |
| <p><i>Integrate the required amount of sub-checklists for monitoring parameter and <b>comment</b> on any line answered with “No”.</i></p>   |             |  |                |                                     |                                 |    |                                |                                     |                                       |    |                            |    |                         |    |                               |    |                                     |    |   |    |                                     |                                     |
| B.6.2.2. Parameter Title: $f_{wg}$<br>fraction of total electricity generated by the project activity using waste gas   | 2,3,4, 5,83 | <table border="1"> <tr> <th>Data Checklist</th> <th>Yes / No</th> </tr> <tr><td>Title in line with methodology?</td><td>NA</td></tr> <tr><td>Data unit correctly expressed?</td><td>NA</td></tr> <tr><td>Appropriate description of parameter?</td><td>NA</td></tr> <tr><td>Source clearly referenced?</td><td>NA</td></tr> <tr><td>Correct value provided?</td><td>NA</td></tr> <tr><td>Has this value been verified?</td><td>NA</td></tr> <tr><td>Choice of data correctly justified?</td><td>NA</td></tr> <tr><td>Measurement method correctly described?</td><td>NA</td></tr> </table> | Data Checklist | Yes / No                            | Title in line with methodology? | NA | Data unit correctly expressed? | NA                                  | Appropriate description of parameter? | NA | Source clearly referenced? | NA | Correct value provided? | NA | Has this value been verified? | NA | Choice of data correctly justified? | NA | Measurement method correctly described? | NA | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Data Checklist  | Yes / No    |  |                |                                     |                                 |    |                                |                                     |                                       |    |                            |    |                         |    |                               |    |                                     |    |   |    |                                     |                                     |
| Title in line with methodology?   | NA          |  |                |                                     |                                 |    |                                |                                     |                                       |    |                            |    |                         |    |                               |    |                                     |    |   |    |                                     |                                     |
| Data unit correctly expressed?  | NA          |  |                |                                     |                                 |    |                                |                                     |                                       |    |                            |    |                         |    |                               |    |                                     |    |   |    |                                     |                                     |
| Appropriate description of parameter?   | NA          |  |                |                                     |                                 |    |                                |                                     |                                       |    |                            |    |                         |    |                               |    |                                     |    |   |    |                                     |                                     |
| Source clearly referenced?  | NA          |  |                |                                     |                                 |    |                                |                                     |                                       |    |                            |    |                         |    |                               |    |                                     |    |   |    |                                     |                                     |
| Correct value provided?   | NA          |  |                |                                     |                                 |    |                                |                                     |                                       |    |                            |    |                         |    |                               |    |                                     |    |   |    |                                     |                                     |
| Has this value been verified?   | NA          |  |                |                                     |                                 |    |                                |                                     |                                       |    |                            |    |                         |    |                               |    |                                     |    |   |    |                                     |                                     |
| Choice of data correctly justified?   | NA          |  |                |                                     |                                 |    |                                |                                     |                                       |    |                            |    |                         |    |                               |    |                                     |    |   |    |                                     |                                     |
| Measurement method correctly described?   | NA          |  |                |                                     |                                 |    |                                |                                     |                                       |    |                            |    |                         |    |                               |    |                                     |    |   |    |                                     |                                     |
| B.6.2.3. Parameter Title: $f_{cap}$<br>fraction of total energy produced using waste gas  | 2,3,4, 5,83 | <table border="1"> <tr> <th>Data Checklist</th> <th>Yes / No</th> </tr> <tr><td></td><td></td></tr> </table>   | Data Checklist | Yes / No                            |                                 |    | CAR                            | <input checked="" type="checkbox"/> |                                       |    |                            |    |                         |    |                               |    |                                     |    |   |    |                                     |                                     |
| Data Checklist  | Yes / No    |  |                |                                     |                                 |    |                                |                                     |                                       |    |                            |    |                         |    |                               |    |                                     |    |   |    |                                     |                                     |
|   |             |  |                |                                     |                                 |    |                                |                                     |                                       |    |                            |    |                         |    |                               |    |                                     |    |   |    |                                     |                                     |

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|---|-------------|--|---------------------------------|------------|---------------------------------|----|---------------------------------------|----|---------------------------------------|----|----------------------------|----|-------------------------------|----|-------------------------------------|-------------------------------------|---|----|---|----|--|-------------------------------------|-------------------------------------|
|   |             | <table><tr><td>Title in line with methodology?</td><td>No</td></tr><tr><td>Data unit correctly expressed?</td><td>No</td></tr><tr><td>Appropriate description of parameter?</td><td>No</td></tr><tr><td>Source clearly referenced?</td><td>No</td></tr><tr><td>Correct value provided?</td><td>No</td></tr><tr><td>Has this value been verified?</td><td>No</td></tr><tr><td>Choice of data correctly justified?</td><td>No</td></tr><tr><td>Measurement method correctly described?</td><td>No</td></tr></table> <p>Project Proponent needs to refer above CAR comment in section B.6.2.1 and Table 2 of the proptocol.</p> | Title in line with methodology? | No         | Data unit correctly expressed?  | No | Appropriate description of parameter? | No | Source clearly referenced?            | No | Correct value provided?    | No | Has this value been verified? | No | Choice of data correctly justified? | No                                  | Measurement method correctly described? | No |   |    |  |                                     |                                     |
| Title in line with methodology?   | No          |  |                                 |            |                                 |    |                                       |    |                                       |    |                            |    |                               |    |                                     |                                     |   |    |   |    |  |                                     |                                     |
| Data unit correctly expressed?  | No          |  |                                 |            |                                 |    |                                       |    |                                       |    |                            |    |                               |    |                                     |                                     |   |    |   |    |  |                                     |                                     |
| Appropriate description of parameter?   | No          |  |                                 |            |                                 |    |                                       |    |                                       |    |                            |    |                               |    |                                     |                                     |   |    |   |    |  |                                     |                                     |
| Source clearly referenced?  | No          |  |                                 |            |                                 |    |                                       |    |                                       |    |                            |    |                               |    |                                     |                                     |   |    |   |    |  |                                     |                                     |
| Correct value provided?   | No          |  |                                 |            |                                 |    |                                       |    |                                       |    |                            |    |                               |    |                                     |                                     |   |    |   |    |  |                                     |                                     |
| Has this value been verified?   | No          |  |                                 |            |                                 |    |                                       |    |                                       |    |                            |    |                               |    |                                     |                                     |   |    |   |    |  |                                     |                                     |
| Choice of data correctly justified?   | No          |  |                                 |            |                                 |    |                                       |    |                                       |    |                            |    |                               |    |                                     |                                     |   |    |   |    |  |                                     |                                     |
| Measurement method correctly described?   | No          |  |                                 |            |                                 |    |                                       |    |                                       |    |                            |    |                               |    |                                     |                                     |   |    |   |    |  |                                     |                                     |
| B.6.2.4. Parameter Title: $\eta_{\text{Plant}, j}$<br>overall efficiency of the existing plant that would be used by recipient    | 2,3,4, 5,83 | <table><tr><td>Data Checklist</td><td>Yes / No</td></tr><tr><td>Title in line with methodology?</td><td>NA</td></tr><tr><td>Data unit correctly expressed?</td><td>NA</td></tr><tr><td>Appropriate description of parameter?</td><td>NA</td></tr><tr><td>Source clearly referenced?</td><td>NA</td></tr><tr><td>Correct value provided?</td><td>NA</td></tr><tr><td>Has this value been verified?</td><td>NA</td></tr><tr><td>Choice of data correctly justified?</td><td>NA</td></tr><tr><td>Measurement method correctly described?</td><td>NA</td></tr></table>   | Data Checklist                  | Yes / No   | Title in line with methodology? | NA | Data unit correctly expressed?        | NA | Appropriate description of parameter? | NA | Source clearly referenced? | NA | Correct value provided?       | NA | Has this value been verified?       | NA                                  | Choice of data correctly justified?     | NA | Measurement method correctly described? | NA |  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Data Checklist  | Yes / No    |  |                                 |            |                                 |    |                                       |    |                                       |    |                            |    |                               |    |                                     |                                     |   |    |   |    |  |                                     |                                     |
| Title in line with methodology?   | NA          |  |                                 |            |                                 |    |                                       |    |                                       |    |                            |    |                               |    |                                     |                                     |   |    |   |    |  |                                     |                                     |
| Data unit correctly expressed?  | NA          |  |                                 |            |                                 |    |                                       |    |                                       |    |                            |    |                               |    |                                     |                                     |   |    |   |    |  |                                     |                                     |
| Appropriate description of parameter?   | NA          |  |                                 |            |                                 |    |                                       |    |                                       |    |                            |    |                               |    |                                     |                                     |   |    |   |    |  |                                     |                                     |
| Source clearly referenced?  | NA          |  |                                 |            |                                 |    |                                       |    |                                       |    |                            |    |                               |    |                                     |                                     |   |    |   |    |  |                                     |                                     |
| Correct value provided?   | NA          |  |                                 |            |                                 |    |                                       |    |                                       |    |                            |    |                               |    |                                     |                                     |   |    |   |    |  |                                     |                                     |
| Has this value been verified?   | NA          |  |                                 |            |                                 |    |                                       |    |                                       |    |                            |    |                               |    |                                     |                                     |   |    |   |    |  |                                     |                                     |
| Choice of data correctly justified?   | NA          |  |                                 |            |                                 |    |                                       |    |                                       |    |                            |    |                               |    |                                     |                                     |   |    |   |    |  |                                     |                                     |
| Measurement method correctly described?   | NA          |  |                                 |            |                                 |    |                                       |    |                                       |    |                            |    |                               |    |                                     |                                     |   |    |   |    |  |                                     |                                     |
| B.6.2.5. Parameter Title: $f_{\text{WG}}$<br>fraction of total heat generated by the project activity electricity using waste gas | 2,3,4, 5,83 | <table><tr><td>Data Checklist</td><td>Yes / No</td></tr><tr><td>Title in line with methodology?</td><td>NA</td></tr><tr><td>Data unit correctly expressed?</td><td>NA</td></tr><tr><td>Appropriate description of parameter?</td><td>NA</td></tr><tr><td>Source clearly referenced?</td><td>NA</td></tr><tr><td>Correct value provided?</td><td>NA</td></tr></table>   | Data Checklist                  | Yes / No   | Title in line with methodology? | NA | Data unit correctly expressed?        | NA | Appropriate description of parameter? | NA | Source clearly referenced? | NA | Correct value provided?       | NA |                                     | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/>     |    |   |    |  |                                     |                                     |
| Data Checklist  | Yes / No    |  |                                 |            |                                 |    |                                       |    |                                       |    |                            |    |                               |    |                                     |                                     |   |    |   |    |  |                                     |                                     |
| Title in line with methodology?   | NA          |  |                                 |            |                                 |    |                                       |    |                                       |    |                            |    |                               |    |                                     |                                     |   |    |   |    |  |                                     |                                     |
| Data unit correctly expressed?  | NA          |  |                                 |            |                                 |    |                                       |    |                                       |    |                            |    |                               |    |                                     |                                     |   |    |   |    |  |                                     |                                     |
| Appropriate description of parameter?   | NA          |  |                                 |            |                                 |    |                                       |    |                                       |    |                            |    |                               |    |                                     |                                     |   |    |   |    |  |                                     |                                     |
| Source clearly referenced?  | NA          |  |                                 |            |                                 |    |                                       |    |                                       |    |                            |    |                               |    |                                     |                                     |   |    |   |    |  |                                     |                                     |
| Correct value provided?   | NA          |  |                                 |            |                                 |    |                                       |    |                                       |    |                            |    |                               |    |                                     |                                     |   |    |   |    |  |                                     |                                     |

Table 1 is applicable to ACM0012, ver 4



## Validation Protocol

Project Title: Usage of waste gas at Namakwa Sands in South Africa.

Date of Completion: 14-12-2012

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| CHECKLIST TOPIC / QUESTION  | Ref.        | COMMENTS                                |          | PDD in GSP                          | Final PDD                           |
|---|-------------|---|----------|-------------------------------------|-------------------------------------|
|   |             | Has this value been verified?           | NA       |                                     |                                     |
|   |             | Choice of data correctly justified?     | NA       |                                     |                                     |
|   |             | Measurement method correctly described? | NA       |                                     |                                     |
| B.6.2.6. Parameter Title: $n_{EP,i,j}$<br>efficiency of the element process that would have been supplied heat to the recipient | 2,3,4, 5,83 |   |          | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|   |             | Data Checklist                          | Yes / No |                                     |                                     |
|   |             | Title in line with methodology?         | NA       |                                     |                                     |
|   |             | Data unit correctly expressed?          | NA       |                                     |                                     |
|   |             | Appropriate description of parameter?   | NA       |                                     |                                     |
|   |             | Source clearly referenced?              | NA       |                                     |                                     |
|   |             | Correct value provided?                 | NA       |                                     |                                     |
|   |             | Has this value been verified?           | NA       |                                     |                                     |
|   |             | Choice of data correctly justified?     | NA       |                                     |                                     |
|   |             | Measurement method correctly described? | NA       |                                     |                                     |
| B.6.2.7. Parameter Title: $n_{Cogen}$<br>efficiency of cogeneration plant using fossil fuel                                     | 2,3,4, 5,83 |   |          | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|   |             | Data Checklist                          | Yes / No |                                     |                                     |
|   |             | Title in line with methodology?         | NA       |                                     |                                     |
|   |             | Data unit correctly expressed?          | NA       |                                     |                                     |
|   |             | Appropriate description of parameter?   | NA       |                                     |                                     |
|   |             | Source clearly referenced?              | NA       |                                     |                                     |
|   |             | Correct value provided?                 | NA       |                                     |                                     |
|   |             | Has this value been verified?           | NA       |                                     |                                     |
|   |             | Choice of data correctly justified?     | NA       |                                     |                                     |
|   |             | Measurement method correctly described? | NA       |                                     |                                     |
| B.6.2.8. Parameter Title: $Q_{WG,y}$<br>quantity of waste gas used for energy generation during year                            | 2,3,4, 5,83 |   |          | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|   |             | Data Checklist                          | Yes / No |                                     |                                     |
|   |             | Title in line with methodology?         | No       |                                     |                                     |
|   |             | Data unit correctly expressed?          | No       |                                     |                                     |

Table 1 is applicable to ACM0012, ver 4

## Validation Protocol

Project Title: Usage of waste gas at Namakwa Sands in South Africa.

Date of Completion: 14-12-2012

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| CHECKLIST TOPIC / QUESTION   | Ref.        | COMMENTS   |    | PDD in GSP     | Final PDD |                                 |    |                                |    |                                       |    |                            |    |                         |    |                               |    |                                     |    |   |                                     |                                     |                                     |
|--|-------------|--|----|----------------|-----------|---------------------------------|----|--------------------------------|----|---------------------------------------|----|----------------------------|----|-------------------------|----|-------------------------------|----|-------------------------------------|----|---|-------------------------------------|-------------------------------------|-------------------------------------|
|  |             | Appropriate description of parameter?  | No |                |           |                                 |    |                                |    |                                       |    |                            |    |                         |    |                               |    |                                     |    |   |                                     |                                     |                                     |
|  |             | Source clearly referenced?   | No |                |           |                                 |    |                                |    |                                       |    |                            |    |                         |    |                               |    |                                     |    |   |                                     |                                     |                                     |
|  |             | Correct value provided?  | No |                |           |                                 |    |                                |    |                                       |    |                            |    |                         |    |                               |    |                                     |    |   |                                     |                                     |                                     |
|  |             | Has this value been verified?  | No |                |           |                                 |    |                                |    |                                       |    |                            |    |                         |    |                               |    |                                     |    |   |                                     |                                     |                                     |
|  |             | Choice of data correctly justified?  | No |                |           |                                 |    |                                |    |                                       |    |                            |    |                         |    |                               |    |                                     |    |   |                                     |                                     |                                     |
|  |             | Measurement method correctly described?  | No |                |           |                                 |    |                                |    |                                       |    |                            |    |                         |    |                               |    |                                     |    |   |                                     |                                     |                                     |
|  |             | Project Proponent needs to refer above CAR comment in section B.6.2.1.   |    |                |           |                                 |    |                                |    |                                       |    |                            |    |                         |    |                               |    |                                     |    |   |                                     |                                     |                                     |
| B.6.2.9. Parameter Title: $\eta_{Boiler, fl}$<br>efficiency of the boiler that would have been used to generate the steam                | 2,3,4, 5,83 | <table><tr><th>Data Checklist</th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td>NA</td></tr><tr><td>Data unit correctly expressed?</td><td>NA</td></tr><tr><td>Appropriate description of parameter?</td><td>NA</td></tr><tr><td>Source clearly referenced?</td><td>NA</td></tr><tr><td>Correct value provided?</td><td>NA</td></tr><tr><td>Has this value been verified?</td><td>NA</td></tr><tr><td>Choice of data correctly justified?</td><td>NA</td></tr><tr><td>Measurement method correctly described?</td><td>NA</td></tr></table> |    | Data Checklist | Yes / No  | Title in line with methodology? | NA | Data unit correctly expressed? | NA | Appropriate description of parameter? | NA | Source clearly referenced? | NA | Correct value provided? | NA | Has this value been verified? | NA | Choice of data correctly justified? | NA | Measurement method correctly described? | NA                                  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Data Checklist   | Yes / No    |  |    |                |           |                                 |    |                                |    |                                       |    |                            |    |                         |    |                               |    |                                     |    |   |                                     |                                     |                                     |
| Title in line with methodology?  | NA          |  |    |                |           |                                 |    |                                |    |                                       |    |                            |    |                         |    |                               |    |                                     |    |   |                                     |                                     |                                     |
| Data unit correctly expressed?   | NA          |  |    |                |           |                                 |    |                                |    |                                       |    |                            |    |                         |    |                               |    |                                     |    |   |                                     |                                     |                                     |
| Appropriate description of parameter?  | NA          |  |    |                |           |                                 |    |                                |    |                                       |    |                            |    |                         |    |                               |    |                                     |    |   |                                     |                                     |                                     |
| Source clearly referenced?   | NA          |  |    |                |           |                                 |    |                                |    |                                       |    |                            |    |                         |    |                               |    |                                     |    |   |                                     |                                     |                                     |
| Correct value provided?  | NA          |  |    |                |           |                                 |    |                                |    |                                       |    |                            |    |                         |    |                               |    |                                     |    |   |                                     |                                     |                                     |
| Has this value been verified?  | NA          |  |    |                |           |                                 |    |                                |    |                                       |    |                            |    |                         |    |                               |    |                                     |    |   |                                     |                                     |                                     |
| Choice of data correctly justified?  | NA          |  |    |                |           |                                 |    |                                |    |                                       |    |                            |    |                         |    |                               |    |                                     |    |   |                                     |                                     |                                     |
| Measurement method correctly described?  | NA          |  |    |                |           |                                 |    |                                |    |                                       |    |                            |    |                         |    |                               |    |                                     |    |   |                                     |                                     |                                     |
| B.6.2.10. Parameter Title: $Q_{WG, FI, B}$<br>amount of waste gas flared using steam prior to the implementation of the project activity | 2,3,4, 5,83 | <table><tr><th>Data Checklist</th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td>NA</td></tr><tr><td>Data unit correctly expressed?</td><td>NA</td></tr><tr><td>Appropriate description of parameter?</td><td>NA</td></tr><tr><td>Source clearly referenced?</td><td>NA</td></tr><tr><td>Correct value provided?</td><td>NA</td></tr><tr><td>Has this value been verified?</td><td>NA</td></tr><tr><td>Choice of data correctly justified?</td><td>NA</td></tr></table>   |    | Data Checklist | Yes / No  | Title in line with methodology? | NA | Data unit correctly expressed? | NA | Appropriate description of parameter? | NA | Source clearly referenced? | NA | Correct value provided? | NA | Has this value been verified? | NA | Choice of data correctly justified? | NA | <input checked="" type="checkbox"/>     | <input checked="" type="checkbox"/> |                                     |                                     |
| Data Checklist   | Yes / No    |  |    |                |           |                                 |    |                                |    |                                       |    |                            |    |                         |    |                               |    |                                     |    |   |                                     |                                     |                                     |
| Title in line with methodology?  | NA          |  |    |                |           |                                 |    |                                |    |                                       |    |                            |    |                         |    |                               |    |                                     |    |   |                                     |                                     |                                     |
| Data unit correctly expressed?   | NA          |  |    |                |           |                                 |    |                                |    |                                       |    |                            |    |                         |    |                               |    |                                     |    |   |                                     |                                     |                                     |
| Appropriate description of parameter?  | NA          |  |    |                |           |                                 |    |                                |    |                                       |    |                            |    |                         |    |                               |    |                                     |    |   |                                     |                                     |                                     |
| Source clearly referenced?   | NA          |  |    |                |           |                                 |    |                                |    |                                       |    |                            |    |                         |    |                               |    |                                     |    |   |                                     |                                     |                                     |
| Correct value provided?  | NA          |  |    |                |           |                                 |    |                                |    |                                       |    |                            |    |                         |    |                               |    |                                     |    |   |                                     |                                     |                                     |
| Has this value been verified?  | NA          |  |    |                |           |                                 |    |                                |    |                                       |    |                            |    |                         |    |                               |    |                                     |    |   |                                     |                                     |                                     |
| Choice of data correctly justified?  | NA          |  |    |                |           |                                 |    |                                |    |                                       |    |                            |    |                         |    |                               |    |                                     |    |   |                                     |                                     |                                     |

Table 1 is applicable to ACM0012, ver 4

## Validation Protocol

Project Title: Usage of waste gas at Namakwa Sands in South Africa.

Date of Completion: 14-12-2012

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| CHECKLIST TOPIC / QUESTION  | Ref.        | COMMENTS   |    | PDD in GSP     | Final PDD |                                 |    |                                |    |                                       |    |                            |    |                                     |                                     |                               |    |                                     |    |   |    |                                     |                                     |
|---|-------------|--|----|----------------|-----------|---------------------------------|----|--------------------------------|----|---------------------------------------|----|----------------------------|----|-------------------------------------|-------------------------------------|-------------------------------|----|-------------------------------------|----|---|----|-------------------------------------|-------------------------------------|
|   |             | Measurement method correctly described?  | NA |                |           |                                 |    |                                |    |                                       |    |                            |    |                                     |                                     |                               |    |                                     |    |   |    |                                     |                                     |
| B.6.2.11. Parameter Title: $Q_{st, fl, B}$<br>steam used to flare the waste gas prior to the implementation of the project activity | 2,3,4, 5,83 | <table><tr><th>Data Checklist</th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td>NA</td></tr><tr><td>Data unit correctly expressed?</td><td>NA</td></tr><tr><td>Appropriate description of parameter?</td><td>NA</td></tr><tr><td>Source clearly referenced?</td><td>NA</td></tr><tr><td>Correct value provided?</td><td>NA</td></tr><tr><td>Has this value been verified?</td><td>NA</td></tr><tr><td>Choice of data correctly justified?</td><td>NA</td></tr><tr><td>Measurement method correctly described?</td><td>NA</td></tr></table> |    | Data Checklist | Yes / No  | Title in line with methodology? | NA | Data unit correctly expressed? | NA | Appropriate description of parameter? | NA | Source clearly referenced? | NA | Correct value provided?             | NA                                  | Has this value been verified? | NA | Choice of data correctly justified? | NA | Measurement method correctly described? | NA | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Data Checklist  | Yes / No    |  |    |                |           |                                 |    |                                |    |                                       |    |                            |    |                                     |                                     |                               |    |                                     |    |   |    |                                     |                                     |
| Title in line with methodology?   | NA          |  |    |                |           |                                 |    |                                |    |                                       |    |                            |    |                                     |                                     |                               |    |                                     |    |   |    |                                     |                                     |
| Data unit correctly expressed?  | NA          |  |    |                |           |                                 |    |                                |    |                                       |    |                            |    |                                     |                                     |                               |    |                                     |    |   |    |                                     |                                     |
| Appropriate description of parameter?   | NA          |  |    |                |           |                                 |    |                                |    |                                       |    |                            |    |                                     |                                     |                               |    |                                     |    |   |    |                                     |                                     |
| Source clearly referenced?  | NA          |  |    |                |           |                                 |    |                                |    |                                       |    |                            |    |                                     |                                     |                               |    |                                     |    |   |    |                                     |                                     |
| Correct value provided?   | NA          |  |    |                |           |                                 |    |                                |    |                                       |    |                            |    |                                     |                                     |                               |    |                                     |    |   |    |                                     |                                     |
| Has this value been verified?   | NA          |  |    |                |           |                                 |    |                                |    |                                       |    |                            |    |                                     |                                     |                               |    |                                     |    |   |    |                                     |                                     |
| Choice of data correctly justified?   | NA          |  |    |                |           |                                 |    |                                |    |                                       |    |                            |    |                                     |                                     |                               |    |                                     |    |   |    |                                     |                                     |
| Measurement method correctly described?   | NA          |  |    |                |           |                                 |    |                                |    |                                       |    |                            |    |                                     |                                     |                               |    |                                     |    |   |    |                                     |                                     |
| B.6.2.12. Parameter Title: $NCV_i$<br>net calorific value annual average for each consumed fuel and the waste gas/heat              | 2,3,4, 5,83 | <table><tr><th>Data Checklist</th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td>NA</td></tr><tr><td>Data unit correctly expressed?</td><td>NA</td></tr><tr><td>Appropriate description of parameter?</td><td>NA</td></tr><tr><td>Source clearly referenced?</td><td>NA</td></tr><tr><td>Correct value provided?</td><td>NA</td></tr><tr><td>Has this value been verified?</td><td>NA</td></tr><tr><td>Choice of data correctly justified?</td><td>NA</td></tr><tr><td>Measurement method correctly described?</td><td>NA</td></tr></table> |    | Data Checklist | Yes / No  | Title in line with methodology? | NA | Data unit correctly expressed? | NA | Appropriate description of parameter? | NA | Source clearly referenced? | NA | Correct value provided?             | NA                                  | Has this value been verified? | NA | Choice of data correctly justified? | NA | Measurement method correctly described? | NA | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Data Checklist  | Yes / No    |  |    |                |           |                                 |    |                                |    |                                       |    |                            |    |                                     |                                     |                               |    |                                     |    |   |    |                                     |                                     |
| Title in line with methodology?   | NA          |  |    |                |           |                                 |    |                                |    |                                       |    |                            |    |                                     |                                     |                               |    |                                     |    |   |    |                                     |                                     |
| Data unit correctly expressed?  | NA          |  |    |                |           |                                 |    |                                |    |                                       |    |                            |    |                                     |                                     |                               |    |                                     |    |   |    |                                     |                                     |
| Appropriate description of parameter?   | NA          |  |    |                |           |                                 |    |                                |    |                                       |    |                            |    |                                     |                                     |                               |    |                                     |    |   |    |                                     |                                     |
| Source clearly referenced?  | NA          |  |    |                |           |                                 |    |                                |    |                                       |    |                            |    |                                     |                                     |                               |    |                                     |    |   |    |                                     |                                     |
| Correct value provided?   | NA          |  |    |                |           |                                 |    |                                |    |                                       |    |                            |    |                                     |                                     |                               |    |                                     |    |   |    |                                     |                                     |
| Has this value been verified?   | NA          |  |    |                |           |                                 |    |                                |    |                                       |    |                            |    |                                     |                                     |                               |    |                                     |    |   |    |                                     |                                     |
| Choice of data correctly justified?   | NA          |  |    |                |           |                                 |    |                                |    |                                       |    |                            |    |                                     |                                     |                               |    |                                     |    |   |    |                                     |                                     |
| Measurement method correctly described?   | NA          |  |    |                |           |                                 |    |                                |    |                                       |    |                            |    |                                     |                                     |                               |    |                                     |    |   |    |                                     |                                     |
| B.6.2.13. Parameter Title: $Q_{WG, BL}$<br>quantity of waste gas generated prior to the start of the project activity               | 2,3,4, 5,83 | <table><tr><th>Data Checklist</th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td>NA</td></tr><tr><td>Data unit correctly expressed?</td><td>NA</td></tr><tr><td>Appropriate description of parameter?</td><td>NA</td></tr><tr><td>Source clearly referenced?</td><td>NA</td></tr></table>   |    | Data Checklist | Yes / No  | Title in line with methodology? | NA | Data unit correctly expressed? | NA | Appropriate description of parameter? | NA | Source clearly referenced? | NA | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |                               |    |                                     |    |   |    |                                     |                                     |
| Data Checklist  | Yes / No    |  |    |                |           |                                 |    |                                |    |                                       |    |                            |    |                                     |                                     |                               |    |                                     |    |   |    |                                     |                                     |
| Title in line with methodology?   | NA          |  |    |                |           |                                 |    |                                |    |                                       |    |                            |    |                                     |                                     |                               |    |                                     |    |   |    |                                     |                                     |
| Data unit correctly expressed?  | NA          |  |    |                |           |                                 |    |                                |    |                                       |    |                            |    |                                     |                                     |                               |    |                                     |    |   |    |                                     |                                     |
| Appropriate description of parameter?   | NA          |  |    |                |           |                                 |    |                                |    |                                       |    |                            |    |                                     |                                     |                               |    |                                     |    |   |    |                                     |                                     |
| Source clearly referenced?  | NA          |  |    |                |           |                                 |    |                                |    |                                       |    |                            |    |                                     |                                     |                               |    |                                     |    |   |    |                                     |                                     |

Table 1 is applicable to ACM0012, ver 4

## Validation Protocol

Project Title: Usage of waste gas at Namakwa Sands in South Africa.

Date of Completion: 14-12-2012

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| CHECKLIST TOPIC / QUESTION   | Ref.        | COMMENTS                                |          | PDD in GSP                          | Final PDD                           |
|--|-------------|---|----------|-------------------------------------|-------------------------------------|
|  |             | Correct value provided?                 | NA       |                                     |                                     |
|  |             | Has this value been verified?           | NA       |                                     |                                     |
|  |             | Choice of data correctly justified?     | NA       |                                     |                                     |
|  |             | Measurement method correctly described? | NA       |                                     |                                     |
| B.6.2.14. Parameter Title: <b>Q<sub>BL, product</sub></b><br>production by process that most logically relates to waste gas generation in baseline   | 2,3,4, 5,83 |   |          | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|  |             | Data Checklist                          | Yes / No |                                     |                                     |
|  |             | Title in line with methodology?         | Yes      |                                     |                                     |
|  |             | Data unit correctly expressed?          | Yes      |                                     |                                     |
|  |             | Appropriate description of parameter?   | Yes      |                                     |                                     |
|  |             | Source clearly referenced?              | Yes      |                                     |                                     |
|  |             | Correct value provided?                 | Yes      |                                     |                                     |
|  |             | Has this value been verified?           | Yes      |                                     |                                     |
|  |             | Choice of data correctly justified?     | Yes      |                                     |                                     |
|  |             | Measurement method correctly described? | Yes      |                                     |                                     |
| B.6.2.15. Parameter Title: <b>q<sub>wg, product</sub></b><br>amount of waste gas/heat/pressure the industrial facility generates per unit of product generated by the process that generates waste gas/heat/pressure | 2,3,4, 5,83 |   |          | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|  |             | Data Checklist                          | Yes / No |                                     |                                     |
|  |             | Title in line with methodology?         | NA       |                                     |                                     |
|  |             | Data unit correctly expressed?          | NA       |                                     |                                     |
|  |             | Appropriate description of parameter?   | NA       |                                     |                                     |
|  |             | Source clearly referenced?              | NA       |                                     |                                     |
|  |             | Correct value provided?                 | NA       |                                     |                                     |
|  |             | Has this value been verified?           | NA       |                                     |                                     |
|  |             | Choice of data correctly justified?     | NA       |                                     |                                     |
|  |             | Measurement method correctly described? | NA       |                                     |                                     |

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|---|----------------|---------------------------------------|-------------------------------------|-------------------------------------|
| B.6.2.16. Parameter Title:<br>Annual electricity supplied to the grid prior to retrofit<br>(applicable only for retrofit and modification activities) | 2,3,4,<br>5,83 |                                       | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|   |                | Data Checklist                        |                                     |                                     |
|   |                | Title in line with methodology?       |                                     |                                     |
|   |                | Data unit correctly expressed?        |                                     |                                     |
|   |                | Appropriate description of parameter? |                                     |                                     |
|   |                | Source clearly referenced?            |                                     |                                     |
|   |                | Correct value provided?               |                                     |                                     |
|   |                | Has this value been verified?         |                                     |                                     |
|   |                | Choice of data correctly justified?   |                                     |                                     |
| B.6.2.17. Parameter Title:<br>Emission factor of the grid (CM)  | 2,3,4,<br>5,83 |                                       | CAR                                 | <input checked="" type="checkbox"/> |
|   |                | Data Checklist                        |                                     |                                     |
|   |                | Title in line with methodology?       |                                     |                                     |
|   |                | Data unit correctly expressed?        |                                     |                                     |
|   |                | Appropriate description of parameter? |                                     |                                     |
|   |                | Source clearly referenced?            |                                     |                                     |
|   |                | Correct value provided?               |                                     |                                     |
|   |                | Has this value been verified?         |                                     |                                     |
|   |                | Choice of data correctly justified?   |                                     |                                     |

Table 1 is applicable to ACM0012, ver 4

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| CHECKLIST TOPIC / QUESTION | Ref. | COMMENTS   |    | PDD in GSP | Final PDD |
|----------------------------|------|--|----|------------|-----------|
|                            |      | Measurement method correctly described?                                | No |            |           |
|                            |      | Project Proponent needs to refer above CAR comment in section B.6.2.1. |    |            |           |

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| CHECKLIST TOPIC / QUESTION  | Ref.       | COMMENTS   | PDD in GSP     | Final PDD |                                 |    |                                |    |                                       |    |                            |    |                         |    |                               |    |                                     |                                     |   |    |     |                                     |
|---|------------|--|----------------|-----------|---------------------------------|----|--------------------------------|----|---------------------------------------|----|----------------------------|----|-------------------------|----|-------------------------------|----|-------------------------------------|-------------------------------------|---|----|-----|-------------------------------------|
| B.6.2.18. Parameter Title:<br>Operating margin (OM) emission factor of the grid | 2,3,4,5,83 | <table><tr><th>Data Checklist</th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td>No</td></tr><tr><td>Data unit correctly expressed?</td><td>No</td></tr><tr><td>Appropriate description?</td><td>No</td></tr><tr><td>Source clearly referenced?</td><td>No</td></tr><tr><td>Correct value provided?</td><td>No</td></tr><tr><td>Has this value been verified?</td><td>No</td></tr><tr><td>Choice of data correctly justified?</td><td>No</td></tr><tr><td>Measurement method correctly described?</td><td>No</td></tr></table> <p>Project Proponent needs to refer above CAR comment in section B.6.2.1 and table 2 of the validation protocol.</p> | Data Checklist | Yes / No  | Title in line with methodology? | No | Data unit correctly expressed? | No | Appropriate description?              | No | Source clearly referenced? | No | Correct value provided? | No | Has this value been verified? | No | Choice of data correctly justified? | No                                  | Measurement method correctly described? | No | CAR | <input checked="" type="checkbox"/> |
| Data Checklist  | Yes / No   |  |                |           |                                 |    |                                |    |                                       |    |                            |    |                         |    |                               |    |                                     |                                     |   |    |     |                                     |
| Title in line with methodology?   | No         |  |                |           |                                 |    |                                |    |                                       |    |                            |    |                         |    |                               |    |                                     |                                     |   |    |     |                                     |
| Data unit correctly expressed?  | No         |  |                |           |                                 |    |                                |    |                                       |    |                            |    |                         |    |                               |    |                                     |                                     |   |    |     |                                     |
| Appropriate description?  | No         |  |                |           |                                 |    |                                |    |                                       |    |                            |    |                         |    |                               |    |                                     |                                     |   |    |     |                                     |
| Source clearly referenced?  | No         |  |                |           |                                 |    |                                |    |                                       |    |                            |    |                         |    |                               |    |                                     |                                     |   |    |     |                                     |
| Correct value provided?   | No         |  |                |           |                                 |    |                                |    |                                       |    |                            |    |                         |    |                               |    |                                     |                                     |   |    |     |                                     |
| Has this value been verified?   | No         |  |                |           |                                 |    |                                |    |                                       |    |                            |    |                         |    |                               |    |                                     |                                     |   |    |     |                                     |
| Choice of data correctly justified?   | No         |  |                |           |                                 |    |                                |    |                                       |    |                            |    |                         |    |                               |    |                                     |                                     |   |    |     |                                     |
| Measurement method correctly described?   | No         |  |                |           |                                 |    |                                |    |                                       |    |                            |    |                         |    |                               |    |                                     |                                     |   |    |     |                                     |
| B.6.2.19. Parameter Title:<br>Build margin (BM) emission factor of the grid     | 2,3,4,5,83 | <table><tr><th>Data Checklist</th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td>No</td></tr><tr><td>Data unit correctly expressed?</td><td>No</td></tr><tr><td>Appropriate description of parameter?</td><td>No</td></tr><tr><td>Source clearly referenced?</td><td>No</td></tr><tr><td>Correct value provided?</td><td>No</td></tr><tr><td>Has this value been verified?</td><td>No</td></tr></table>   | Data Checklist | Yes / No  | Title in line with methodology? | No | Data unit correctly expressed? | No | Appropriate description of parameter? | No | Source clearly referenced? | No | Correct value provided? | No | Has this value been verified? | No | CAR                                 | <input checked="" type="checkbox"/> |   |    |     |                                     |
| Data Checklist  | Yes / No   |  |                |           |                                 |    |                                |    |                                       |    |                            |    |                         |    |                               |    |                                     |                                     |   |    |     |                                     |
| Title in line with methodology?   | No         |  |                |           |                                 |    |                                |    |                                       |    |                            |    |                         |    |                               |    |                                     |                                     |   |    |     |                                     |
| Data unit correctly expressed?  | No         |  |                |           |                                 |    |                                |    |                                       |    |                            |    |                         |    |                               |    |                                     |                                     |   |    |     |                                     |
| Appropriate description of parameter?   | No         |  |                |           |                                 |    |                                |    |                                       |    |                            |    |                         |    |                               |    |                                     |                                     |   |    |     |                                     |
| Source clearly referenced?  | No         |  |                |           |                                 |    |                                |    |                                       |    |                            |    |                         |    |                               |    |                                     |                                     |   |    |     |                                     |
| Correct value provided?   | No         |  |                |           |                                 |    |                                |    |                                       |    |                            |    |                         |    |                               |    |                                     |                                     |   |    |     |                                     |
| Has this value been verified?   | No         |  |                |           |                                 |    |                                |    |                                       |    |                            |    |                         |    |                               |    |                                     |                                     |   |    |     |                                     |

Table 1 is applicable to ACM0012, ver 4

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| CHECKLIST TOPIC / QUESTION | Ref. | COMMENTS  |    | PDD in GSP | Final PDD |
|----------------------------|------|---|----|------------|-----------|
|                            |      | Choice of data correctly justified?   | No |            |           |
|                            |      | Measurement method correctly described?   | No |            |           |
|                            |      | Project Proponent needs to refer above CAR comment in section B.6.2.1 and table 2 of the validation protocol. |    |            |           |



## Validation Protocol

Project Title: Usage of waste gas at Namakwa Sands in South Africa.

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| CHECKLIST TOPIC / QUESTION  | Ref.  | COMMENTS                                |          | PDD in GSP                          | Final PDD                           |
|---|-------|---|----------|-------------------------------------|-------------------------------------|
| B.6.2.20. Parameter Title:<br>fuel consumption of each power source       | 2,3,4 | Data Checklist                          | Yes / No | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|   |       | Title in line with methodology?         | NA       |                                     |                                     |
|   |       | Data unit correctly expressed?          | NA       |                                     |                                     |
|   |       | Appropriate description of parameter?   | NA       |                                     |                                     |
|   |       | Source clearly referenced?              | NA       |                                     |                                     |
|   |       | Correct value provided?                 | NA       |                                     |                                     |
|   |       | Has this value been verified?           | NA       |                                     |                                     |
|   |       | Choice of data correctly justified?     | NA       |                                     |                                     |
|   |       | Measurement method correctly described? | NA       |                                     |                                     |
| B.6.2.21. Parameter Title:<br>emission coefficient of each fuel           | 2,3,4 | Data Checklist                          | Yes / No | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|   |       | Title in line with methodology?         | NA       |                                     |                                     |
|   |       | Data unit correctly expressed?          | NA       |                                     |                                     |
|   |       | Appropriate description of parameter?   | NA       |                                     |                                     |
|   |       | Source clearly referenced?              | NA       |                                     |                                     |
|   |       | Correct value provided?                 | NA       |                                     |                                     |
|   |       | Has this value been verified?           | NA       |                                     |                                     |
|   |       | Choice of data correctly justified?     | NA       |                                     |                                     |
|   |       | Measurement method correctly described? | NA       |                                     |                                     |
| B.6.2.22. Parameter Title:<br>electricity generation of each power source | 2,3,4 | Data Checklist                          | Yes / No | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |

Table 1 is applicable to ACM0012, ver 4

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| CHECKLIST TOPIC / QUESTION   | Ref.           | COMMENTS                                |          | PDD in GSP                          | Final PDD                           |
|--|----------------|---|----------|-------------------------------------|-------------------------------------|
|  |                | Title in line with methodology?         | NA       |                                     |                                     |
|  |                | Data unit correctly expressed?          | NA       |                                     |                                     |
|  |                | Appropriate description of parameter?   | NA       |                                     |                                     |
|  |                | Source clearly referenced?              | NA       |                                     |                                     |
|  |                | Correct value provided?                 | NA       |                                     |                                     |
|  |                | Has this value been verified?           | NA       |                                     |                                     |
|  |                | Choice of data correctly justified?     | NA       |                                     |                                     |
|  |                | Measurement method correctly described? | NA       |                                     |                                     |
| B.6.2.23. Parameter Title:<br>fraction of time with low costs /must run plant at the margin<br>(for simple adjusted OM only) | 2,3,4          | Data Checklist                          | Yes / No | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|  |                | Title in line with methodology?         | NA       |                                     |                                     |
|  |                | Data unit correctly expressed?          | NA       |                                     |                                     |
|  |                | Appropriate description of parameter?   | NA       |                                     |                                     |
|  |                | Source clearly referenced?              | NA       |                                     |                                     |
|  |                | Correct value provided?                 | NA       |                                     |                                     |
|  |                | Has this value been verified?           | NA       |                                     |                                     |
|  |                | Choice of data correctly justified?     | NA       |                                     |                                     |
|  |                | Measurement method correctly described? | NA       |                                     |                                     |
| B.6.2.24. Parameter Title:<br>electricity imports  | 2,3,4,<br>5,83 | Data Checklist                          | Yes / No | CAR                                 | <input checked="" type="checkbox"/> |
|  |                | Title in line with methodology?         | No       |                                     |                                     |

Table 1 is applicable to ACM0012, ver 4

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| CHECKLIST TOPIC / QUESTION  | Ref.     | COMMENTS   |                                | PDD in GSP | Final PDD                             |    |                                |    |                                       |    |                               |    |                                     |    |   |    |                                     |    |   |    |  |   |   |
|---|----------|--|--------------------------------|------------|---------------------------------------|----|--------------------------------|----|---------------------------------------|----|-------------------------------|----|-------------------------------------|----|---|----|-------------------------------------|----|---|----|--|---|---|
|   |          | <table><tr><td>Data unit correctly expressed?</td><td>No</td></tr><tr><td>Appropriate description of parameter?</td><td>No</td></tr><tr><td>Source clearly referenced?</td><td>No</td></tr><tr><td>Correct value provided?</td><td>No</td></tr><tr><td>Has this value been verified?</td><td>No</td></tr><tr><td>Choice of data correctly justified?</td><td>No</td></tr><tr><td>Measurement method correctly described?</td><td>No</td></tr></table>  | Data unit correctly expressed? | No         | Appropriate description of parameter? | No | Source clearly referenced?     | No | Correct value provided?               | No | Has this value been verified? | No | Choice of data correctly justified? | No | Measurement method correctly described? | No |                                     |    |   |    |  |   |   |
| Data unit correctly expressed?  | No       |  |                                |            |                                       |    |                                |    |                                       |    |                               |    |                                     |    |   |    |                                     |    |   |    |  |   |   |
| Appropriate description of parameter?   | No       |  |                                |            |                                       |    |                                |    |                                       |    |                               |    |                                     |    |   |    |                                     |    |   |    |  |   |   |
| Source clearly referenced?  | No       |  |                                |            |                                       |    |                                |    |                                       |    |                               |    |                                     |    |   |    |                                     |    |   |    |  |   |   |
| Correct value provided?   | No       |  |                                |            |                                       |    |                                |    |                                       |    |                               |    |                                     |    |   |    |                                     |    |   |    |  |   |   |
| Has this value been verified?   | No       |  |                                |            |                                       |    |                                |    |                                       |    |                               |    |                                     |    |   |    |                                     |    |   |    |  |   |   |
| Choice of data correctly justified?   | No       |  |                                |            |                                       |    |                                |    |                                       |    |                               |    |                                     |    |   |    |                                     |    |   |    |  |   |   |
| Measurement method correctly described?   | No       |  |                                |            |                                       |    |                                |    |                                       |    |                               |    |                                     |    |   |    |                                     |    |   |    |  |   |   |
|   |          | Project Proponent needs to refer CAR above in section B.6.2.1 and Table 2 of the validation protocol.  |                                |            |                                       |    |                                |    |                                       |    |                               |    |                                     |    |   |    |                                     |    |   |    |  |   |   |
| B.6.2.25. Parameter Title:<br>CO <sub>2</sub> emission coefficient of fuels used in connected grids | 2,3,4    | <table><tr><td>Data Checklist</td><td>Yes / No</td></tr><tr><td>Title in line with methodology?</td><td>NA</td></tr><tr><td>Data unit correctly expressed?</td><td>NA</td></tr><tr><td>Appropriate description of parameter?</td><td>NA</td></tr><tr><td>Source clearly referenced?</td><td>NA</td></tr><tr><td>Correct value provided?</td><td>NA</td></tr><tr><td>Has this value been verified?</td><td>NA</td></tr><tr><td>Choice of data correctly justified?</td><td>NA</td></tr><tr><td>Measurement method correctly described?</td><td>NA</td></tr></table> | Data Checklist                 | Yes / No   | Title in line with methodology?       | NA | Data unit correctly expressed? | NA | Appropriate description of parameter? | NA | Source clearly referenced?    | NA | Correct value provided?             | NA | Has this value been verified?           | NA | Choice of data correctly justified? | NA | Measurement method correctly described? | NA |  | ☑ | ☑ |
| Data Checklist  | Yes / No |  |                                |            |                                       |    |                                |    |                                       |    |                               |    |                                     |    |   |    |                                     |    |   |    |  |   |   |
| Title in line with methodology?   | NA       |  |                                |            |                                       |    |                                |    |                                       |    |                               |    |                                     |    |   |    |                                     |    |   |    |  |   |   |
| Data unit correctly expressed?  | NA       |  |                                |            |                                       |    |                                |    |                                       |    |                               |    |                                     |    |   |    |                                     |    |   |    |  |   |   |
| Appropriate description of parameter?   | NA       |  |                                |            |                                       |    |                                |    |                                       |    |                               |    |                                     |    |   |    |                                     |    |   |    |  |   |   |
| Source clearly referenced?  | NA       |  |                                |            |                                       |    |                                |    |                                       |    |                               |    |                                     |    |   |    |                                     |    |   |    |  |   |   |
| Correct value provided?   | NA       |  |                                |            |                                       |    |                                |    |                                       |    |                               |    |                                     |    |   |    |                                     |    |   |    |  |   |   |
| Has this value been verified?   | NA       |  |                                |            |                                       |    |                                |    |                                       |    |                               |    |                                     |    |   |    |                                     |    |   |    |  |   |   |
| Choice of data correctly justified?   | NA       |  |                                |            |                                       |    |                                |    |                                       |    |                               |    |                                     |    |   |    |                                     |    |   |    |  |   |   |
| Measurement method correctly described?   | NA       |  |                                |            |                                       |    |                                |    |                                       |    |                               |    |                                     |    |   |    |                                     |    |   |    |  |   |   |
| B.6.3. Ex-ante calculation of emission reductions   |          |  |                                |            |                                       |    |                                |    |                                       |    |                               |    |                                     |    |   |    |                                     |    |   |    |  |   |   |

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|---|-------------|---|-------------------------------------|-------------------------------------|
| B.6.3.1. Is the projection based on the same procedures as used for future monitoring?  | 2,3,4, 5,83 | Yes   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| B.6.3.2. Are the GHG calculations documented in a complete and transparent manner?  | 2,3,4, 5,83 | Project Proponent needs to refer above CAR and CR comment in section B.6.2.1.   | CAR<br>CR                           | <input checked="" type="checkbox"/> |
| B.6.3.3. Is the data provided in this section consistent with data as presented in other chapters of the PDD?   | 2,3,4, 5,83 | Yes   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| B.6.3.4. Has the equation for calculating baseline emissions from electricity that is displaced by the project activity been used if project activity is use of waste pressure to generate electricity? | 2,3,4, 5,83 | Project Proponent needs to refer comment in above CAR and CR in section B.6.2.1 | CAR<br>CR                           | <input checked="" type="checkbox"/> |
| B.6.3.5. Does the parameter of efficiency ( $n_{BL}$ ) defined according to the requirements of the applied methodology?  | 2,3,4, 5,83 | Not applicable; grid electricity not captive power plant is the base-line       | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| B.6.3.6. Are the baseline emissions capped following one of the two methods described in the methodology (ACM0012)? Which method has been applied?  | 2,3,4, 5,83 | Project Proponent needs to refer above CAR comment in section B.6.1.2.          | CAR                                 | <input checked="" type="checkbox"/> |
| <b>B.6.4. Summary of the ex-ante estimation of emission reductions</b>  |             |   |                                     |                                     |
| B.6.4.1. Is the data provided in this section in consistency with data as presented in other chapters of the PDD?   | 2,3,4, 5,83 | Yes   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |

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|--|-------------|--|----------------------|-----------|---------------------------------|----|--------------------------------|----|---------------------------------------|----|----------------------------|----|--|----|-------------------------------|----|---|----|---------------------------------|----|----------------------------------|----|-----------------------------|----|-------------------------------|----|---|---|
| B.7. Application of the monitoring methodology and description of the monitoring plan  |             |  |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| B.7.1. Data and parameters monitored   |             |  |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| B.7.1.1. Is the list of parameters presented in chapter B.7.1 considered to be complete with regard to the requirements of the applied methodology?  | 2,3,4       | The list of parameters presented in chapter B.7.1.   | ☑                    | ☑         |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| B.7.1.2. Parameter Title: <b>FF<sub>i,y</sub></b> ,<br>quantity of fossil fuel type i combusted to supplement waste gas in the project activity during the year y, in energy or mass units (project emissions) | 2,3,4, 5,83 | <table><tr><th>Monitoring Checklist</th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td>NA</td></tr><tr><td>Data unit correctly expressed?</td><td>NA</td></tr><tr><td>Appropriate description of parameter?</td><td>NA</td></tr><tr><td>Source clearly referenced?</td><td>NA</td></tr><tr><td>Correct value provided for estimation?</td><td>NA</td></tr><tr><td>Has this value been verified?</td><td>NA</td></tr><tr><td>Measurement method correctly described?</td><td>NA</td></tr><tr><td>Correct reference to standards?</td><td>NA</td></tr><tr><td>Indication of accuracy provided?</td><td>NA</td></tr><tr><td>QA/QC procedures described?</td><td>NA</td></tr><tr><td>QA/QC procedures appropriate?</td><td>NA</td></tr></table> | Monitoring Checklist | Yes / No  | Title in line with methodology? | NA | Data unit correctly expressed? | NA | Appropriate description of parameter? | NA | Source clearly referenced? | NA | Correct value provided for estimation? | NA | Has this value been verified? | NA | Measurement method correctly described? | NA | Correct reference to standards? | NA | Indication of accuracy provided? | NA | QA/QC procedures described? | NA | QA/QC procedures appropriate? | NA | ☑ | ☑ |
| Monitoring Checklist   | Yes / No    |  |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Title in line with methodology?  | NA          |  |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Data unit correctly expressed?   | NA          |  |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Appropriate description of parameter?  | NA          |  |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Source clearly referenced?   | NA          |  |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Correct value provided for estimation?   | NA          |  |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Has this value been verified?  | NA          |  |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Measurement method correctly described?  | NA          |  |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Correct reference to standards?  | NA          |  |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Indication of accuracy provided?   | NA          |  |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| QA/QC procedures described?  | NA          |  |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| QA/QC procedures appropriate?  | NA          |  |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| B.7.1.3. Parameter Title: <b>NCV<sub>i</sub></b> ,<br>net calorific value of the fossil fuel i (project emissions)   | 2,3,4, 5,83 | <table><tr><th>Monitoring Checklist</th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td>NA</td></tr><tr><td>Data unit correctly expressed?</td><td>NA</td></tr><tr><td>Appropriate description of parameter?</td><td>NA</td></tr></table>  | Monitoring Checklist | Yes / No  | Title in line with methodology? | NA | Data unit correctly expressed? | NA | Appropriate description of parameter? | NA | ☑                          | ☑  |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Monitoring Checklist   | Yes / No    |  |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Title in line with methodology?  | NA          |  |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Data unit correctly expressed?   | NA          |  |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Appropriate description of parameter?  | NA          |  |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |

Table 1 is applicable to ACM0012, ver 4

## Validation Protocol

Project Title: Usage of waste gas at Namakwa Sands in South Africa.

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| CHECKLIST TOPIC / QUESTION  | Ref.           | COMMENTS                                |          | PDD in GSP | Final PDD |
|---|----------------|---|----------|------------|-----------|
|   |                | Source clearly referenced?              | NA       |            |           |
|   |                | Correct value provided for estimation?  | NA       |            |           |
|   |                | Has this value been verified?           | NA       |            |           |
|   |                | Measurement method correctly described? | NA       |            |           |
|   |                | Correct reference to standards?         | NA       |            |           |
|   |                | Indication of accuracy provided?        | NA       |            |           |
|   |                | QA/QC procedures described?             | NA       |            |           |
|   |                | QA/QC procedures appropriate?           | NA       |            |           |
| B.7.1.4. Parameter Title: <b>EF</b> <sub>CO2, i</sub><br>CO2 emission factor per unit of energy or mass of the fuel type i<br>(project emissions)   | 2,3,4,<br>5,83 |   |          | ☑          | ☑         |
|   |                | Monitoring Checklist                    | Yes / No |            |           |
|   |                | Title in line with methodology?         | NA       |            |           |
|   |                | Data unit correctly expressed?          | NA       |            |           |
|   |                | Appropriate description of parameter?   | NA       |            |           |
|   |                | Source clearly referenced?              | NA       |            |           |
|   |                | Correct value provided for estimation?  | NA       |            |           |
|   |                | Has this value been verified?           | NA       |            |           |
|   |                | Measurement method correctly described? | NA       |            |           |
|   |                | Correct reference to standards?         | NA       |            |           |
|   |                | Indication of accuracy provided?        | NA       |            |           |
|   |                | QA/QC procedures described?             | NA       |            |           |
|   |                | QA/QC procedures appropriate?           | NA       |            |           |
| B.7.1.5. Parameter Title: <b>EC</b> <sub>PJ, y</sub><br>Additional electricity consumed in year y, for gas cleaning equipment, or any other project related equipment as a result of the implementation of the project activity.<br>(project emissions) | 2,3,4,<br>5,83 |   |          | ☑          | ☑         |
|   |                | Monitoring Checklist                    | Yes / No |            |           |
|   |                | Title in line with methodology?         | Yes      |            |           |
|   |                | Data unit correctly expressed?          | Yes      |            |           |
|   |                | Appropriate description of parameter?   | Yes      |            |           |
|   |                | Source clearly referenced?              | Yes      |            |           |

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Project Title: Usage of waste gas at Namakwa Sands in South Africa.

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| CHECKLIST TOPIC / QUESTION  | Ref.        | COMMENTS   |  | PDD in GSP                          | Final PDD                           |     |   |     |                                       |     |                                  |     |  |     |                               |     |   |    |                                 |    |                                  |    |                             |    |                               |    |  |     |                                     |
|---|-------------|--|--|-------------------------------------|-------------------------------------|-----|---|-----|---------------------------------------|-----|----------------------------------|-----|--|-----|-------------------------------|-----|---|----|---------------------------------|----|----------------------------------|----|-----------------------------|----|-------------------------------|----|--|-----|-------------------------------------|
|   |             | <table><tr><td>Correct value provided for estimation?</td><td>Yes</td></tr><tr><td>Has this value been verified?</td><td>Yes</td></tr><tr><td>Measurement method correctly described?</td><td>Yes</td></tr><tr><td>Correct reference to standards?</td><td>Yes</td></tr><tr><td>Indication of accuracy provided?</td><td>Yes</td></tr><tr><td>QA/QC procedures described?</td><td>Yes</td></tr><tr><td>QA/QC procedures appropriate?</td><td>Yes</td></tr></table>   | Correct value provided for estimation? | Yes                                 | Has this value been verified?       | Yes | Measurement method correctly described? | Yes | Correct reference to standards?       | Yes | Indication of accuracy provided? | Yes | QA/QC procedures described?            | Yes | QA/QC procedures appropriate? | Yes |   |    |                                 |    |                                  |    |                             |    |                               |    |  |     |                                     |
| Correct value provided for estimation?  | Yes         |  |  |                                     |                                     |     |   |     |                                       |     |                                  |     |  |     |                               |     |   |    |                                 |    |                                  |    |                             |    |                               |    |  |     |                                     |
| Has this value been verified?   | Yes         |  |  |                                     |                                     |     |   |     |                                       |     |                                  |     |  |     |                               |     |   |    |                                 |    |                                  |    |                             |    |                               |    |  |     |                                     |
| Measurement method correctly described?   | Yes         |  |  |                                     |                                     |     |   |     |                                       |     |                                  |     |  |     |                               |     |   |    |                                 |    |                                  |    |                             |    |                               |    |  |     |                                     |
| Correct reference to standards?   | Yes         |  |  |                                     |                                     |     |   |     |                                       |     |                                  |     |  |     |                               |     |   |    |                                 |    |                                  |    |                             |    |                               |    |  |     |                                     |
| Indication of accuracy provided?  | Yes         |  |  |                                     |                                     |     |   |     |                                       |     |                                  |     |  |     |                               |     |   |    |                                 |    |                                  |    |                             |    |                               |    |  |     |                                     |
| QA/QC procedures described?   | Yes         |  |  |                                     |                                     |     |   |     |                                       |     |                                  |     |  |     |                               |     |   |    |                                 |    |                                  |    |                             |    |                               |    |  |     |                                     |
| QA/QC procedures appropriate?   | Yes         |  |  |                                     |                                     |     |   |     |                                       |     |                                  |     |  |     |                               |     |   |    |                                 |    |                                  |    |                             |    |                               |    |  |     |                                     |
| B.7.1.6. Parameter Title: <b>EF</b> <sub>CO2, EL, y</sub><br>CO2 emission factor for electricity consumed by the project activity in year y (project emissions) | 2,3,4, 5,83 | <table><tr><th>Monitoring Checklist</th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td>No</td></tr><tr><td>Data unit correctly expressed?</td><td>No</td></tr><tr><td>Appropriate description of parameter?</td><td>No</td></tr><tr><td>Source clearly referenced?</td><td>No</td></tr><tr><td>Correct value provided for estimation?</td><td>No</td></tr><tr><td>Has this value been verified?</td><td>No</td></tr><tr><td>Measurement method correctly described?</td><td>No</td></tr><tr><td>Correct reference to standards?</td><td>No</td></tr><tr><td>Indication of accuracy provided?</td><td>No</td></tr><tr><td>QA/QC procedures described?</td><td>No</td></tr><tr><td>QA/QC procedures appropriate?</td><td>No</td></tr></table> <p><b><u>Corrective Action Request No.18.</u></b><br/>Project Proponent needs to include parameter " <b>EF</b><sub>CO2, EL, y</sub><br/>CO2 emission factor for electricity consumed by the project activity in year y (project emissions)"</p> | Monitoring Checklist                   | Yes / No                            | Title in line with methodology?     | No  | Data unit correctly expressed?          | No  | Appropriate description of parameter? | No  | Source clearly referenced?       | No  | Correct value provided for estimation? | No  | Has this value been verified? | No  | Measurement method correctly described? | No | Correct reference to standards? | No | Indication of accuracy provided? | No | QA/QC procedures described? | No | QA/QC procedures appropriate? | No |  | CAR | <input checked="" type="checkbox"/> |
| Monitoring Checklist  | Yes / No    |  |  |                                     |                                     |     |   |     |                                       |     |                                  |     |  |     |                               |     |   |    |                                 |    |                                  |    |                             |    |                               |    |  |     |                                     |
| Title in line with methodology?   | No          |  |  |                                     |                                     |     |   |     |                                       |     |                                  |     |  |     |                               |     |   |    |                                 |    |                                  |    |                             |    |                               |    |  |     |                                     |
| Data unit correctly expressed?  | No          |  |  |                                     |                                     |     |   |     |                                       |     |                                  |     |  |     |                               |     |   |    |                                 |    |                                  |    |                             |    |                               |    |  |     |                                     |
| Appropriate description of parameter?   | No          |  |  |                                     |                                     |     |   |     |                                       |     |                                  |     |  |     |                               |     |   |    |                                 |    |                                  |    |                             |    |                               |    |  |     |                                     |
| Source clearly referenced?  | No          |  |  |                                     |                                     |     |   |     |                                       |     |                                  |     |  |     |                               |     |   |    |                                 |    |                                  |    |                             |    |                               |    |  |     |                                     |
| Correct value provided for estimation?  | No          |  |  |                                     |                                     |     |   |     |                                       |     |                                  |     |  |     |                               |     |   |    |                                 |    |                                  |    |                             |    |                               |    |  |     |                                     |
| Has this value been verified?   | No          |  |  |                                     |                                     |     |   |     |                                       |     |                                  |     |  |     |                               |     |   |    |                                 |    |                                  |    |                             |    |                               |    |  |     |                                     |
| Measurement method correctly described?   | No          |  |  |                                     |                                     |     |   |     |                                       |     |                                  |     |  |     |                               |     |   |    |                                 |    |                                  |    |                             |    |                               |    |  |     |                                     |
| Correct reference to standards?   | No          |  |  |                                     |                                     |     |   |     |                                       |     |                                  |     |  |     |                               |     |   |    |                                 |    |                                  |    |                             |    |                               |    |  |     |                                     |
| Indication of accuracy provided?  | No          |  |  |                                     |                                     |     |   |     |                                       |     |                                  |     |  |     |                               |     |   |    |                                 |    |                                  |    |                             |    |                               |    |  |     |                                     |
| QA/QC procedures described?   | No          |  |  |                                     |                                     |     |   |     |                                       |     |                                  |     |  |     |                               |     |   |    |                                 |    |                                  |    |                             |    |                               |    |  |     |                                     |
| QA/QC procedures appropriate?   | No          |  |  |                                     |                                     |     |   |     |                                       |     |                                  |     |  |     |                               |     |   |    |                                 |    |                                  |    |                             |    |                               |    |  |     |                                     |
| B.7.1.7. Parameter Title: <b>FC</b> <sub>EL, CP, k, y</sub>   | 2,3,4,      |  |  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |     |   |     |                                       |     |                                  |     |  |     |                               |     |   |    |                                 |    |                                  |    |                             |    |                               |    |  |     |                                     |

Table 1 is applicable to ACM0012, ver 4

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Project Title: Usage of waste gas at Namakwa Sands in South Africa.

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| CHECKLIST TOPIC / QUESTION   | Ref.        | COMMENTS                                |          | PDD in GSP | Final PDD |
|--|-------------|---|----------|------------|-----------|
| Quantity of fuel type k combusted in the captive power plant at the project site in year y where k are the fuel types fired in the captive power plant at the project site in year y (project emissions) | 5,83        | Monitoring Checklist                    | Yes / No |            |           |
|  |             | Title in line with methodology?         | NA       |            |           |
|  |             | Data unit correctly expressed?          | NA       |            |           |
|  |             | Appropriate description of parameter?   | NA       |            |           |
|  |             | Source clearly referenced?              | NA       |            |           |
|  |             | Correct value provided for estimation?  | NA       |            |           |
|  |             | Has this value been verified?           | NA       |            |           |
|  |             | Measurement method correctly described? | NA       |            |           |
|  |             | Correct reference to standards?         | NA       |            |           |
|  |             | Indication of accuracy provided?        | NA       |            |           |
|  |             | QA/QC procedures described?             | NA       |            |           |
|  |             | QA/QC procedures appropriate?           | NA       |            |           |
| B.7.1.8. Parameter Title: <b>NCV<sub>k</sub></b><br>Net calorific value of fuel type k where k are the fuel types fired in the captive power plant at the project site in year y (project emissions)     | 2,3,4, 5,83 | Monitoring Checklist                    | Yes / No | ☑          | ☑         |
|  |             | Title in line with methodology?         | NA       |            |           |
|  |             | Data unit correctly expressed?          | NA       |            |           |
|  |             | Appropriate description of parameter?   | NA       |            |           |
|  |             | Source clearly referenced?              | NA       |            |           |
|  |             | Correct value provided for estimation?  | NA       |            |           |
|  |             | Has this value been verified?           | NA       |            |           |
|  |             | Measurement method correctly described? | NA       |            |           |
|  |             | Correct reference to standards?         | NA       |            |           |
|  |             | Indication of accuracy provided?        | NA       |            |           |
|  |             | QA/QC procedures described?             | NA       |            |           |
|  |             | QA/QC procedures appropriate?           | NA       |            |           |
| B.7.1.9. Parameter Title: <b>EF<sub>CO2, k</sub></b><br>Emission factor of fuel type k where k are the fuel types fired in the captive power plant at the  | 2,3,4, 5,83 |   |          | ☑          | ☑         |
|  |             | Monitoring Checklist                    | Yes / No |            |           |

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Project Title: Usage of waste gas at Namakwa Sands in South Africa.

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| CHECKLIST TOPIC / QUESTION  | Ref.           | COMMENTS                                |     | PDD in GSP                          | Final PDD                           |
|---|----------------|---|-----|-------------------------------------|-------------------------------------|
| project site in year y<br>(project emissions)   |                | Title in line with methodology?         | NA  |                                     |                                     |
|   |                | Data unit correctly expressed?          | NA  |                                     |                                     |
|   |                | Appropriate description of parameter?   | NA  |                                     |                                     |
|   |                | Source clearly referenced?              | NA  |                                     |                                     |
|   |                | Correct value provided for estimation?  | NA  |                                     |                                     |
|   |                | Has this value been verified?           | NA  |                                     |                                     |
|   |                | Measurement method correctly described? | NA  |                                     |                                     |
|   |                | Correct reference to standards?         | NA  |                                     |                                     |
|   |                | Indication of accuracy provided?        | NA  |                                     |                                     |
|   |                | QA/QC procedures described?             | NA  |                                     |                                     |
|   |                | QA/QC procedures appropriate?           | NA  |                                     |                                     |
| B.7.1.10.      Parameter Title: <b>EC</b> <sub>CP, y</sub><br>Quantity of electricity generated in the captive power plant at the project site in year y<br>(project emissions)                                       | 2,3,4,<br>5,83 |   |     | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|   |                | Monitoring Checklist      Yes / No      |     |                                     |                                     |
|   |                | Title in line with methodology?         | NA  |                                     |                                     |
|   |                | Data unit correctly expressed?          | NA  |                                     |                                     |
|   |                | Appropriate description of parameter?   | NA  |                                     |                                     |
|   |                | Source clearly referenced?              | NA  |                                     |                                     |
|   |                | Correct value provided for estimation?  | NA  |                                     |                                     |
|   |                | Has this value been verified?           | NA  |                                     |                                     |
|   |                | Measurement method correctly described? | NA  |                                     |                                     |
|   |                | Correct reference to standards?         | NA  |                                     |                                     |
|   |                | Indication of accuracy provided?        | NA  |                                     |                                     |
|   |                | QA/QC procedures described?             | NA  |                                     |                                     |
|   |                | QA/QC procedures appropriate?           | NA  |                                     |                                     |
| B.7.1.11.      Parameter Title: <b>ws</b> <sub>i, j</sub><br>fraction of total heat that is used by the recipient j in the project that in absence of the project activity would have been supplied by the ith boiler | 2,3,4,<br>5,83 |   |     | CR                                  | <input checked="" type="checkbox"/> |
|   |                | Monitoring Checklist      Yes / No      |     |                                     |                                     |
|   |                | Title in line with methodology?         | Yes |                                     |                                     |

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## Validation Protocol

Project Title: Usage of waste gas at Namakwa Sands in South Africa.

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| CHECKLIST TOPIC / QUESTION  | Ref.        | COMMENTS  |                                | PDD in GSP | Final PDD                             |     |                                |     |  |    |                               |    |   |    |                                 |    |   |    |                                 |    |                                  |    |                             |    |  |    |                                     |
|---|-------------|---|--------------------------------|------------|---------------------------------------|-----|--------------------------------|-----|--|----|-------------------------------|----|---|----|---------------------------------|----|---|----|---------------------------------|----|----------------------------------|----|-----------------------------|----|--|----|-------------------------------------|
| (baseline emissions)  |             | <table><tr><td>Data unit correctly expressed?</td><td>Yes</td></tr><tr><td>Appropriate description of parameter?</td><td>Yes</td></tr><tr><td>Source clearly referenced?</td><td>Yes</td></tr><tr><td>Correct value provided for estimation?</td><td>No</td></tr><tr><td>Has this value been verified?</td><td>No</td></tr><tr><td>Measurement method correctly described?</td><td>No</td></tr><tr><td>Correct reference to standards?</td><td>No</td></tr><tr><td>Indication of accuracy provided?</td><td>No</td></tr><tr><td>QA/QC procedures described?</td><td>No</td></tr><tr><td>QA/QC procedures appropriate?</td><td>No</td></tr></table> <p><b><u>Clarification Request No. 20.</u></b></p> <p>Provide the supportive to verify the mentioned value of thermal parameter.</p> <p>Also refer above CR comment and Table 2 of the validation protocol..</p> | Data unit correctly expressed? | Yes        | Appropriate description of parameter? | Yes | Source clearly referenced?     | Yes | Correct value provided for estimation? | No | Has this value been verified? | No | Measurement method correctly described? | No | Correct reference to standards? | No | Indication of accuracy provided?        | No | QA/QC procedures described?     | No | QA/QC procedures appropriate?    | No |                             |    |  |    |                                     |
| Data unit correctly expressed?  | Yes         |   |                                |            |                                       |     |                                |     |  |    |                               |    |   |    |                                 |    |   |    |                                 |    |                                  |    |                             |    |  |    |                                     |
| Appropriate description of parameter?   | Yes         |   |                                |            |                                       |     |                                |     |  |    |                               |    |   |    |                                 |    |   |    |                                 |    |                                  |    |                             |    |  |    |                                     |
| Source clearly referenced?  | Yes         |   |                                |            |                                       |     |                                |     |  |    |                               |    |   |    |                                 |    |   |    |                                 |    |                                  |    |                             |    |  |    |                                     |
| Correct value provided for estimation?  | No          |   |                                |            |                                       |     |                                |     |  |    |                               |    |   |    |                                 |    |   |    |                                 |    |                                  |    |                             |    |  |    |                                     |
| Has this value been verified?   | No          |   |                                |            |                                       |     |                                |     |  |    |                               |    |   |    |                                 |    |   |    |                                 |    |                                  |    |                             |    |  |    |                                     |
| Measurement method correctly described?   | No          |   |                                |            |                                       |     |                                |     |  |    |                               |    |   |    |                                 |    |   |    |                                 |    |                                  |    |                             |    |  |    |                                     |
| Correct reference to standards?   | No          |   |                                |            |                                       |     |                                |     |  |    |                               |    |   |    |                                 |    |   |    |                                 |    |                                  |    |                             |    |  |    |                                     |
| Indication of accuracy provided?  | No          |   |                                |            |                                       |     |                                |     |  |    |                               |    |   |    |                                 |    |   |    |                                 |    |                                  |    |                             |    |  |    |                                     |
| QA/QC procedures described?   | No          |   |                                |            |                                       |     |                                |     |  |    |                               |    |   |    |                                 |    |   |    |                                 |    |                                  |    |                             |    |  |    |                                     |
| QA/QC procedures appropriate?   | No          |   |                                |            |                                       |     |                                |     |  |    |                               |    |   |    |                                 |    |   |    |                                 |    |                                  |    |                             |    |  |    |                                     |
| B.7.1.12.      Parameter Title: $Q_{WCM,y}$ $Q_{WG,y}$<br>Quantity of WECM /Waste Gas used for energy generation during year y (baseline emissions) | 2,3,4, 5,83 | <table><tr><th>Monitoring Checklist</th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td>No</td></tr><tr><td>Data unit correctly expressed?</td><td>No</td></tr><tr><td>Appropriate description of parameter?</td><td>No</td></tr><tr><td>Source clearly referenced?</td><td>No</td></tr><tr><td>Correct value provided for estimation?</td><td>No</td></tr><tr><td>Has this value been verified?</td><td>No</td></tr><tr><td>Measurement method correctly described?</td><td>No</td></tr><tr><td>Correct reference to standards?</td><td>No</td></tr><tr><td>Indication of accuracy provided?</td><td>No</td></tr><tr><td>QA/QC procedures described?</td><td>No</td></tr></table>  | Monitoring Checklist           | Yes / No   | Title in line with methodology?       | No  | Data unit correctly expressed? | No  | Appropriate description of parameter?  | No | Source clearly referenced?    | No | Correct value provided for estimation?  | No | Has this value been verified?   | No | Measurement method correctly described? | No | Correct reference to standards? | No | Indication of accuracy provided? | No | QA/QC procedures described? | No |  | CR | <input checked="" type="checkbox"/> |
| Monitoring Checklist  | Yes / No    |   |                                |            |                                       |     |                                |     |  |    |                               |    |   |    |                                 |    |   |    |                                 |    |                                  |    |                             |    |  |    |                                     |
| Title in line with methodology?   | No          |   |                                |            |                                       |     |                                |     |  |    |                               |    |   |    |                                 |    |   |    |                                 |    |                                  |    |                             |    |  |    |                                     |
| Data unit correctly expressed?  | No          |   |                                |            |                                       |     |                                |     |  |    |                               |    |   |    |                                 |    |   |    |                                 |    |                                  |    |                             |    |  |    |                                     |
| Appropriate description of parameter?   | No          |   |                                |            |                                       |     |                                |     |  |    |                               |    |   |    |                                 |    |   |    |                                 |    |                                  |    |                             |    |  |    |                                     |
| Source clearly referenced?  | No          |   |                                |            |                                       |     |                                |     |  |    |                               |    |   |    |                                 |    |   |    |                                 |    |                                  |    |                             |    |  |    |                                     |
| Correct value provided for estimation?  | No          |   |                                |            |                                       |     |                                |     |  |    |                               |    |   |    |                                 |    |   |    |                                 |    |                                  |    |                             |    |  |    |                                     |
| Has this value been verified?   | No          |   |                                |            |                                       |     |                                |     |  |    |                               |    |   |    |                                 |    |   |    |                                 |    |                                  |    |                             |    |  |    |                                     |
| Measurement method correctly described?   | No          |   |                                |            |                                       |     |                                |     |  |    |                               |    |   |    |                                 |    |   |    |                                 |    |                                  |    |                             |    |  |    |                                     |
| Correct reference to standards?   | No          |   |                                |            |                                       |     |                                |     |  |    |                               |    |   |    |                                 |    |   |    |                                 |    |                                  |    |                             |    |  |    |                                     |
| Indication of accuracy provided?  | No          |   |                                |            |                                       |     |                                |     |  |    |                               |    |   |    |                                 |    |   |    |                                 |    |                                  |    |                             |    |  |    |                                     |
| QA/QC procedures described?   | No          |   |                                |            |                                       |     |                                |     |  |    |                               |    |   |    |                                 |    |   |    |                                 |    |                                  |    |                             |    |  |    |                                     |

## Validation Protocol

Project Title: Usage of waste gas at Namakwa Sands in South Africa.

Date of Completion: 14-12-2012

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| CHECKLIST TOPIC / QUESTION  | Ref.        | COMMENTS   |  | PDD in GSP                    | Final PDD |                                 |     |                                |     |                                       |     |                            |     |  |                                     |                               |     |   |     |                                 |     |                                  |     |                             |     |                               |     |                                     |                                     |
|---|-------------|--|--|-------------------------------|-----------|---------------------------------|-----|--------------------------------|-----|---------------------------------------|-----|----------------------------|-----|--|-------------------------------------|-------------------------------|-----|---|-----|---------------------------------|-----|----------------------------------|-----|-----------------------------|-----|-------------------------------|-----|-------------------------------------|-------------------------------------|
|   |             | <table><tr><td>QA/QC procedures appropriate?</td><td>No</td></tr></table> <p><b>Clarification Request No. 21.</b><br/>Project Proponent needs to justify why measurement of the quantity of waste gas is not required in the project activity?</p>   |  | QA/QC procedures appropriate? | No        |                                 |     |                                |     |                                       |     |                            |     |  |                                     |                               |     |   |     |                                 |     |                                  |     |                             |     |                               |     |                                     |                                     |
| QA/QC procedures appropriate?   | No          |  |  |                               |           |                                 |     |                                |     |                                       |     |                            |     |  |                                     |                               |     |   |     |                                 |     |                                  |     |                             |     |                               |     |                                     |                                     |
| B.7.1.13.      Parameter Title: <b>Q</b> <sub>OE,y</sub><br>Quantity of actual output/intermediate energy during year y   | 2,3,4, 5,83 | <table><tr><th>Monitoring Checklist</th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td>Yes</td></tr><tr><td>Data unit correctly expressed?</td><td>Yes</td></tr><tr><td>Appropriate description of parameter?</td><td>Yes</td></tr><tr><td>Source clearly referenced?</td><td>Yes</td></tr><tr><td>Correct value provided for estimation?</td><td>Yes</td></tr><tr><td>Has this value been verified?</td><td>Yes</td></tr><tr><td>Measurement method correctly described?</td><td>Yes</td></tr><tr><td>Correct reference to standards?</td><td>Yes</td></tr><tr><td>Indication of accuracy provided?</td><td>Yes</td></tr><tr><td>QA/QC procedures described?</td><td>Yes</td></tr><tr><td>QA/QC procedures appropriate?</td><td>Yes</td></tr></table> <p>Project Proponent needs to refer above CR comment and Table 2 of the validation protocol.</p> |  | Monitoring Checklist          | Yes / No  | Title in line with methodology? | Yes | Data unit correctly expressed? | Yes | Appropriate description of parameter? | Yes | Source clearly referenced? | Yes | Correct value provided for estimation? | Yes                                 | Has this value been verified? | Yes | Measurement method correctly described? | Yes | Correct reference to standards? | Yes | Indication of accuracy provided? | Yes | QA/QC procedures described? | Yes | QA/QC procedures appropriate? | Yes | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Monitoring Checklist  | Yes / No    |  |  |                               |           |                                 |     |                                |     |                                       |     |                            |     |  |                                     |                               |     |   |     |                                 |     |                                  |     |                             |     |                               |     |                                     |                                     |
| Title in line with methodology?   | Yes         |  |  |                               |           |                                 |     |                                |     |                                       |     |                            |     |  |                                     |                               |     |   |     |                                 |     |                                  |     |                             |     |                               |     |                                     |                                     |
| Data unit correctly expressed?  | Yes         |  |  |                               |           |                                 |     |                                |     |                                       |     |                            |     |  |                                     |                               |     |   |     |                                 |     |                                  |     |                             |     |                               |     |                                     |                                     |
| Appropriate description of parameter?   | Yes         |  |  |                               |           |                                 |     |                                |     |                                       |     |                            |     |  |                                     |                               |     |   |     |                                 |     |                                  |     |                             |     |                               |     |                                     |                                     |
| Source clearly referenced?  | Yes         |  |  |                               |           |                                 |     |                                |     |                                       |     |                            |     |  |                                     |                               |     |   |     |                                 |     |                                  |     |                             |     |                               |     |                                     |                                     |
| Correct value provided for estimation?  | Yes         |  |  |                               |           |                                 |     |                                |     |                                       |     |                            |     |  |                                     |                               |     |   |     |                                 |     |                                  |     |                             |     |                               |     |                                     |                                     |
| Has this value been verified?   | Yes         |  |  |                               |           |                                 |     |                                |     |                                       |     |                            |     |  |                                     |                               |     |   |     |                                 |     |                                  |     |                             |     |                               |     |                                     |                                     |
| Measurement method correctly described?   | Yes         |  |  |                               |           |                                 |     |                                |     |                                       |     |                            |     |  |                                     |                               |     |   |     |                                 |     |                                  |     |                             |     |                               |     |                                     |                                     |
| Correct reference to standards?   | Yes         |  |  |                               |           |                                 |     |                                |     |                                       |     |                            |     |  |                                     |                               |     |   |     |                                 |     |                                  |     |                             |     |                               |     |                                     |                                     |
| Indication of accuracy provided?  | Yes         |  |  |                               |           |                                 |     |                                |     |                                       |     |                            |     |  |                                     |                               |     |   |     |                                 |     |                                  |     |                             |     |                               |     |                                     |                                     |
| QA/QC procedures described?   | Yes         |  |  |                               |           |                                 |     |                                |     |                                       |     |                            |     |  |                                     |                               |     |   |     |                                 |     |                                  |     |                             |     |                               |     |                                     |                                     |
| QA/QC procedures appropriate?   | Yes         |  |  |                               |           |                                 |     |                                |     |                                       |     |                            |     |  |                                     |                               |     |   |     |                                 |     |                                  |     |                             |     |                               |     |                                     |                                     |
| B.7.1.14.      Parameter Title: <b>EF</b> <sub>elec,i,j</sub><br>CO <sub>2</sub> emission factor for the electricity source i (i=gr (grid) or i=is (identified source)) , displaced due to the project activity, during the year y in tons CO2/MWh (baseline emissions) | 2,3,4, 5,83 | <table><tr><th>Monitoring Checklist</th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td>No</td></tr><tr><td>Data unit correctly expressed?</td><td>No</td></tr><tr><td>Appropriate description of parameter?</td><td>No</td></tr><tr><td>Source clearly referenced?</td><td>No</td></tr></table>   |  | Monitoring Checklist          | Yes / No  | Title in line with methodology? | No  | Data unit correctly expressed? | No  | Appropriate description of parameter? | No  | Source clearly referenced? | No  | CR                                     | <input checked="" type="checkbox"/> |                               |     |   |     |                                 |     |                                  |     |                             |     |                               |     |                                     |                                     |
| Monitoring Checklist  | Yes / No    |  |  |                               |           |                                 |     |                                |     |                                       |     |                            |     |  |                                     |                               |     |   |     |                                 |     |                                  |     |                             |     |                               |     |                                     |                                     |
| Title in line with methodology?   | No          |  |  |                               |           |                                 |     |                                |     |                                       |     |                            |     |  |                                     |                               |     |   |     |                                 |     |                                  |     |                             |     |                               |     |                                     |                                     |
| Data unit correctly expressed?  | No          |  |  |                               |           |                                 |     |                                |     |                                       |     |                            |     |  |                                     |                               |     |   |     |                                 |     |                                  |     |                             |     |                               |     |                                     |                                     |
| Appropriate description of parameter?   | No          |  |  |                               |           |                                 |     |                                |     |                                       |     |                            |     |  |                                     |                               |     |   |     |                                 |     |                                  |     |                             |     |                               |     |                                     |                                     |
| Source clearly referenced?  | No          |  |  |                               |           |                                 |     |                                |     |                                       |     |                            |     |  |                                     |                               |     |   |     |                                 |     |                                  |     |                             |     |                               |     |                                     |                                     |

Table 1 is applicable to ACM0012, ver 4

## Validation Protocol

Project Title: Usage of waste gas at Namakwa Sands in South Africa.

Date of Completion: 14-12-2012

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| CHECKLIST TOPIC / QUESTION   | Ref.        | COMMENTS   |  | PDD in GSP | Final PDD                       |    |   |    |                                       |    |                                  |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |  |     |                                     |
|--|-------------|--|--|------------|---------------------------------|----|---|----|---------------------------------------|----|----------------------------------|----|--|----|-------------------------------|----|---|----|---------------------------------|----|----------------------------------|----|-----------------------------|----|-------------------------------|----|--|-----|-------------------------------------|
|  |             | <table><tr><td>Correct value provided for estimation?</td><td>No</td></tr><tr><td>Has this value been verified?</td><td>No</td></tr><tr><td>Measurement method correctly described?</td><td>No</td></tr><tr><td>Correct reference to standards?</td><td>No</td></tr><tr><td>Indication of accuracy provided?</td><td>No</td></tr><tr><td>QA/QC procedures described?</td><td>No</td></tr><tr><td>QA/QC procedures appropriate?</td><td>No</td></tr></table>  | Correct value provided for estimation? | No         | Has this value been verified?   | No | Measurement method correctly described? | No | Correct reference to standards?       | No | Indication of accuracy provided? | No | QA/QC procedures described?            | No | QA/QC procedures appropriate? | No |   |    |                                 |    |                                  |    |                             |    |                               |    |  |     |                                     |
| Correct value provided for estimation?   | No          |  |  |            |                                 |    |   |    |                                       |    |                                  |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |  |     |                                     |
| Has this value been verified?  | No          |  |  |            |                                 |    |   |    |                                       |    |                                  |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |  |     |                                     |
| Measurement method correctly described?  | No          |  |  |            |                                 |    |   |    |                                       |    |                                  |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |  |     |                                     |
| Correct reference to standards?  | No          |  |  |            |                                 |    |   |    |                                       |    |                                  |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |  |     |                                     |
| Indication of accuracy provided?   | No          |  |  |            |                                 |    |   |    |                                       |    |                                  |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |  |     |                                     |
| QA/QC procedures described?  | No          |  |  |            |                                 |    |   |    |                                       |    |                                  |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |  |     |                                     |
| QA/QC procedures appropriate?  | No          |  |  |            |                                 |    |   |    |                                       |    |                                  |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |  |     |                                     |
|  |             | Project Proponent needs to refer above CR comment in section B.7.1.11 and Table 2 of the validation protocol.  |  |            |                                 |    |   |    |                                       |    |                                  |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |  |     |                                     |
| B.7.1.15. Parameter Title: <b>EF<sub>CO2, is, j</sub></b><br>CO <sub>2</sub> emission factor per unit of energy of the fossil fuel used in the baseline generation source i (i=is) providing energy to recipient j. (baseline emissions) | 2,3,4, 5,83 | <table><tr><td>Monitoring Checklist</td><td>Yes / No</td></tr><tr><td>Title in line with methodology?</td><td>No</td></tr><tr><td>Data unit correctly expressed?</td><td>No</td></tr><tr><td>Appropriate description of parameter?</td><td>No</td></tr><tr><td>Source clearly referenced?</td><td>No</td></tr><tr><td>Correct value provided for estimation?</td><td>No</td></tr><tr><td>Has this value been verified?</td><td>No</td></tr><tr><td>Measurement method correctly described?</td><td>No</td></tr><tr><td>Correct reference to standards?</td><td>No</td></tr><tr><td>Indication of accuracy provided?</td><td>No</td></tr><tr><td>QA/QC procedures described?</td><td>No</td></tr><tr><td>QA/QC procedures appropriate?</td><td>No</td></tr></table> <p><b><u>Corrective Action Request No.19.</u></b></p> <p>The parameter " CO<sub>2</sub> emission factor per unit of energy of the fossil fuel used in the baseline generation source i (i=is) providing energy to recipient j. (baseline emissions)" should be the monitor-</p> | Monitoring Checklist                   | Yes / No   | Title in line with methodology? | No | Data unit correctly expressed?          | No | Appropriate description of parameter? | No | Source clearly referenced?       | No | Correct value provided for estimation? | No | Has this value been verified? | No | Measurement method correctly described? | No | Correct reference to standards? | No | Indication of accuracy provided? | No | QA/QC procedures described? | No | QA/QC procedures appropriate? | No |  | CAR | <input checked="" type="checkbox"/> |
| Monitoring Checklist   | Yes / No    |  |  |            |                                 |    |   |    |                                       |    |                                  |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |  |     |                                     |
| Title in line with methodology?  | No          |  |  |            |                                 |    |   |    |                                       |    |                                  |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |  |     |                                     |
| Data unit correctly expressed?   | No          |  |  |            |                                 |    |   |    |                                       |    |                                  |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |  |     |                                     |
| Appropriate description of parameter?  | No          |  |  |            |                                 |    |   |    |                                       |    |                                  |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |  |     |                                     |
| Source clearly referenced?   | No          |  |  |            |                                 |    |   |    |                                       |    |                                  |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |  |     |                                     |
| Correct value provided for estimation?   | No          |  |  |            |                                 |    |   |    |                                       |    |                                  |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |  |     |                                     |
| Has this value been verified?  | No          |  |  |            |                                 |    |   |    |                                       |    |                                  |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |  |     |                                     |
| Measurement method correctly described?  | No          |  |  |            |                                 |    |   |    |                                       |    |                                  |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |  |     |                                     |
| Correct reference to standards?  | No          |  |  |            |                                 |    |   |    |                                       |    |                                  |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |  |     |                                     |
| Indication of accuracy provided?   | No          |  |  |            |                                 |    |   |    |                                       |    |                                  |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |  |     |                                     |
| QA/QC procedures described?  | No          |  |  |            |                                 |    |   |    |                                       |    |                                  |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |  |     |                                     |
| QA/QC procedures appropriate?  | No          |  |  |            |                                 |    |   |    |                                       |    |                                  |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |  |     |                                     |

## Validation Protocol

Project Title: Usage of waste gas at Namakwa Sands in South Africa.

Date of Completion: 14-12-2012

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| CHECKLIST TOPIC / QUESTION  | Ref.           | COMMENTS   | PDD in GSP           | Final PDD |                                 |     |                                |     |                                       |     |                            |    |  |    |                               |    |   |    |                                 |                                     |                                  |    |                             |    |                               |    |                                     |                                     |
|---|----------------|--|----------------------|-----------|---------------------------------|-----|--------------------------------|-----|---------------------------------------|-----|----------------------------|----|--|----|-------------------------------|----|---|----|---------------------------------|-------------------------------------|----------------------------------|----|-----------------------------|----|-------------------------------|----|-------------------------------------|-------------------------------------|
|   |                | ing parameter under section B.7.1. of the PDD, Project Proponent needs to clarify.<br>Also, refer the table Table 2.   |                      |           |                                 |     |                                |     |                                       |     |                            |    |  |    |                               |    |   |    |                                 |                                     |                                  |    |                             |    |                               |    |                                     |                                     |
| B.7.1.16. Parameter Title: <b>EF<sub>CO2, COGEN</sub></b><br>CO <sub>2</sub> emission factor per unit of energy of the fuel that would have been used in the baseline cogeneration plant<br>(baseline emissions)  | 2,3,4,<br>5,83 | <table><tr><th>Monitoring Checklist</th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td>NA</td></tr><tr><td>Data unit correctly expressed?</td><td>NA</td></tr><tr><td>Appropriate description of parameter?</td><td>NA</td></tr><tr><td>Source clearly referenced?</td><td>NA</td></tr><tr><td>Correct value provided for estimation?</td><td>NA</td></tr><tr><td>Has this value been verified?</td><td>NA</td></tr><tr><td>Measurement method correctly described?</td><td>NA</td></tr><tr><td>Correct reference to standards?</td><td>NA</td></tr><tr><td>Indication of accuracy provided?</td><td>NA</td></tr><tr><td>QA/QC procedures described?</td><td>NA</td></tr><tr><td>QA/QC procedures appropriate?</td><td>NA</td></tr></table> | Monitoring Checklist | Yes / No  | Title in line with methodology? | NA  | Data unit correctly expressed? | NA  | Appropriate description of parameter? | NA  | Source clearly referenced? | NA | Correct value provided for estimation? | NA | Has this value been verified? | NA | Measurement method correctly described? | NA | Correct reference to standards? | NA                                  | Indication of accuracy provided? | NA | QA/QC procedures described? | NA | QA/QC procedures appropriate? | NA | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Monitoring Checklist  | Yes / No       |  |                      |           |                                 |     |                                |     |                                       |     |                            |    |  |    |                               |    |   |    |                                 |                                     |                                  |    |                             |    |                               |    |                                     |                                     |
| Title in line with methodology?   | NA             |  |                      |           |                                 |     |                                |     |                                       |     |                            |    |  |    |                               |    |   |    |                                 |                                     |                                  |    |                             |    |                               |    |                                     |                                     |
| Data unit correctly expressed?  | NA             |  |                      |           |                                 |     |                                |     |                                       |     |                            |    |  |    |                               |    |   |    |                                 |                                     |                                  |    |                             |    |                               |    |                                     |                                     |
| Appropriate description of parameter?   | NA             |  |                      |           |                                 |     |                                |     |                                       |     |                            |    |  |    |                               |    |   |    |                                 |                                     |                                  |    |                             |    |                               |    |                                     |                                     |
| Source clearly referenced?  | NA             |  |                      |           |                                 |     |                                |     |                                       |     |                            |    |  |    |                               |    |   |    |                                 |                                     |                                  |    |                             |    |                               |    |                                     |                                     |
| Correct value provided for estimation?  | NA             |  |                      |           |                                 |     |                                |     |                                       |     |                            |    |  |    |                               |    |   |    |                                 |                                     |                                  |    |                             |    |                               |    |                                     |                                     |
| Has this value been verified?   | NA             |  |                      |           |                                 |     |                                |     |                                       |     |                            |    |  |    |                               |    |   |    |                                 |                                     |                                  |    |                             |    |                               |    |                                     |                                     |
| Measurement method correctly described?   | NA             |  |                      |           |                                 |     |                                |     |                                       |     |                            |    |  |    |                               |    |   |    |                                 |                                     |                                  |    |                             |    |                               |    |                                     |                                     |
| Correct reference to standards?   | NA             |  |                      |           |                                 |     |                                |     |                                       |     |                            |    |  |    |                               |    |   |    |                                 |                                     |                                  |    |                             |    |                               |    |                                     |                                     |
| Indication of accuracy provided?  | NA             |  |                      |           |                                 |     |                                |     |                                       |     |                            |    |  |    |                               |    |   |    |                                 |                                     |                                  |    |                             |    |                               |    |                                     |                                     |
| QA/QC procedures described?   | NA             |  |                      |           |                                 |     |                                |     |                                       |     |                            |    |  |    |                               |    |   |    |                                 |                                     |                                  |    |                             |    |                               |    |                                     |                                     |
| QA/QC procedures appropriate?   | NA             |  |                      |           |                                 |     |                                |     |                                       |     |                            |    |  |    |                               |    |   |    |                                 |                                     |                                  |    |                             |    |                               |    |                                     |                                     |
| B.7.1.17. Parameter Title: <b>EG<sub>i,j,y</sub></b><br>quantity of electricity supplied to the recipient j by generator, which in the absence of the project activity would have sourced from I th source /I can be either grid or identified source) during the year y in MWh<br>(baseline emissions) | 2,3,4,<br>5,83 | <table><tr><th>Monitoring Checklist</th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td>Yes</td></tr><tr><td>Data unit correctly expressed?</td><td>Yes</td></tr><tr><td>Appropriate description of parameter?</td><td>Yes</td></tr><tr><td>Source clearly referenced?</td><td>No</td></tr><tr><td>Correct value provided for estimation?</td><td>No</td></tr><tr><td>Has this value been verified?</td><td>No</td></tr><tr><td>Measurement method correctly described?</td><td>No</td></tr></table>   | Monitoring Checklist | Yes / No  | Title in line with methodology? | Yes | Data unit correctly expressed? | Yes | Appropriate description of parameter? | Yes | Source clearly referenced? | No | Correct value provided for estimation? | No | Has this value been verified? | No | Measurement method correctly described? | No | CAR                             | <input checked="" type="checkbox"/> |                                  |    |                             |    |                               |    |                                     |                                     |
| Monitoring Checklist  | Yes / No       |  |                      |           |                                 |     |                                |     |                                       |     |                            |    |  |    |                               |    |   |    |                                 |                                     |                                  |    |                             |    |                               |    |                                     |                                     |
| Title in line with methodology?   | Yes            |  |                      |           |                                 |     |                                |     |                                       |     |                            |    |  |    |                               |    |   |    |                                 |                                     |                                  |    |                             |    |                               |    |                                     |                                     |
| Data unit correctly expressed?  | Yes            |  |                      |           |                                 |     |                                |     |                                       |     |                            |    |  |    |                               |    |   |    |                                 |                                     |                                  |    |                             |    |                               |    |                                     |                                     |
| Appropriate description of parameter?   | Yes            |  |                      |           |                                 |     |                                |     |                                       |     |                            |    |  |    |                               |    |   |    |                                 |                                     |                                  |    |                             |    |                               |    |                                     |                                     |
| Source clearly referenced?  | No             |  |                      |           |                                 |     |                                |     |                                       |     |                            |    |  |    |                               |    |   |    |                                 |                                     |                                  |    |                             |    |                               |    |                                     |                                     |
| Correct value provided for estimation?  | No             |  |                      |           |                                 |     |                                |     |                                       |     |                            |    |  |    |                               |    |   |    |                                 |                                     |                                  |    |                             |    |                               |    |                                     |                                     |
| Has this value been verified?   | No             |  |                      |           |                                 |     |                                |     |                                       |     |                            |    |  |    |                               |    |   |    |                                 |                                     |                                  |    |                             |    |                               |    |                                     |                                     |
| Measurement method correctly described?   | No             |  |                      |           |                                 |     |                                |     |                                       |     |                            |    |  |    |                               |    |   |    |                                 |                                     |                                  |    |                             |    |                               |    |                                     |                                     |

Table 1 is applicable to ACM0012, ver 4

## Validation Protocol

Project Title: Usage of waste gas at Namakwa Sands in South Africa.

Date of Completion: 14-12-2012

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| CHECKLIST TOPIC / QUESTION  | Ref.           | COMMENTS   |                                 | PDD in GSP                          | Final PDD                           |                                 |                             |                                |                               |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |                                     |                                     |
|---|----------------|--|---------------------------------|-------------------------------------|-------------------------------------|---------------------------------|-----------------------------|--------------------------------|-------------------------------|---------------------------------------|----|----------------------------|----|--|----|-------------------------------|----|---|----|---------------------------------|----|----------------------------------|----|-----------------------------|----|-------------------------------|----|-------------------------------------|-------------------------------------|
|   |                | <table><tr><td>Correct reference to standards?</td><td>No</td></tr><tr><td>Indication of accuracy provided?</td><td>No</td></tr><tr><td>QA/QC procedures described?</td><td>No</td></tr><tr><td>QA/QC procedures appropriate?</td><td>No</td></tr></table> <p><b><u>Corrective Action Request No.20.</u></b></p> <p>Provide the supportive to verify the mentioned electricity supplied values. Also, include the information on cross check, technical details, backup and calibration procedure of the energy meter in the parameter table.</p> <p>Also, refer the table Table 2.</p>  | Correct reference to standards? | No                                  | Indication of accuracy provided?    | No                              | QA/QC procedures described? | No                             | QA/QC procedures appropriate? | No                                    |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |                                     |                                     |
| Correct reference to standards?   | No             |  |                                 |                                     |                                     |                                 |                             |                                |                               |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |                                     |                                     |
| Indication of accuracy provided?  | No             |  |                                 |                                     |                                     |                                 |                             |                                |                               |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |                                     |                                     |
| QA/QC procedures described?   | No             |  |                                 |                                     |                                     |                                 |                             |                                |                               |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |                                     |                                     |
| QA/QC procedures appropriate?   | No             |  |                                 |                                     |                                     |                                 |                             |                                |                               |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |                                     |                                     |
| B.7.1.18.      Parameter Title: <b>EG<sub>j,y</sub></b><br>quantity of electricity supplied to the recipient plant j by the project activity during the year y in MWh<br>(baseline emissions) | 2,3,4,<br>5,83 | <table><tr><th>Monitoring Checklist</th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td>NA</td></tr><tr><td>Data unit correctly expressed?</td><td>NA</td></tr><tr><td>Appropriate description of parameter?</td><td>NA</td></tr><tr><td>Source clearly referenced?</td><td>NA</td></tr><tr><td>Correct value provided for estimation?</td><td>NA</td></tr><tr><td>Has this value been verified?</td><td>NA</td></tr><tr><td>Measurement method correctly described?</td><td>NA</td></tr><tr><td>Correct reference to standards?</td><td>NA</td></tr><tr><td>Indication of accuracy provided?</td><td>NA</td></tr><tr><td>QA/QC procedures described?</td><td>NA</td></tr><tr><td>QA/QC procedures appropriate?</td><td>NA</td></tr></table> |                                 | Monitoring Checklist                | Yes / No                            | Title in line with methodology? | NA                          | Data unit correctly expressed? | NA                            | Appropriate description of parameter? | NA | Source clearly referenced? | NA | Correct value provided for estimation? | NA | Has this value been verified? | NA | Measurement method correctly described? | NA | Correct reference to standards? | NA | Indication of accuracy provided? | NA | QA/QC procedures described? | NA | QA/QC procedures appropriate? | NA | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Monitoring Checklist  | Yes / No       |  |                                 |                                     |                                     |                                 |                             |                                |                               |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |                                     |                                     |
| Title in line with methodology?   | NA             |  |                                 |                                     |                                     |                                 |                             |                                |                               |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |                                     |                                     |
| Data unit correctly expressed?  | NA             |  |                                 |                                     |                                     |                                 |                             |                                |                               |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |                                     |                                     |
| Appropriate description of parameter?   | NA             |  |                                 |                                     |                                     |                                 |                             |                                |                               |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |                                     |                                     |
| Source clearly referenced?  | NA             |  |                                 |                                     |                                     |                                 |                             |                                |                               |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |                                     |                                     |
| Correct value provided for estimation?  | NA             |  |                                 |                                     |                                     |                                 |                             |                                |                               |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |                                     |                                     |
| Has this value been verified?   | NA             |  |                                 |                                     |                                     |                                 |                             |                                |                               |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |                                     |                                     |
| Measurement method correctly described?   | NA             |  |                                 |                                     |                                     |                                 |                             |                                |                               |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |                                     |                                     |
| Correct reference to standards?   | NA             |  |                                 |                                     |                                     |                                 |                             |                                |                               |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |                                     |                                     |
| Indication of accuracy provided?  | NA             |  |                                 |                                     |                                     |                                 |                             |                                |                               |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |                                     |                                     |
| QA/QC procedures described?   | NA             |  |                                 |                                     |                                     |                                 |                             |                                |                               |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |                                     |                                     |
| QA/QC procedures appropriate?   | NA             |  |                                 |                                     |                                     |                                 |                             |                                |                               |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |                                     |                                     |
| B.7.1.19.      Parameter Title: <b>HG<sub>j,y</sub></b><br>net quantity of heat supplied to the recipient   | 2,3,4,<br>5,83 |  |                                 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |                                 |                             |                                |                               |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |                                     |                                     |

Table 1 is applicable to ACM0012, ver 4

## Validation Protocol

Project Title: Usage of waste gas at Namakwa Sands in South Africa.

Date of Completion: 14-12-2012

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| CHECKLIST TOPIC / QUESTION   | Ref.        | COMMENTS                                |          | PDD in GSP                          | Final PDD                           |
|--|-------------|---|----------|-------------------------------------|-------------------------------------|
| plant $j$ by the project activity during the year $y$ in TJ. In case of steam this is expressed as difference of energy content between the steam supplied to the recipient plant and the condensate returned by the recipient plant(s) to element process of cogeneration plant. In case of hot water/oil this is expressed as difference in energy content between the hot water/oil supplied to and returned by the recipient plant(s) to element process of cogeneration plant) (baseline emissions) |             | Monitoring Checklist                    | Yes / No |                                     |                                     |
|  |             | Title in line with methodology?         | NA       |                                     |                                     |
|  |             | Data unit correctly expressed?          | NA       |                                     |                                     |
|  |             | Appropriate description of parameter?   | NA       |                                     |                                     |
|  |             | Source clearly referenced?              | NA       |                                     |                                     |
|  |             | Correct value provided for estimation?  | NA       |                                     |                                     |
|  |             | Has this value been verified?           | NA       |                                     |                                     |
|  |             | Measurement method correctly described? | NA       |                                     |                                     |
|  |             | Correct reference to standards?         | NA       |                                     |                                     |
|  |             | Indication of accuracy provided?        | NA       |                                     |                                     |
|  |             | QA/QC procedures described?             | NA       |                                     |                                     |
|  |             | QA/QC procedures appropriate?           | NA       |                                     |                                     |
| B.7.1.20. Parameter Title: <b>MG</b> <sub><math>i,j,y,mot</math></sub> or <b>MG</b> <sub><math>i,j,y,tur</math></sub><br>Mechanical energy supplied to the recipient $j$ by generator, that is supplied by source motor $i$ or steam turbine $i$ in the absence of the project activity in year $y$  | 2,3,4, 5,83 | Monitoring Checklist                    | Yes / No | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|  |             | Title in line with methodology?         | NA       |                                     |                                     |
|  |             | Data unit correctly expressed?          | NA       |                                     |                                     |
|  |             | Appropriate description of parameter?   | NA       |                                     |                                     |
|  |             | Source clearly referenced?              | NA       |                                     |                                     |
|  |             | Correct value provided for estimation?  | NA       |                                     |                                     |
|  |             | Has this value been verified?           | NA       |                                     |                                     |
|  |             | Measurement method correctly described? | NA       |                                     |                                     |
|  |             | Correct reference to standards?         | NA       |                                     |                                     |
|  |             | Indication of accuracy provided?        | NA       |                                     |                                     |
|  |             | QA/QC procedures described?             | NA       |                                     |                                     |
|  |             | QA/QC procedures appropriate?           | NA       |                                     |                                     |
| B.7.1.21. Parameter Title: <b>EF</b> <sub><math>CO_2, i, j</math></sub><br>CO <sub>2</sub> emission factor per unit of energy of the baseline fuel used in $i$ th boiler used by recipient   | 2,3,4, 5,83 | Monitoring Checklist                    | Yes / No | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |

Table 1 is applicable to ACM0012, ver 4

## Validation Protocol

Project Title: Usage of waste gas at Namakwa Sands in South Africa.

Date of Completion: 14-12-2012

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| CHECKLIST TOPIC / QUESTION   | Ref.        | COMMENTS   |    | PDD in GSP           | Final PDD |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
|--|-------------|--|----|----------------------|-----------|---------------------------------|----|--------------------------------|----|---------------------------------------|----|----------------------------|----|--|----|-------------------------------|----|---|----|---------------------------------|----|----------------------------------|----|-----------------------------|----|-------------------------------|----|---|---|
| j, in tCO2/TJ, in absence of the project activity (baseline emissions)   |             | Title in line with methodology?  | NA |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
|  |             | Data unit correctly expressed?   | NA |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
|  |             | Appropriate description of parameter?  | NA |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
|  |             | Source clearly referenced?   | NA |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
|  |             | Correct value provided for estimation?   | NA |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
|  |             | Has this value been verified?  | NA |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
|  |             | Measurement method correctly described?  | NA |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
|  |             | Correct reference to standards?  | NA |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
|  |             | Indication of accuracy provided?   | NA |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
|  |             | QA/QC procedures described?  | NA |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
|  |             | QA/QC procedures appropriate?  | NA |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| B.7.1.22. Parameter Title: <b>EF<sub>CO2, j</sub></b><br>CO <sub>2</sub> emission factor of fossil fuel (tCO2/TJ) that would have been used at facility 'j' for flaring the waste gas (baseline emissions) | 2,3,4, 5,83 | <table><tr><th>Monitoring Checklist</th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td>NA</td></tr><tr><td>Data unit correctly expressed?</td><td>NA</td></tr><tr><td>Appropriate description of parameter?</td><td>NA</td></tr><tr><td>Source clearly referenced?</td><td>NA</td></tr><tr><td>Correct value provided for estimation?</td><td>NA</td></tr><tr><td>Has this value been verified?</td><td>NA</td></tr><tr><td>Measurement method correctly described?</td><td>NA</td></tr><tr><td>Correct reference to standards?</td><td>NA</td></tr><tr><td>Indication of accuracy provided?</td><td>NA</td></tr><tr><td>QA/QC procedures described?</td><td>NA</td></tr><tr><td>QA/QC procedures appropriate?</td><td>NA</td></tr></table> |    | Monitoring Checklist | Yes / No  | Title in line with methodology? | NA | Data unit correctly expressed? | NA | Appropriate description of parameter? | NA | Source clearly referenced? | NA | Correct value provided for estimation? | NA | Has this value been verified? | NA | Measurement method correctly described? | NA | Correct reference to standards? | NA | Indication of accuracy provided? | NA | QA/QC procedures described? | NA | QA/QC procedures appropriate? | NA | ☑ | ☑ |
| Monitoring Checklist   | Yes / No    |  |    |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Title in line with methodology?  | NA          |  |    |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Data unit correctly expressed?   | NA          |  |    |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Appropriate description of parameter?  | NA          |  |    |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Source clearly referenced?   | NA          |  |    |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Correct value provided for estimation?   | NA          |  |    |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Has this value been verified?  | NA          |  |    |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Measurement method correctly described?  | NA          |  |    |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Correct reference to standards?  | NA          |  |    |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Indication of accuracy provided?   | NA          |  |    |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| QA/QC procedures described?  | NA          |  |    |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| QA/QC procedures appropriate?  | NA          |  |    |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| B.7.1.23. Parameter Title: <b>Q<sub>i, h</sub></b><br>amount of individual fuel (and other fuel(s)) i consumed at the energy generation unit during hour h   | 2,3,4, 5,83 | <table><tr><th>Monitoring Checklist</th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td>NA</td></tr></table>   |    | Monitoring Checklist | Yes / No  | Title in line with methodology? | NA | ☑                              | ☑  |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Monitoring Checklist   | Yes / No    |  |    |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Title in line with methodology?  | NA          |  |    |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |

Table 1 is applicable to ACM0012, ver 4



## Validation Protocol

Project Title: Usage of waste gas at Namakwa Sands in South Africa.

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| CHECKLIST TOPIC / QUESTION   | Ref.           | COMMENTS                                |          | PDD in GSP                          | Final PDD                           |
|--|----------------|---|----------|-------------------------------------|-------------------------------------|
| (baseline emissions)   |                | Data unit correctly expressed?          | NA       |                                     |                                     |
|  |                | Appropriate description of parameter?   | NA       |                                     |                                     |
|  |                | Source clearly referenced?              | NA       |                                     |                                     |
|  |                | Correct value provided for estimation?  | NA       |                                     |                                     |
|  |                | Has this value been verified?           | NA       |                                     |                                     |
|  |                | Measurement method correctly described? | NA       |                                     |                                     |
|  |                | Correct reference to standards?         | NA       |                                     |                                     |
|  |                | Indication of accuracy provided?        | NA       |                                     |                                     |
|  |                | QA/QC procedures described?             | NA       |                                     |                                     |
|  |                | QA/QC procedures appropriate?           | NA       |                                     |                                     |
| B.7.1.24. Parameter Title: <b>EG<sub>tot, y</sub></b><br>total annual energy produced at the cogeneration plants, using waste energy and fossil fuel<br>(baseline emissions) | 2,3,4,<br>5,83 | Monitoring Checklist                    | Yes / No | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|  |                | Title in line with methodology?         | NA       |                                     |                                     |
|  |                | Data unit correctly expressed?          | NA       |                                     |                                     |
|  |                | Appropriate description of parameter?   | NA       |                                     |                                     |
|  |                | Source clearly referenced?              | NA       |                                     |                                     |
|  |                | Correct value provided for estimation?  | NA       |                                     |                                     |
|  |                | Has this value been verified?           | NA       |                                     |                                     |
|  |                | Measurement method correctly described? | NA       |                                     |                                     |
|  |                | Correct reference to standards?         | NA       |                                     |                                     |
|  |                | Indication of accuracy provided?        | NA       |                                     |                                     |
|  |                | QA/QC procedures described?             | NA       |                                     |                                     |
|  |                | QA/QC procedures appropriate?           | NA       |                                     |                                     |
| B.7.1.25. Parameter Title: <b>NCV<sub>WG</sub></b><br>net Calorific Value of Waste Gas<br>(baseline emissions)   | 2,3,4,<br>5,83 | Monitoring Checklist                    | Yes / No | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|  |                | Title in line with methodology?         | NA       |                                     |                                     |
|  |                | Data unit correctly expressed?          | NA       |                                     |                                     |
|  |                | Appropriate description of parameter?   | NA       |                                     |                                     |
|  |                | Source clearly referenced?              | NA       |                                     |                                     |

Table 1 is applicable to ACM0012, ver 4

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| CHECKLIST TOPIC / QUESTION   | Ref.           | COMMENTS                                |          | PDD in GSP                          | Final PDD                           |
|--|----------------|---|----------|-------------------------------------|-------------------------------------|
|  |                | Correct value provided for estimation?  | NA       |                                     |                                     |
|  |                | Has this value been verified?           | NA       |                                     |                                     |
|  |                | Measurement method correctly described? | NA       |                                     |                                     |
|  |                | Correct reference to standards?         | NA       |                                     |                                     |
|  |                | Indication of accuracy provided?        | NA       |                                     |                                     |
|  |                | QA/QC procedures described?             | NA       |                                     |                                     |
|  |                | QA/QC procedures appropriate?           | NA       |                                     |                                     |
| B.7.1.26. Parameter Title: $C_{p_{wcm}}$ or $CP_i$<br>Specific Heat of WECM or fuel                            | 2,3,4,<br>5,83 | Monitoring Checklist                    | Yes / No | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|  |                | Title in line with methodology?         | NA       |                                     |                                     |
|  |                | Data unit correctly expressed?          | NA       |                                     |                                     |
|  |                | Appropriate description of parameter?   | NA       |                                     |                                     |
|  |                | Source clearly referenced?              | NA       |                                     |                                     |
|  |                | Correct value provided for estimation?  | NA       |                                     |                                     |
|  |                | Has this value been verified?           | NA       |                                     |                                     |
|  |                | Measurement method correctly described? | NA       |                                     |                                     |
|  |                | Correct reference to standards?         | NA       |                                     |                                     |
|  |                | Indication of accuracy provided?        | NA       |                                     |                                     |
|  |                | QA/QC procedures described?             | NA       |                                     |                                     |
|  |                | QA/QC procedures appropriate?           | NA       |                                     |                                     |
| B.7.1.27. Parameter Title: $t_{wcm,y}$<br>Average temperature of Waste Energy Carrying Medium (WECM) in year y | 2,3,4,<br>5,83 | Monitoring Checklist                    | Yes / No | CAR                                 | <input checked="" type="checkbox"/> |
|  |                | Title in line with methodology?         | No       |                                     |                                     |
|  |                | Data unit correctly expressed?          | No       |                                     |                                     |
|  |                | Appropriate description of parameter?   | No       |                                     |                                     |
|  |                | Source clearly referenced?              | No       |                                     |                                     |
|  |                | Correct value provided for estimation?  | No       |                                     |                                     |

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Project Title: Usage of waste gas at Namakwa Sands in South Africa.

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| CHECKLIST TOPIC / QUESTION   | Ref.       | COMMENTS   |  | PDD in GSP                    | Final PDD |   |    |                                 |    |                                       |                                     |                             |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |                                     |                                     |
|--|------------|--|--|-------------------------------|-----------|---|----|---------------------------------|----|---------------------------------------|-------------------------------------|-----------------------------|----|--|----|-------------------------------|----|---|----|---------------------------------|----|----------------------------------|----|-----------------------------|----|-------------------------------|----|-------------------------------------|-------------------------------------|
|  |            | <table><tr><td>Has this value been verified?</td><td>No</td></tr><tr><td>Measurement method correctly described?</td><td>No</td></tr><tr><td>Correct reference to standards?</td><td>No</td></tr><tr><td>Indication of accuracy provided?</td><td>No</td></tr><tr><td>QA/QC procedures described?</td><td>No</td></tr><tr><td>QA/QC procedures appropriate?</td><td>No</td></tr></table> <p>Project Proponent needs to refer CAR above in section B.7.1.29 and Table 2 of the protocol.</p>  |  | Has this value been verified? | No        | Measurement method correctly described? | No | Correct reference to standards? | No | Indication of accuracy provided?      | No                                  | QA/QC procedures described? | No | QA/QC procedures appropriate?          | No |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |                                     |                                     |
| Has this value been verified?  | No         |  |  |                               |           |   |    |                                 |    |                                       |                                     |                             |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |                                     |                                     |
| Measurement method correctly described?  | No         |  |  |                               |           |   |    |                                 |    |                                       |                                     |                             |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |                                     |                                     |
| Correct reference to standards?  | No         |  |  |                               |           |   |    |                                 |    |                                       |                                     |                             |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |                                     |                                     |
| Indication of accuracy provided?   | No         |  |  |                               |           |   |    |                                 |    |                                       |                                     |                             |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |                                     |                                     |
| QA/QC procedures described?  | No         |  |  |                               |           |   |    |                                 |    |                                       |                                     |                             |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |                                     |                                     |
| QA/QC procedures appropriate?  | No         |  |  |                               |           |   |    |                                 |    |                                       |                                     |                             |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |                                     |                                     |
| B.7.1.28. Parameter Title: $P_{WCM,y}$<br>Average pressure of WECM in year $y$ | 2,3,5,83   | <table><tr><th>Monitoring Checklist</th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td>NA</td></tr><tr><td>Data unit correctly expressed?</td><td>NA</td></tr><tr><td>Appropriate description of parameter?</td><td>NA</td></tr><tr><td>Source clearly referenced?</td><td>NA</td></tr><tr><td>Correct value provided for estimation?</td><td>NA</td></tr><tr><td>Has this value been verified?</td><td>NA</td></tr><tr><td>Measurement method correctly described?</td><td>NA</td></tr><tr><td>Correct reference to standards?</td><td>NA</td></tr><tr><td>Indication of accuracy provided?</td><td>NA</td></tr><tr><td>QA/QC procedures described?</td><td>NA</td></tr><tr><td>QA/QC procedures appropriate?</td><td>NA</td></tr></table> |  | Monitoring Checklist          | Yes / No  | Title in line with methodology?         | NA | Data unit correctly expressed?  | NA | Appropriate description of parameter? | NA                                  | Source clearly referenced?  | NA | Correct value provided for estimation? | NA | Has this value been verified? | NA | Measurement method correctly described? | NA | Correct reference to standards? | NA | Indication of accuracy provided? | NA | QA/QC procedures described? | NA | QA/QC procedures appropriate? | NA | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Monitoring Checklist   | Yes / No   |  |  |                               |           |   |    |                                 |    |                                       |                                     |                             |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |                                     |                                     |
| Title in line with methodology?  | NA         |  |  |                               |           |   |    |                                 |    |                                       |                                     |                             |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |                                     |                                     |
| Data unit correctly expressed?   | NA         |  |  |                               |           |   |    |                                 |    |                                       |                                     |                             |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |                                     |                                     |
| Appropriate description of parameter?  | NA         |  |  |                               |           |   |    |                                 |    |                                       |                                     |                             |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |                                     |                                     |
| Source clearly referenced?   | NA         |  |  |                               |           |   |    |                                 |    |                                       |                                     |                             |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |                                     |                                     |
| Correct value provided for estimation?   | NA         |  |  |                               |           |   |    |                                 |    |                                       |                                     |                             |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |                                     |                                     |
| Has this value been verified?  | NA         |  |  |                               |           |   |    |                                 |    |                                       |                                     |                             |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |                                     |                                     |
| Measurement method correctly described?  | NA         |  |  |                               |           |   |    |                                 |    |                                       |                                     |                             |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |                                     |                                     |
| Correct reference to standards?  | NA         |  |  |                               |           |   |    |                                 |    |                                       |                                     |                             |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |                                     |                                     |
| Indication of accuracy provided?   | NA         |  |  |                               |           |   |    |                                 |    |                                       |                                     |                             |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |                                     |                                     |
| QA/QC procedures described?  | NA         |  |  |                               |           |   |    |                                 |    |                                       |                                     |                             |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |                                     |                                     |
| QA/QC procedures appropriate?  | NA         |  |  |                               |           |   |    |                                 |    |                                       |                                     |                             |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |                                     |                                     |
| B.7.1.29. Parameter Title: $H_{WCM,y}$<br>Average enthalpy of WECM in year $y$ | 2,3,4,5,83 | <table><tr><th>Monitoring Checklist</th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td>NA</td></tr><tr><td>Data unit correctly expressed?</td><td>NA</td></tr></table>  |  | Monitoring Checklist          | Yes / No  | Title in line with methodology?         | NA | Data unit correctly expressed?  | NA | <input checked="" type="checkbox"/>   | <input checked="" type="checkbox"/> |                             |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |                                     |                                     |
| Monitoring Checklist   | Yes / No   |  |  |                               |           |   |    |                                 |    |                                       |                                     |                             |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |                                     |                                     |
| Title in line with methodology?  | NA         |  |  |                               |           |   |    |                                 |    |                                       |                                     |                             |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |                                     |                                     |
| Data unit correctly expressed?   | NA         |  |  |                               |           |   |    |                                 |    |                                       |                                     |                             |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |                                     |                                     |

Table 1 is applicable to ACM0012, ver 4

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|--|-------------|---|----|----------------------|-----------|---------------------------------|----|--------------------------------|----|---------------------------------------|-------|----------------------------|----|--|----|-------------------------------|----|---|----|---------------------------------|----|----------------------------------|----|-----------------------------|----|-------------------------------|----|---|---|
|  |             | Appropriate description of parameter?   | NA |                      |           |                                 |    |                                |    |                                       |       |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
|  |             | Source clearly referenced?  | NA |                      |           |                                 |    |                                |    |                                       |       |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
|  |             | Correct value provided for estimation?  | NA |                      |           |                                 |    |                                |    |                                       |       |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
|  |             | Has this value been verified?   | NA |                      |           |                                 |    |                                |    |                                       |       |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
|  |             | Measurement method correctly described?   | NA |                      |           |                                 |    |                                |    |                                       |       |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
|  |             | Correct reference to standards?   | NA |                      |           |                                 |    |                                |    |                                       |       |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
|  |             | Indication of accuracy provided?  | NA |                      |           |                                 |    |                                |    |                                       |       |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
|  |             | QA/QC procedures described?   | NA |                      |           |                                 |    |                                |    |                                       |       |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
|  |             | QA/QC procedures appropriate?   | NA |                      |           |                                 |    |                                |    |                                       |       |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| B.7.1.30.      Parameter Title: <b>ST<sub>whr, y</sub></b><br>energy content of the steam generated in waste heat recovery boiler fed to turbine via common steam header<br>(baseline emissions) | 2,3,4, 5,83 | <table><tr><th>Monitoring Checklist</th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td>NA</td></tr><tr><td>Data unit correctly expressed?</td><td>NA</td></tr><tr><td>Appropriate description of parameter?</td><td>NA</td></tr><tr><td>Source clearly referenced?</td><td>NA</td></tr><tr><td>Correct value provided for estimation?</td><td>NA</td></tr><tr><td>Has this value been verified?</td><td>NA</td></tr><tr><td>Measurement method correctly described?</td><td>NA</td></tr><tr><td>Correct reference to standards?</td><td>NA</td></tr><tr><td>Indication of accuracy provided?</td><td>NA</td></tr><tr><td>QA/QC procedures described?</td><td>NA</td></tr><tr><td>QA/QC procedures appropriate?</td><td>NA</td></tr></table> <p>To be checked and verified during site visit.</p> |    | Monitoring Checklist | Yes / No  | Title in line with methodology? | NA | Data unit correctly expressed? | NA | Appropriate description of parameter? | NA    | Source clearly referenced? | NA | Correct value provided for estimation? | NA | Has this value been verified? | NA | Measurement method correctly described? | NA | Correct reference to standards? | NA | Indication of accuracy provided? | NA | QA/QC procedures described? | NA | QA/QC procedures appropriate? | NA | ☑ | ☑ |
| Monitoring Checklist   | Yes / No    |   |    |                      |           |                                 |    |                                |    |                                       |       |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Title in line with methodology?  | NA          |   |    |                      |           |                                 |    |                                |    |                                       |       |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Data unit correctly expressed?   | NA          |   |    |                      |           |                                 |    |                                |    |                                       |       |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Appropriate description of parameter?  | NA          |   |    |                      |           |                                 |    |                                |    |                                       |       |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Source clearly referenced?   | NA          |   |    |                      |           |                                 |    |                                |    |                                       |       |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Correct value provided for estimation?   | NA          |   |    |                      |           |                                 |    |                                |    |                                       |       |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Has this value been verified?  | NA          |   |    |                      |           |                                 |    |                                |    |                                       |       |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Measurement method correctly described?  | NA          |   |    |                      |           |                                 |    |                                |    |                                       |       |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Correct reference to standards?  | NA          |   |    |                      |           |                                 |    |                                |    |                                       |       |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Indication of accuracy provided?   | NA          |   |    |                      |           |                                 |    |                                |    |                                       |       |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| QA/QC procedures described?  | NA          |   |    |                      |           |                                 |    |                                |    |                                       |       |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| QA/QC procedures appropriate?  | NA          |   |    |                      |           |                                 |    |                                |    |                                       |       |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| B.7.1.31.      Parameter Title: <b>ST<sub>other, y</sub></b><br>energy content of the steam generated in other boilers fed to turbine via common steam header<br>(baseline emissions)            | 2,3,4, 5,83 | <table><tr><th>Monitoring Checklist</th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td>NA</td></tr><tr><td>Data unit correctly expressed?</td><td>NA</td></tr></table>   |    | Monitoring Checklist | Yes / No  | Title in line with methodology? | NA | Data unit correctly expressed? | NA | ☑                                     | 2,3,4 |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Monitoring Checklist   | Yes / No    |   |    |                      |           |                                 |    |                                |    |                                       |       |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Title in line with methodology?  | NA          |   |    |                      |           |                                 |    |                                |    |                                       |       |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Data unit correctly expressed?   | NA          |   |    |                      |           |                                 |    |                                |    |                                       |       |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |

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|--|-------------|--|----|----------------------|-----------|---------------------------------|----|--------------------------------|----|---------------------------------------|----|----------------------------|----|--|----|-------------------------------|----|---|----|---------------------------------|----|----------------------------------|----|-----------------------------|----|-------------------------------|----|---|---|
|  |             | Appropriate description of parameter?  | NA |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
|  |             | Source clearly referenced?   | NA |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
|  |             | Correct value provided for estimation?   | NA |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
|  |             | Has this value been verified?  | NA |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
|  |             | Measurement method correctly described?  | NA |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
|  |             | Correct reference to standards?  | NA |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
|  |             | Indication of accuracy provided?   | NA |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
|  |             | QA/QC procedures described?  | NA |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
|  |             | QA/QC procedures appropriate?  | NA |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| B.7.1.32. Parameter Title: <b>EF</b> <sub>heat, j, y</sub><br>CO2 emission factor of the heat source that would have supplied the recipient plant j in absence of the project activity, expressed in tCO2/TJ<br>(baseline emissions) | 2,3,4, 5,83 | <table><tr><th>Monitoring Checklist</th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td>NA</td></tr><tr><td>Data unit correctly expressed?</td><td>NA</td></tr><tr><td>Appropriate description of parameter?</td><td>NA</td></tr><tr><td>Source clearly referenced?</td><td>NA</td></tr><tr><td>Correct value provided for estimation?</td><td>NA</td></tr><tr><td>Has this value been verified?</td><td>NA</td></tr><tr><td>Measurement method correctly described?</td><td>NA</td></tr><tr><td>Correct reference to standards?</td><td>NA</td></tr><tr><td>Indication of accuracy provided?</td><td>NA</td></tr><tr><td>QA/QC procedures described?</td><td>NA</td></tr><tr><td>QA/QC procedures appropriate?</td><td>NA</td></tr></table> To be checked and verified during site visit. |    | Monitoring Checklist | Yes / No  | Title in line with methodology? | NA | Data unit correctly expressed? | NA | Appropriate description of parameter? | NA | Source clearly referenced? | NA | Correct value provided for estimation? | NA | Has this value been verified? | NA | Measurement method correctly described? | NA | Correct reference to standards? | NA | Indication of accuracy provided? | NA | QA/QC procedures described? | NA | QA/QC procedures appropriate? | NA | ☑ | ☑ |
| Monitoring Checklist   | Yes / No    |  |    |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Title in line with methodology?  | NA          |  |    |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Data unit correctly expressed?   | NA          |  |    |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Appropriate description of parameter?  | NA          |  |    |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Source clearly referenced?   | NA          |  |    |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Correct value provided for estimation?   | NA          |  |    |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Has this value been verified?  | NA          |  |    |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Measurement method correctly described?  | NA          |  |    |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Correct reference to standards?  | NA          |  |    |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Indication of accuracy provided?   | NA          |  |    |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| QA/QC procedures described?  | NA          |  |    |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| QA/QC procedures appropriate?  | NA          |  |    |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| B.7.1.33. Parameter Title:<br>steam flow rate  | 2,3,4, 5,83 | <table><tr><th>Monitoring Checklist</th><th>Yes / No</th></tr><tr><td>Title in line with methodology?</td><td>NA</td></tr><tr><td>Data unit correctly expressed?</td><td>NA</td></tr></table>  |    | Monitoring Checklist | Yes / No  | Title in line with methodology? | NA | Data unit correctly expressed? | NA | ☑                                     | ☑  |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Monitoring Checklist   | Yes / No    |  |    |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Title in line with methodology?  | NA          |  |    |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |
| Data unit correctly expressed?   | NA          |  |    |                      |           |                                 |    |                                |    |                                       |    |                            |    |  |    |                               |    |   |    |                                 |    |                                  |    |                             |    |                               |    |   |   |

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| CHECKLIST TOPIC / QUESTION   | Ref.           | COMMENTS                                |          | PDD in GSP | Final PDD |
|--|----------------|---|----------|------------|-----------|
|  |                | Appropriate description of parameter?   | NA       |            |           |
|  |                | Source clearly referenced?              | NA       |            |           |
|  |                | Correct value provided for estimation?  | NA       |            |           |
|  |                | Has this value been verified?           | NA       |            |           |
|  |                | Measurement method correctly described? | NA       |            |           |
|  |                | Correct reference to standards?         | NA       |            |           |
|  |                | Indication of accuracy provided?        | NA       |            |           |
|  |                | QA/QC procedures described?             | NA       |            |           |
|  |                | QA/QC procedures appropriate?           | NA       |            |           |
| B.7.1.34. Parameter Title:<br>pressure of steam                      | 2,3,4,<br>5,83 |   |          | ☑          | ☑         |
|  |                | Monitoring Checklist                    | Yes / No |            |           |
|  |                | Title in line with methodology?         | NA       |            |           |
|  |                | Data unit correctly expressed?          | NA       |            |           |
|  |                | Appropriate description of parameter?   | NA       |            |           |
|  |                | Source clearly referenced?              | NA       |            |           |
|  |                | Correct value provided for estimation?  | NA       |            |           |
|  |                | Has this value been verified?           | NA       |            |           |
|  |                | Measurement method correctly described? | NA       |            |           |
|  |                | Correct reference to standards?         | NA       |            |           |
|  |                | Indication of accuracy provided?        | NA       |            |           |
|  |                | QA/QC procedures described?             | NA       |            |           |
|  |                | QA/QC procedures appropriate?           | NA       |            |           |
| B.7.1.35. Parameter Title:<br>temperature of steam/hot water/hot oil | 2,3,4,<br>5,83 |   |          | ☑          | ☑         |
|  |                | Monitoring Checklist                    | Yes / No |            |           |
|  |                | Title in line with methodology?         | NA       |            |           |
|  |                | Data unit correctly expressed?          | NA       |            |           |
|  |                | Appropriate description of parameter?   | NA       |            |           |

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| CHECKLIST TOPIC / QUESTION  | Ref.        | COMMENTS                                |          | PDD in GSP                          | Final PDD                           |
|---|-------------|---|----------|-------------------------------------|-------------------------------------|
|   |             | Source clearly referenced?              | NA       |                                     |                                     |
|   |             | Correct value provided for estimation?  | NA       |                                     |                                     |
|   |             | Has this value been verified?           | NA       |                                     |                                     |
|   |             | Measurement method correctly described? | NA       |                                     |                                     |
|   |             | Correct reference to standards?         | NA       |                                     |                                     |
|   |             | Indication of accuracy provided?        | NA       |                                     |                                     |
|   |             | QA/QC procedures described?             | NA       |                                     |                                     |
|   |             | QA/QC procedures appropriate?           | NA       |                                     |                                     |
| B.7.1.36. Parameter Title: $n_{BL,t}$<br>efficiency of element process/captive power plant/cogeneration plant during time interval t where t is a discrete time interval during the year y (baseline emissions) | 2,3,4, 5,83 | Monitoring Checklist                    | Yes / No | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|   |             | Title in line with methodology?         | NA       |                                     |                                     |
|   |             | Data unit correctly expressed?          | NA       |                                     |                                     |
|   |             | Appropriate description of parameter?   | NA       |                                     |                                     |
|   |             | Source clearly referenced?              | NA       |                                     |                                     |
|   |             | Correct value provided for estimation?  | NA       |                                     |                                     |
|   |             | Has this value been verified?           | NA       |                                     |                                     |
|   |             | Measurement method correctly described? | NA       |                                     |                                     |
|   |             | Correct reference to standards?         | NA       |                                     |                                     |
|   |             | Indication of accuracy provided?        | NA       |                                     |                                     |
|   |             | QA/QC procedures described?             | NA       |                                     |                                     |
|   |             | QA/QC procedures appropriate?           | NA       |                                     |                                     |
| B.7.1.37. Parameter Title: $\eta_{\text{project plant},j}$<br>Efficiency is the overall efficiency of the new electricity generating plant (%) in year y  | 2,3,4, 5,83 | Monitoring Checklist                    | Yes / No | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|   |             | Title in line with methodology?         | A        |                                     |                                     |
|   |             | Data unit correctly expressed?          | A        |                                     |                                     |
|   |             | Appropriate description of parameter?   | NA       |                                     |                                     |
|   |             | Source clearly referenced?              | NA       |                                     |                                     |

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| CHECKLIST TOPIC / QUESTION   | Ref.       | COMMENTS  |          | PDD in GSP                          | Final PDD                           |
|--|------------|---|----------|-------------------------------------|-------------------------------------|
|  |            | Correct value provided for estimation?  | NA       |                                     |                                     |
|  |            | Has this value been verified?   | NA       |                                     |                                     |
|  |            | Measurement method correctly described?   | NA       |                                     |                                     |
|  |            | Correct reference to standards?   | NA       |                                     |                                     |
|  |            | Indication of accuracy provided?  | NA       |                                     |                                     |
|  |            | QA/QC procedures described?   | NA       |                                     |                                     |
|  |            | QA/QC procedures appropriate?   | NA       |                                     |                                     |
| B.7.1.38. Parameter Title: <b>EC</b> $P_{J,import,i,y}$<br>Quantity of import electricity from source $i$ consumed replacing captive electricity generated in the absence of the project activity during year $y$ in MWh | 2,3,4,5,83 | Monitoring Checklist  | Yes / No | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|  |            | Title in line with methodology?   | NA       |                                     |                                     |
|  |            | Data unit correctly expressed?  | NA       |                                     |                                     |
|  |            | Appropriate description of parameter?   | NA       |                                     |                                     |
|  |            | Source clearly referenced?  | NA       |                                     |                                     |
|  |            | Correct value provided for estimation?  | NA       |                                     |                                     |
|  |            | Has this value been verified?   | NA       |                                     |                                     |
|  |            | Measurement method correctly described?   | NA       |                                     |                                     |
|  |            | Correct reference to standards?   | NA       |                                     |                                     |
|  |            | Indication of accuracy provided?  | NA       |                                     |                                     |
|  |            | QA/QC procedures described?   | NA       |                                     |                                     |
|  |            | QA/QC procedures appropriate?   | NA       |                                     |                                     |
| <b>B.7.2. Description of the monitoring plan</b>   |            |   |          |                                     |                                     |
| B.7.2.1. Is the operational and management structure clearly described and in compliance with the envisioned situation?  | 2,3,4,5,83 | <b>Clarification Request No. 22.</b><br>Project Proponent needs to submit the operation and management control procedure of the plant to verify the details mentioned under the monitoring plan of the project activity.<br>Also, clarify the emergency preparedness and document archiv- |          | CR                                  | <input checked="" type="checkbox"/> |



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| CHECKLIST TOPIC / QUESTION   | Ref.        | COMMENTS   | PDD in GSP                          | Final PDD                           |
|--|-------------|--|-------------------------------------|-------------------------------------|
|  |             | ing procedure in the PDD.  |                                     |                                     |
| B.7.2.2. Are responsibilities and institutional arrangements for data collection and archiving clearly provided?   | 2,3,4, 5,83 | Project Proponent needs to refer above CR in section B.7.2.1   | CR                                  | <input checked="" type="checkbox"/> |
| B.7.2.3. Does the monitoring plan provide current good monitoring practice?  | 2,3,4, 5,83 | Project Proponent needs to refer above CR in section b.7.2.1.  | CR                                  | <input checked="" type="checkbox"/> |
| B.7.2.4. If applicable: Does annex 4 provide useful information enabling a better understanding of the envisioned monitoring provisions?   | 2,3,4, 5,83 | Project Proponent needs to refer above CR in section B.7.2.1.  | CR                                  | <input checked="" type="checkbox"/> |
| <b>B.8. Date of completion of the application of the baseline study and monitoring methodology an the name of the responsible person(s)/entity(ies)</b>                              |             |  |                                     |                                     |
| B.8.1.1. Is there any indication of a date when the baseline was determined?   | 2,,5,8 3    | Yes, date has been mentioned in the PDD. The baseline and monitoring study were completed 11/11/2010                 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| B.8.1.2. Is this consistent with the time line of the PDD history?   | 2,5,83      | Yes, it is.  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| B.8.1.3. Is the information on the person(s) / entity(ies) responsible for the application of the baseline and monitoring methodology provided consistent with the actual situation? | 2,,5,8 3    | Yes, Promethium Carbon (Pty) Ltd. Is the responsible for the application of the baseline and monitoring information. | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| B.8.1.4. Is information provided whether this person / entity is also considered a project participant?  | 2,5,83      | Yes, a statement is mentioned in the PDD which clarifies that entity is not the project participant.                 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |

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| CHECKLIST TOPIC / QUESTION  | Ref.        | COMMENTS  | PDD in GSP                          | Final PDD                           |
|---|-------------|---|-------------------------------------|-------------------------------------|
| <b>C. Duration of the project activity / crediting period</b>   |             |   |                                     |                                     |
| <b>C.1. Duration of the project activity</b>  |             |   |                                     |                                     |
| C.1.1. Are the project's starting date and operational lifetime clearly defined and reasonable?   | 2,,5,8<br>3 | <p>According to PDD, project starting date is 31/03/2011 and the operational lifetime of the project activity is expected to be 15 yrs.</p> <p><b><u>Clarification Request No. 23.</u></b></p> <p>Project Proponent needs to provide the supportive to verify the starting date. Also, ensure that the starting date should be in line with EB 41 para 67.</p> <p>Also the MoU for the construction was signed on 11<sup>th</sup> April 2008 with 'Group Energy Five', why this is not being considered as the starting date of the project activity, Project Proponent needs to clarify.</p> <p><b><u>Clarification Request No. 24.</u></b></p> <p>Why holding company cost are caused due to the CDM project?</p> <p>Also, IRR is negative with and without CDM revenue then why project proponent will continue this project? Clarify.</p> | CR                                  | <input checked="" type="checkbox"/> |
| <b>C.2. Choice of the crediting period and related information</b>  |             |   |                                     |                                     |
| C.2.1. Is the assumed crediting time clearly defined and reasonable (renewable crediting period of max 7 years with potential for 2 renewals or fixed crediting period of max. 10 years)? | 2,5,83      | <p>Yes, fixed crediting period of 10 years has been chosen and defined in the PDD.</p>  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |

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| CHECKLIST TOPIC / QUESTION   | Ref.    | COMMENTS  | PDD in GSP                          | Final PDD                           |
|--|---------|---|-------------------------------------|-------------------------------------|
| <b>D. Environmental impacts</b>  |         |   |                                     |                                     |
| <b>D.1. Documentation on the analysis of the environmental impacts, including transboundary impacts</b>  |         |   |                                     |                                     |
| D.1.1. Has the analysis of the environmental impacts of the project activity been sufficiently described?  | 2,5,83  | Yes.  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| D.1.2. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, has an EIA been approved?   | 2,,5,83 | As per EIA regulation 2006, project proponent has conducted basic environment assessment. | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| D.1.3. Will the project create any adverse environmental effects?  | 2,5,83  | Project is not expected to create any adverse environmental effects                       | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| D.1.4. Were transboundary environmental impacts identified in the analysis?  | 2,5,83  | No transboundary environment impacts are anticipated.                                     | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| <b>D.2. If environmental impacts are considered significant by the project participants or the host Party, Project Proponent needs to provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party</b> |         |   |                                     |                                     |
| D.2.1. Have the identified environmental impacts been addressed in the project design sufficiently?  | 25,83   | Yes, the impacts in project scenarios have been considered.                               | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| D.2.2. Does the project comply with environmental legislation in the host country?   | 2,5,83  | Yes   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |

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| CHECKLIST TOPIC / QUESTION  | Ref.             | COMMENTS   | PDD in GSP | Final PDD                           |
|---|------------------|--|------------|-------------------------------------|
| <b>E. Stakeholders' comments</b>  |                  |  |            |                                     |
| <b>E.1. Brief description how comments by local stakeholders have been invited and compiled</b>   |                  |  |            |                                     |
| E.1.1. Have relevant stakeholders been consulted?   | 2,3,4,5,43,44,83 | <b><u>Corrective Action Request No.21.</u></b><br>Project Proponent needs to clarify who are the interested and affected parties of the project activity?  | CAR        | <input checked="" type="checkbox"/> |
| E.1.2. Have appropriate media been used to invite comments by local stakeholders?   | 25,43,44,83      | Project Proponent needs to refer above CAR comment in section E.1.1.   | CAR        | <input checked="" type="checkbox"/> |
| E.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? | 2,5,43,44,83     | <b><u>Corrective Action Request No.22.</u></b><br>Project Proponent needs to include a statement which will clarify any stakeholder consultation is required or not by regulations/laws in the host country. | CAR        | <input checked="" type="checkbox"/> |
| E.1.4. Is the undertaken stakeholder process that was carried out described in a complete and transparent manner?   | 2,5,43,44,83     | Project Proponent needs to refer above CAR comment in section E.1.3.   | CAR        | <input checked="" type="checkbox"/> |
| <b>E.2. Summary of the comments received</b>  |                  |  |            |                                     |
| E.2.1. Is a summary of the received stakeholder comments provided?  | 2,5,43,44,83     | Project Proponent needs to refer CAR in section E.1.3  | CAR        | <input checked="" type="checkbox"/> |
| <b>E.3. Report on how due account was taken of any comments received</b>  |                  |  |            |                                     |
| E.3.1. Has due account been taken of any stake-   | 2,5,43           | Project Proponent needs to refer above CAR comment in E.1.3.   | CAR        | <input checked="" type="checkbox"/> |

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| CHECKLIST TOPIC / QUESTION   | Ref.        | COMMENTS  | PDD in GSP                          | Final PDD                           |
|--|-------------|---|-------------------------------------|-------------------------------------|
| holder comments received?  | ,<br>44,83  |   |                                     |                                     |
| <b>F. Annexes 1 – 4</b>  |             |   |                                     |                                     |
| <b>F.1. Annex 1: Contact Information</b>   |             |   |                                     |                                     |
| F.1.1. Is the information provided consistent with the one given under section A.3?  | 2,,5,8<br>3 | Yes   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| F.1.2. Is the information on all private participants and directly involved Parties presented?   | 2,,5,8<br>3 | Yes, all information has been presented.                                  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| <b>F.2. Annex 2: Information regarding public funding</b>  |             |   |                                     |                                     |
| F.2.1. Is the information provided on the inclusion of public funding (if any) in consistency with the actual situation presented by the project participants? | 2,5,83      | Project Proponent needs to refer above CR comment in section B.5          | CR                                  | <input checked="" type="checkbox"/> |
| F.2.2. If necessary: Is an affirmation available that any such funding from Annex-I-countries does not result in a diversion of ODA?                           | 2,5,83      | Project Proponent needs to refer above CR comment to section B.5          | CR                                  | <input checked="" type="checkbox"/> |
| <b>F.3. Annex 3: Baseline information</b>  |             |   |                                     |                                     |
| F.3.1. If additional background information on baseline data is provided: Is this information consistent with data presented by other sections of the PDD?     | 2,5,83      | Project Proponent needs to refer CAR and CR comments given in section B.2 | CAR<br>CR                           | <input checked="" type="checkbox"/> |
| F.3.2. If additional background information on baseline data is provided: Is this information consistent with data presented by other sec-                     | 2,5,83      | Project Proponent needs to refer CAR and CR comments given in section B.2 | CAR<br>CR                           | <input checked="" type="checkbox"/> |

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| CHECKLIST TOPIC / QUESTION  | Ref.        | COMMENTS  | PDD in GSP | Final PDD                           |
|---|-------------|---|------------|-------------------------------------|
| tions of the PDD?   |             |   |            |                                     |
| F.3.3. Is the data provided verifiable? Has sufficient evidence been provided to the validation team?   | 2,5,83      | Project Proponent needs to refer CAR and CR comments given in section B.2 | CAR        | <input checked="" type="checkbox"/> |
| F.3.4. Does the additional information substantiate / support statements given in other sections of the PDD?  | 2,5,83      | Project Proponent needs to refer CAR and CR comments given in section B.2 | CAR        | <input checked="" type="checkbox"/> |
| <b>F.4. Annex 4: Monitoring information</b>   |             |   |            |                                     |
| F.4.1. If additional background information on monitoring is provided: Is this information consistent with data presented in other sections of the PDD? | 2,3,4, 5,83 | Project Proponent needs to refer above CAR and CR comment in section B.7  | CAR<br>CR  | <input checked="" type="checkbox"/> |
| F.4.2. Is the information provided verifiable? Has sufficient evidence been provided to the validation team?  | 2,3,4, 5,83 | Project Proponent needs to refer above CAR and CR comment in section B.7  | CAR<br>CR  | <input checked="" type="checkbox"/> |
| F.4.3. Do the additional information and / or documented procedures substantiate / support statements given in other sections of the PDD?               | 2,3,4, 5,83 | Project Proponent needs to refer above CAR and CR comment in section B.7  | CAR<br>CR  | <input checked="" type="checkbox"/> |

**Table 2 Resolution of Corrective Action and Clarification Requests**

| Clarifications and corrective action re-quests by validation team | Ref. to table 1 | Summary of project owner response                      | Validation team Conclusion        |
|---|-----------------|--|-----------------------------------|
| <b><u>Corrective Action Request No.1.</u></b>                     | A.1.2.          | Further details, pertaining to points (a) to (b), have | 1. Project proponent has included |

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|   |         |  |  |
|---|---------|--|--|
| <p>More transparency is required on following points of the project activity under section A.2.:</p> <p>(a) Current status of the project activity which would include expected commissioning date of the project activity.</p> <p>(b) Generation equipments capacity of the project activity</p> |         | <p>been included in section A.2 of the revised PDD.</p>  | <p>a timeline of the project in section A.2 of the revised PDD. The expected commissioning date is 01/01/2013</p> <p>2. Rated capacity of the each combustion engine is 1698 kW according to the technical specification provide by GE Jenbacher for a combustion engine.</p> <p>Eight internal combustion engines will be installed in the project activity. Therefore, at the completion of the project, the engines will displace a guaranteed 13.6 MW of electricity. Same is now clarified in the PDD.</p> <p>Above issues are now resolved.<br/>(IRL 5, IRL 10, IRL 11, IRL 13, IRL 15, IRL 16, IRL 17, IRL 31, IRL 45, IRL 72,)<br/><input checked="" type="checkbox"/></p> |
| <p><b><u>Corrective Action Request No.2.</u></b></p> <p>Project Proponent needs to ensure that name of "Exxaro resources Ltd" is being consistent throughout PDD.</p>   | A.1.2.  | <p>The name 'Exxaro Resources Ltd' is consistent throughout the revised PDD.</p>   | <p>Exxaro Resources name is now consistent throughout the PDD. This issue is now resolved.<br/>(IRL5 and IRL 83)<br/><input checked="" type="checkbox"/></p>   |
| <p><b><u>Corrective Action Request No.3.</u></b></p> <p>Project Proponent needs to include a process flow diagram of the project activity including equipment position</p>  | A.4.3.2 | <p>A process flow diagram has been included in section A.4.3 of the revised PDD.</p> <p>The furnaces were built by Aesa Brown Boveri. This</p> | <p>A clear process flow diagram (fig 4 of the PDD) of the project activity has now been included in the project activ-</p>   |

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| <p>in the process.</p> <p>Also, indicate the manufacturer name with technical details of the furnace. Also, provide the supportive to verify the same and indicated gas composition details of the furnace off gas.</p> <p>Further, provide the supportive to verify the mentioned volume of gas availability details and ensure that the volume amount should be average of last 3 years of gas available value.</p> <p>Furthermore, thermal process of the project activity is not clearly described in section A.4.3 of the PDD. Project Proponent needs to include.</p> |        | <p>technical information has been included in the revised PDD.</p> <p>Project Proponent needs to refer to the consolidated emission reduction spreadsheet (that has been sent together with this document) for the supportive of gas availability details.</p> <p>No longer applicable – the use of waste gas for thermal energy has been excluded from the project activity.</p> | <p>ity.</p> <ul style="list-style-type: none"> <li>The manufacturer name of the both furnaces is Aesa Brown Boveri (ABB). Also included the capacity of the furnaces which has been verified by DOE with the technical specification of the furnaces.</li> <li>Project proponent has submitted consolidated emission reduction spreadsheet. The energy balance of the project has been calculated as per applied methodology. Plant data which has used for energy balance calculation has confirmed by ADC (Pty) Ltd. (ECSA no. 20030135)</li> <li>Since thermal energy portion has been excluded from the project activity boundary therefore issue raised on thermal process is no longer relevant for the project.</li> </ul> <p>All above issues are now resolved.<br/>(IRL 5, IRL 9, IRL 36, IRL 45 and IRL 71)</p> <p><input checked="" type="checkbox"/></p> |
| <p><b><u>Corrective Action Request No.4.</u></b></p> <p>Project proponent should have revised the project according to version 04 of ACM0012 as version 3.2 is not valid for request for registra-</p>  | B.1.2. | <p>Project has been updated according to version.04 of the methodology.</p>   | <p>Project proponent has now been revised the project according to the version .04 of the ACM0012. This issue is now closed.</p>   |

Table 1 is applicable to ACM0012, ver 4



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| tion submission.   |        |   | ( IRL4,IRL 5 and IRL 83)<br><input checked="" type="checkbox"/>  |
| <b><u>Corrective Action Request No.5.</u></b><br>Project activity will utilize furnace off gas for electricity generation and for material heating purpose in the dryer. However, it is not transparently described under which energy source criteria (Cogeneration, generation of electricity, direct use of process heat, generation of heat in the element process). | B.2.2. | The waste energy is an energy source for the generation of electricity. This has been transparently described in item 1 of the table in section B.2 of the revised PDD.   | The waste energy of the furnace off gas will be used for electricity generation. This is now clarified in the PDD. This issue is now resolved.<br>(IRL 5, IRL18 and IRL 83)<br><input checked="" type="checkbox"/>                                       |
| <b><u>Corrective Action Request No.6.</u></b><br>Project Proponent needs to justify the reasons where gases and sources are excluded in the table.   | B.3.2. | The table in section B.3 has been revised to match methodology ACM0012. The reasons as to why gases and sources are excluded have been justified in the revised PDD.  | Project proponent has explained the reason of included and excluded gases in the table 1 of the PDD. This issue is now resolved.<br>(IRL 4, IRL 5, IRL 18 and IRL 83)<br><input checked="" type="checkbox"/>   |
| <b><u>Corrective Action Request No.7.</u></b><br>PDD stated "The availability of these fossil fuels is also limited. For example, natural gas and coal are not available in the vicinity of the proposed project activity (Western Cape Province)." Project Proponent needs to indicate the source which can support this statement.                                     | B.4.6. | <i>Natural gas</i><br><br>Reference document: ' Gas supply in South Africa'. This is an article that appeared in the magazine 'Energy Efficiency Made Simple' and describes the natural gas supply in South Africa. Please refer to page 59 paragraph 4 of the article. It states that 'Sasol Gas has | The submitted supportive documents are clearly demonstrating that the natural gas and coal is not available in the vicinity of the proposed project activity.<br>This issue is now closed.<br>(IRL 51 and IRL 52)<br><input checked="" type="checkbox"/> |

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|  |  | <p>been importing natural gas from....Mozambique...to Secunda in the Mpumalanga province of South Africa. About half of this gas is converted to liquid fuels and chemicals at Secunda, and at Sasolburg in the Free State province. The other half is distributed to...the province of Gauteng'. No gas is exported to the Western Cape Province, the location of the project activity. This supports the statement that natural gas is not available in the vicinity of the proposed project activity.</p> <p>The reference for this article has also been included as a footnote in section B.4 of the PDD.</p> <p><i>Coal</i></p> <p>Reference document: 'Coal reserve distribution in South Africa'. This is a journal article on the characterisation of coal reserves in South Africa. Page 96 Figure 1 of the article shows a map of coalfields in the county. It can be seen that the coalfields are located in the eastern part of the country, whilst the project activity is located on the west coast. Furthermore, on page 95 paragraph 2 of the article, it states that 'coal is found in South Africa in 19 coalfields, located mainly in KwaZulu-Natal, Mpumalanga, Limpopo, and the Free State, with lesser amounts in Gauteng, the North</p> |  |
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|   |        | <p>West Province and the Eastern Cape'. The Western Cape Province (the location of the project activity) is not mentioned as having any coalfields. This supports the statement that coal is not available in the vicinity of the proposed project activity.</p> <p>The reference for this journal article has also been included as a footnote in section B.4 of the PDD.</p>  |  |
| <p><b><u>Corrective Action Request No.8.</u></b></p> <p>Project has not justified baseline scenario thorough matrix approach required as per applied methodology. Project Proponent needs to justify.</p> | B.4.9. | <p>The baseline scenario has been included in a table under Step 4 of section B.4, as per Table 2 in methodology ACM0012.</p>   | <p>The baseline scenario of the project activity has now been justified through matrix approach of the applied methodology.</p> <p>This issue is now resolved.<br/>(IRL4, IRL 5 and IRL 83)</p> <p><input checked="" type="checkbox"/></p>   |
| <p><b><u>Corrective Action Request No.9.</u></b></p> <p>Project Proponent needs to indicate the benchmark value and its source transparently in the PDD.</p>  | B.5.5. | <p>According to paragraph 15 of the 'Guidelines on the assessment of investment analysis' (Version 05), the values in the table in appendix A may also be used, as a simple default option, if a company internal benchmark is used. This project activity falls under both project categories 'Group 1' (10.9%) and 'Group 2' (11.9%) as ACM0012 is written for sectoral scopes 1 (Energy Industries) and 4 (Manufacturing Industries).</p> <p>The project participant then chose to select an average benchmark between project categories 'Group 1' and 'Group 2', making the real after tax expected return on equity in South Africa is 11.4%.</p> | <p>The benchmark of the project activity has been taken by PP according to the "Guideline of the assessment of the investment analysis" (version.05), EB 62. Since project falls under sectoral scope 1&amp;2 therefore project proponent has been taken average benchmark value 11.4% of the sectoral scope 2 in the project. It can be accepted as this benchmark value came from the default value of the above guidance.</p> |

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|  |        |   | <p>This issue is now resolved.<br/>(IRL # 53, IRL 64, IRL 65, IRL 66, IRL 67, IRL 73, IRL 78, IRL82 and IRL83)<br/>☑</p>  |
| <p><b><u>Corrective Action Request No.10.</u></b><br/>Project proponent needs to justify the sensitive analysis of the project activity in line with EB 51 Annex 58 para 17 &amp; 18.<br/>Further, how EURO conversion is being considered a scenario under sensitivity analysis as the same is not directly related to project activity? Project Proponent needs to clarify.<br/>Project proponent has been considered Group five values in the IRR calculation sheet. Contract with Group five has already been terminated then why DOE will accept their document to verify the capital cost of the project? Also see comments in ER sheet.</p> | B.5.5. | <p>The sensitivity analysis in the revised PDD is in line with EB 51 Annex 58 paragraph 17 &amp;18.</p> <p>The Euro conversion has been removed from the sensitivity analysis in the revised PDD. The analysis has, instead, been performed on the individual variables that constitute more than 20% of the total project cost and project revenues (as per EB 51 Annex 58). These variables are:</p> <ul style="list-style-type: none"> <li>• Capital expenditure; and</li> <li>• GE Jenbacher engine preventative maintenance.</li> <li>• electricity generation,</li> <li>• electricity price and</li> <li>• .</li> </ul> <p>The initial MoU served as a basis for a potential future</p> | <p>Project proponent has demonstrated the sensitivity analysis of the project activity according to Annex 58 para 17 &amp; 18 of EB 51. Sensitivity analysis has been shown on the following variables</p> <ul style="list-style-type: none"> <li>• Capital expenditure; and</li> <li>• GE Jenbacher engine preventative maintenance.</li> <li>• electricity generation,</li> <li>• electricity price and</li> <li>•</li> </ul> <p>Also, EURO conversion has now been removed from the sensitivity analysis. Further, project proponent was signed MoU with group five companies for future contract of the project activity. Though MoU was expired but PP has approved the project based on the</p> |

Table 1 is applicable to ACM0012, ver 4

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|   |        |   |  |
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|   |        | <p>contract between Exxaro Resources Ltd and Group Five. This MoU has since expired and Exxaro Resources Ltd is in the process of negotiating a new contract with Group Five. The new contract is based on the quotation that was received for project implementation. For this reason, the Group Five capital cost of the project is the correct and relevant value to use. The Board of Directors of Exxaro Resources Limited approved this project on 17/08/2011, and their approval was based on this quotation. Please refer to the resolution of that board decision: 'Board approval'.</p> <p>Also, a letter from a registered chartered account in South Africa (with registration number 00297105) has submitted which states the following: 'We (Aurco) scrutinised the Board Resolution, together with project costing. We hereby confirm that the board considered the Group five costs, together with other costs, when they approved the project'</p> | <p>quotation received from the group five company. Same has been verified with board approval copy and also confirmed by the independent chartered accountant firm (Aurco).</p> <p>This issue is now resolved.</p> <p>(IRL 53, IRL 64, IRL 65, IRL 66, IRL 67, IRL 73, IRL 78, IRL 82 and IRL 83)</p> <p>☑</p>                                   |
| <p><b><u>Corrective Action Request No.11.</u></b></p> <p>Project proponent needs to further justify barriers of the project activity in line with Annex-13 of EB 50 and also provide the supportive to verify the barriers.</p> | B.5.8. | <p>The barrier analysis has been removed from the revised PDD. The additionality of the project is demonstrated by an investment analysis alone. This is still in line with the 'Tool for the demonstration and assessment of additionality' (Version 06).</p>  | <p>The barriers of the project activity have now been removed in the revised PDD and demonstrated the additionality of the project as per Tool for the demonstration and assessment of additionality' (Version 06).</p> <p>This issue is now resolved.</p> <p>(IRL 4, IRL 5, IRL 53, IRL 64, IRL 65, IRL 66, IRL 67, IRL 73, IRL 78, and IRL</p> |

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|   |          |   | 82)<br><input checked="" type="checkbox"/>   |
| <b><u>Corrective Action Request No.12.</u></b><br>Project Proponent needs to include the information about the other projects which are similar to the project activity in Step 4a of the PDD             | B.5.11.  | This has been included in section B.5 of the revised PDD, and elaborated upon below.<br><br>Please refer to 'Electro smelting of ilmenite for production of TiO <sub>2</sub> slag – potential of India as a global player'. This is a journal article about ilmenite smelting from the Indian Ferro Alloy Producers Association. Please refer to page 6 of the article. According to Table 1 at the bottom of the page, there are five western world operations smelting ilmenite. One of the operations is in Canada, one is in Norway, and the other three are in South Africa:<br>– Richards Bay Minerals in Richards Bay, South Africa.<br>– Namakwa Sands in Saldanha Bay, South Africa.<br>– Ticor in Empangeni, KZN, South Africa. Ticor is now owned by Exxaro Resources Ltd, and the smelting operation is called KZN Sands. | Project proponent has been included names of the similar project activity in South Africa in the PDD.<br><br>The Richards Bay Minerals, Namakwa Sands, and Exxaro KZN Sands' are the only Ilmenite smelting company in the South Africa. Same has been verified by DOE with the submitted supportive.<br>(IRL# 51 and 52)<br><input checked="" type="checkbox"/> |
| <b><u>Corrective Action Request No.13.</u></b><br>Project Proponent needs to justify the $f_{cap}$ value of the project activity in line with the procedure given in method 2 of the applied methodology. | B.6.1.2. | The PDD has been revised to calculate $f_{cap}$ using Method 2.<br><br>$f_{cap}$ is estimated by dividing the amount of waste gas generated in the baseline by the amount of waste gas generated during the project activity (as per ACM0012  | $f_{cap}$ of the project activity has now been demonstrated as per the method 2 of the applied methodology. However, why $QWCM_{BL}$ value 104,598,312 m <sup>3</sup> /year has now changed to 91,688,951 m <sup>3</sup> /year. Clarify the reason.  |

Table 1 is applicable to ACM0012, ver 4

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|  |  | <p>version 04).</p> <p><b>Response 2:</b></p> <p>The average quantity of WECM released in the atmosphere (in the three years prior to the start of the project activity) was initially based on indicative values (hence the value of 104,598,312 m<sup>3</sup>/year). When the project participant received supporting documents for the production figures at Namakwa Sands for the three years prior to the start of the project activity, an energy balance over the plant could be determined. Actual values for the average quantity of WECM released in the atmosphere could then be calculated. Hence the amount was changed to 91,688,951 m<sup>3</sup>/year</p> <p>The amount of waste gas generated in the baseline is calculated (using chemical reaction equations) from the declared production figures. These records are declared and signed by the management accountant and operations manager before being sent to Exxaro Resources Ltd head office. Please refer to the consolidated emission reduction sheet for this calculation from the actual plant records.</p> <p>The declared plant measurement records for the three years prior to the project start date are:</p> <p>‘(45) Declared production figures 2008’</p> | <p><b>Final Response from audit team:</b></p> <p>The QWCM<sub>BL</sub> value 104,598,312 m<sup>3</sup>/year was not calculated on last three years production and waste gas figures of the plant prior to the start of the project activity as required in the applied methodology. . However, according to requirement of the 3.2.2. of the methodology ACM0012, version .04, project proponent has now calculated QWCM<sub>BL</sub> based on the three years production and waste gas figures of the plant prior to the start of the project activity. This is the reason that QWCM<sub>BL</sub> value has now been changed from 104,598,312 m<sup>3</sup>/year to 91,688,951 m<sup>3</sup>/year. This has been checked by DOE with production report of the last three years (2008, 2009 and 2010) and found that values are correct. Further, project proponent has submitted letter from an independent professional engineer (ADC (Pty) Ltd.) who is affiliated with the Engineering Council of South Africa (ECSA) (registration number 20030135) and confirms that input data in the energy balance sheet are</p> |
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|                       |                       | <p>‘(46) Declared production figures 2009’</p> <p>‘(47) Declared production figures 2010’</p> <p>These records are signed and declared by the management accountant.</p> <p>According to the definition in ACM0012, <math>f_{cap}</math> is estimated by dividing the amount of waste gas generated in the baseline by the amount of waste gas generated during the project activity. Please see the table below for the amount of waste gas generated in the baseline and project activity.</p> <table><tr><th><math>Q_{WCM,BL}</math></th><th><math>Q_{WCM,y}</math></th></tr><tr><th>Nm<sup>3</sup>/year</th><th>Nm<sup>3</sup>/year</th></tr><tr><td>91 688 951</td><td>91 433 808</td></tr><tr><td>91 688 951</td><td>95 475 607</td></tr><tr><td>91 688 951</td><td>94 541 846</td></tr><tr><td>91 688 951</td><td>91 809 288</td></tr><tr><td>91 688 951</td><td>89 811 598</td></tr><tr><td>91 688 951</td><td>91 419 555</td></tr><tr><td>91 688 951</td><td>87 767 489</td></tr><tr><td>91 688 951</td><td>95 475 607</td></tr><tr><td>91 688 951</td><td>89 811 598</td></tr><tr><td>91 688 951</td><td>91 809 288</td></tr></table> | $Q_{WCM,BL}$ | $Q_{WCM,y}$ | Nm <sup>3</sup> /year | Nm <sup>3</sup> /year | 91 688 951 | 91 433 808 | 91 688 951 | 95 475 607 | 91 688 951 | 94 541 846 | 91 688 951 | 91 809 288 | 91 688 951 | 89 811 598 | 91 688 951 | 91 419 555 | 91 688 951 | 87 767 489 | 91 688 951 | 95 475 607 | 91 688 951 | 89 811 598 | 91 688 951 | 91 809 288 | <p>taken from the plant.</p> <p>This issue is now resolved.<br/>(IRL 81)<br/><input checked="" type="checkbox"/></p> |
|-----------------------|-----------------------|---|--------------|-------------|-----------------------|-----------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|--|
| $Q_{WCM,BL}$          | $Q_{WCM,y}$           |   |              |             |                       |                       |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |  |
| Nm <sup>3</sup> /year | Nm <sup>3</sup> /year |   |              |             |                       |                       |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |  |
| 91 688 951            | 91 433 808            |   |              |             |                       |                       |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |  |
| 91 688 951            | 95 475 607            |   |              |             |                       |                       |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |  |
| 91 688 951            | 94 541 846            |   |              |             |                       |                       |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |  |
| 91 688 951            | 91 809 288            |   |              |             |                       |                       |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |  |
| 91 688 951            | 89 811 598            |   |              |             |                       |                       |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |  |
| 91 688 951            | 91 419 555            |   |              |             |                       |                       |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |  |
| 91 688 951            | 87 767 489            |   |              |             |                       |                       |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |  |
| 91 688 951            | 95 475 607            |   |              |             |                       |                       |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |  |
| 91 688 951            | 89 811 598            |   |              |             |                       |                       |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |  |
| 91 688 951            | 91 809 288            |   |              |             |                       |                       |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |  |



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|   |           | <p>According to the definition in methodology ACM0012 p.13, <math>f_{cap}</math> is the energy that would have been produced in project year <math>y</math> using waste energy generated in base year expressed as a fraction of total energy produced using waste source in year <math>y</math>. The ratio is 1 if the waste energy generated in project year <math>y</math> is same or less than that generated in base year. The table below summarises the estimated ex-ante <math>f_{cap}</math> values during the crediting period.</p> <table><tr><th>Year</th><th><math>f_{cap}</math></th></tr><tr><td></td><td>-</td></tr><tr><td>2013</td><td>1.00</td></tr><tr><td>2014</td><td>0.96</td></tr><tr><td>2015</td><td>0.97</td></tr><tr><td>2016</td><td>1.00</td></tr><tr><td>2017</td><td>1.00</td></tr><tr><td>2018</td><td>1.00</td></tr><tr><td>2019</td><td>1.00</td></tr><tr><td>2020</td><td>0.96</td></tr><tr><td>2021</td><td>1.00</td></tr><tr><td>2022</td><td>1.00</td></tr></table> | Year   | $f_{cap}$ |  | - | 2013 | 1.00 | 2014 | 0.96 | 2015 | 0.97 | 2016 | 1.00 | 2017 | 1.00 | 2018 | 1.00 | 2019 | 1.00 | 2020 | 0.96 | 2021 | 1.00 | 2022 | 1.00 |  |
|---|-----------|--|--|-----------|--|---|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|
| Year  | $f_{cap}$ |  |  |           |  |   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
|   | -         |  |  |           |  |   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| 2013  | 1.00      |  |  |           |  |   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| 2014  | 0.96      |  |  |           |  |   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| 2015  | 0.97      |  |  |           |  |   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| 2016  | 1.00      |  |  |           |  |   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| 2017  | 1.00      |  |  |           |  |   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| 2018  | 1.00      |  |  |           |  |   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| 2019  | 1.00      |  |  |           |  |   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| 2020  | 0.96      |  |  |           |  |   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| 2021  | 1.00      |  |  |           |  |   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| 2022  | 1.00      |  |  |           |  |   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| <p><b><u>Corrective Action Request No.14.</u></b><br/>According to the applied methodology ACM0012 version.04, <math>W_{Si,j}</math> is the fraction of total heat that is used</p> | B.6.1.2.  | <p>No longer applicable – the use of waste gas for thermal energy has been excluded from the project activity.</p>   | <p>In the process, a portion of the available waste gas would be used to produce electricity. A smaller portion of the gas would provide the heat into the</p> |           |  |   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |

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| <p>by recipient j in the project that in the absence of the project activity would have been supplied by the ith boiler. However, in base case process heat requirement is meeting by burner not boiler then how the same is in line with requirement of applied methodology ? Project Proponent needs to justify.</p> |  |  | <p>slag dryer through the burner for heating purpose of the material in the dryer and the same was considered by the project proponent as a thermal energy in the initial project design document (GSP PDD). . However, waste gas will be going to be combusted in a burner and then it will be used directly as a process heat source. According to ACM0012, version.03.2 (used in the published PDD), the heat source of the baseline process will come from fossil fuel based steam boiler but in process, slag dryer is receiving heat through the burner. The project proponent has excluded the use of waste gas for thermal energy generation from the project activity to avoid the any applicability problem in the project.</p> <p>Project activity boundary is now only electricity generation from waste gas.</p> <p>Since thermal part (dryer) of the project has been excluded from the boundary of the project activity therefore this issue is no longer relevant for the project.</p> <p>Same has also clarified in section 2.10 (project description) of the report.</p> <p>This issue is now resolved.</p> |
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|  |          |  | (IRL 4, IRL 5 and IRL 83)<br><input checked="" type="checkbox"/>   |
| <b><u>Corrective Action Request No.15.</u></b><br>Incineration process would be done in IC engine through electricity. This electricity should come under project emission calculation. Also, clarify how this electricity would be monitored in the project activity? | B.6.1.5. | Parameter $EC_{PJ,y}$ is included in section B.7.1 of the PDD. This is the measured variable for the additional grid electricity consumed as a result of the implementation of the project activity. | Parameter $EC_{PJ,y}$ has now been included in section B.7.1 of the revised PDD to monitor the grid electricity of the project activity.<br>This issue is now closed.<br>(IRL 4 and IRL 83)<br><input checked="" type="checkbox"/>   |
| <b><u>Corrective Action Request No.16.</u></b><br>Project Proponent should transparently demonstrate how emission reduction of heat part of the project activity would be calculated in line with methodology conditions.  | B.6.1.7. | No longer applicable – the use of waste gas for thermal energy has been excluded from the project activity.  | In the process, a portion of the available waste gas would be mainly used to produce electricity. A smaller portion of the gas would provide the heat into the slag dryer through the burner for heating purpose of the material in the dryer and the same was considered by the project proponent as a thermal energy in the initial project design document. . However, waste gas will be going to be combusted in a burner and then it will be used directly as a process heat source. According to ACM0012, version.03.2 (used in the published PDD), the heat source of the baseline process will come from fossil fuel based steam boiler but in process, slag dryer is receiving heat through the burner. The project proponent has excluded the use of waste gas for ther- |

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|  |          |   | <p>mal energy generation from the project activity to avoid the any applicability problem in the project.</p> <p>Project activity boundary is now only electricity generation from waste gas.</p> <p>Since thermal part (dryer) of the project has been excluded from the boundary of the project activity therefore this issue is no longer relevant for the project.</p> <p>Same has also clarified in section 2.10 (project description) of the report. (IRL4, IRL 82 and IRL 83)</p> <p><input checked="" type="checkbox"/></p>                    |
| <p><b><u>Corrective Action Request No.17.</u></b></p> <p>Project Proponent needs to include the <math>f_{cap}</math>, <math>Q_{WG, y}</math>, <math>Q_{WCM, BL}</math>, <math>Q_{WCM, product}</math>, Emission factor of the grid and electricity imports parameter details in the PDD</p> <p>Also, provide the supportive to verify value of the project activity.</p> | B.6.2.1. | <p><math>Q_{WCM, BL}</math>, <math>Q_{WCM, product}</math>, and the emission factor of the grid (<math>EF_{Elec, gr, j, y}</math>), have been included in section B.6.2 of the revised PDD.</p> <p>Information pertaining to the calculations of the emission factor of the grid, including the operating margin, combined margin, etc, can be found in the following documents that were provided during the site visit: folder A.1, documents A.2 – 10a and A.2 – 10b.</p> <p>The value of <math>f_{cap}</math> has been included in section B.6.1, not in section B.6.2, as it does not appear in the list of 'Data and parameters not monitored', between pages</p> | <p>Project Proponent needs to include the grid emission factor calculation in the PDD. Also ensure that emission factor calculation should be done in line with "Tool to calculate the emission factor for an electricity system" (version.2.2.1).</p> <p>Further, provide the plant measurement record to verify the mentioned gas released values of the spread sheet.</p> <p><b><u>Response from audit team:</u></b></p> <p>Project Proponent needs to update the version of the emission factor calculation tool with the latest version (i.e.</p> |

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|  |  | <p>31 and 37 of ACM0012.</p> <p><math>Q_{WG,y}</math> has been included in section B.7.1 of the revised PDD, as per methodology ACM0012.</p> <p><u>Response # 2</u></p> <p>1. The grid emission factor calculation has been included in section B.6.1 of the PDD. This emission factor calculation is in line with version 02.1 of the 'Tool to calculate the emission factor of an electricity system'.</p> <p>2. Please refer to the plant measurement records that have been sent together with this protocol:</p> <p>'(45) Declared production figures 2008'</p> <p>'(46) Declared production figures 2009'</p> <p>'(47) Declared production figures 2010'</p> <p>The amount of waste gas generated in the baseline is calculated (using chemical reaction equations) from the declared production figures. These records are declared and signed by the management accountant and operations manager before being sent to Exxaro Resources Ltd head office. Please refer to the consolidated emission reduction spread sheet for this calculation from the actual plant records.</p> | <p>02.2.1)</p> <p><b><u>Final response from audit team:</u></b></p> <p>Project proponent has been calculated grid emission factor for the project activity according to the Tool to calculate the emission factor for an electricity system'. (version.2.2.1). However, the new version did not impact on the emission factor value.</p> <p>This issue is now closed.<br/>(IRL 4 and IRL 83)</p> <p><input checked="" type="checkbox"/></p> |
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|  |  | <p><u>Response # 3</u></p> <p>1. The PDD has been updated with version 02.2.1 of the 'Tool to calculate the emission factor for an electricity system'. Please see supporting documents 'SAPP GEF report' and 'SAPP GEF calculations'.</p> <p>2. Gas consumption data<br/>According to page 4 of ACM0012, for Type-1 project activities the project participant shall demonstrate that the waste energy was flared or released into the atmosphere by either <u>one</u> of the following ways:</p> <ol style="list-style-type: none"><li>1) Direct measurements; <i>or</i></li><li>2) An energy balance; <i>or</i></li><li>3) Energy bills; <i>or</i></li><li>4) Process plant manufacturer's original design specifications.</li></ol> <p>The project participant selected approach (2). According to this approach, the project participant shall:</p> <ol style="list-style-type: none"><li>a) Provide an energy balance of the relevant sections of the plant to prove that the waste energy was not a source of energy before the implementation of the project activity.</li></ol> |  |
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|  |  | <p>b) For the energy balance, applicable process parameters are required.</p> <p>c) The energy balance must demonstrate that the waste energy was not used.</p> <p>d) The energy balance must also provide conservative estimations of energy content.</p> <p>The project participant has met criteria (a) to (d), and therefore does demonstrate the use of waste energy in the absence of the CDM project activity in accordance with ACM0012:</p> <p>a) Please refer to 'consolidated emission reduction spread sheet'. The energy balance over the furnace was calculated using the following approach:</p> <ul style="list-style-type: none"><li>– The declared production figures for three years prior to the project activity were entered into top portion the spreadsheet. These are the auditable figures that are signed off by the Namakwa Sands Management Accountant and Operations Manager. Please refer to supporting documents for the production records. The production figures have also been referenced in the 'Energy Balance' sheet. Please refer to row 6 for the reference document number and page number, and please refer to column D for the exact location within the reference document.</li><li>– The quantity of waste gas produced was then</li></ul> |  |
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|  |  | <p>calculated through a carbon balance from the production records. Please use the 'Trace Dependents' function in Excel to follow the calculation sequence in the energy balance.</p> <p>b) The energy balance uses the following applicable process parameters (from the declared production records): Feed-on utilisation (rows 15 and 27); Iron tapped (rows 18 and 30); electrical energy consumption (rows 19 and 31); Anthracite consumption (rows 20 and 32); and electrode consumption (rows 21 and 33).</p> <p>Support for the applicability of the process parameters has also been submitted as measured gas data (temperatures, pressures, flow rates and composition).</p> <p>c) The energy balance calculates the amount of waste gas that is flared prior to the implementation of the project activity. Please refer to row 75.</p> <p>d) The energy balance provides conservative estimations of energy content of the gas. Please refer to row 96 in sheet 'Energy Balance'.</p> <p>Points (a) to (d) above show that the energy balance</p> |  |
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|  |          | <p>calculation is in line with methodology ACM0012 and is sufficient to verify the gas data.</p> <p><u>Response # 4</u></p> <p>Please refer to the responses to the above CAR. Furthermore, on 03/10/2011, Version 2.2.1 of the 'Tool to calculate the emission factor for an electricity system' was published (EB 63). Though the new tool has no impact on the calculations of the SAPP grid emission factor, the PDD has been updated to refer to this version.</p>   |   |
| <p><b><u>Corrective Action Request No.18.</u></b></p> <p>Project Proponent needs to include parameter "<math>EF_{CO_2, EL, y}</math> CO2 emission factor for electricity consumed by the project activity in year y (project emissions)"</p> | B.7.1.6. | <p><math>EF_{CO_2, EL, y}</math> has been included in section B.6.2 (this value will be calculated ex-ante, as per the 'Tool to calculate emission factor for an electricity system').</p> <p>The PDD has been updated with version 2.2.1 of the 'Tool to calculate the emission factor for an electricity system' was published. Though the new tool has no impact on the calculations of the SAPP grid emission factor, the PDD has been updated to refer to this version. Please also see reference document for the latest report of the SAPP grid emission factor.</p> | <p>The parameter <math>EF_{CO_2, EL, y}</math> has been included in the revised PDD. This issue is now closed.</p> <p>(IRL# 4, 83)</p> <p><input checked="" type="checkbox"/></p> |
| <p><b><u>Corrective Action Request No.19.</u></b></p> <p>Provide the supportive to verify the mentioned electricity supplied values. Also, include the information on</p>  | B.7.1.17 | <p><u>Response # 1</u></p> <p><i>Electricity supplied values</i></p>  | <p>Project Proponent needs to provide the work order copy for internal combustion engines. DOE will check the internal combustion details with GE</p>                             |

Table 1 is applicable to ACM0012, ver 4

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| <p>cross check, technical details, backup and calibration procedure of the energy meter in the parameter table.</p> |  | <p>Please refer to page 1 of the technical description of the internal combustion engines. This document was provided during the site visit (folder A.4.3, document A.4.3 – 2). To be conservative, the guaranteed electrical output of the engines was used in the emission reduction calculations (each engine has a guaranteed electrical output of 1.698 MW).</p> <p>The parasitic load of the plant is 540 kW. Please refer to the document ‘Electrical load schedule’ (that has been sent together with this protocol) for the supportive of this parameter.</p> <p>In addition, the operating availabilities of the engines have been included in the calculation of the quantity of electricity supplied to the recipient plant – this, too, is conservative. Please refer to the following supporting documents for the operating availabilities:</p> <p>Weighted furnace off gas availability (79%) – document ‘Furnace availabilities’.</p> <p>Engine availability (95%) – ‘GE Jenbacher Preventative Maintenance Contract’, page 17.</p> <p>Availability (taking into account planned maintenance) – ‘Downtimes for Preventative Maintenance’ (97%).</p> | <p>Jenbacher supportive documents after ensuring with work order by project proponent that GE Jenbacher will provide the internal combustion engines for project activity.</p> <p>Further, submitted preventive maintenance contract between Exxaro and GE South Africa is not the final agreement copy. Project Proponent needs to provide final (signed by the authority of Exxaro and GE) agreement copy to DOE.</p> <p><b><u>Response from audit team:</u></b></p> <p>Project proponent has been confirmed through a self declaration letter that GE is selected as an engine provider. However According to the response, total of 8 gas fired internal engines will be installed in the project and each engine electrical output is 1698 KW. Then the output of the project activity would be 13.58 MW (i.e. 1698*8) but how project activity is 15 MW? Also, electricity report talks about 15.3 MW projects. Project Proponent needs to clarify.</p> <p><b><u>Response from audit team:</u></b></p> <p>Project proponent justification on why GE values will be accepted by the DOE for the project as still no agreement has been done with them is still</p> |
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|  |  | <p>All three of the above mentioned documents have been sent together with this protocol.</p> <p><i>Cross check, technical details, backup and calibration</i></p> <p>This information has been included in the table of parameter <math>EG_{i,j,y}</math> in section B.7. The check meter that is adjacent to the main meter serves as a cross check.</p> <p>For additional supporting documents relating to backup procedures and data archiving, please refer to the following documents that have been sent together with this protocol: 'Infrastructure Audit for Server, PABX &amp; PLC Rooms at Namakwa Sands' and 'Procedure for daily tape backups'. These documents give a technical overview of the server room at Namakwa Sands and the procedures to ensure that in case of losing files (or a breakdown); there are backups from which the data can be restored.</p> <p><u>Response # 2</u></p> <p>With response to the copy of the work order:</p> <p>Please refer to page 2 of the document "Response</p> | <p>not convincing. PP need to further justify the same.</p> <p><b><u>Response from audit team:</u></b></p> <p>Exxaro Resources Ltd has confirmed in the self declaration letter that GE Jenbacher is selected as the technology provider for this project. However, official contract can be signed after receiving a positive validation report from DOE.</p> <p>This issue is now resolved.<br/>(IRL 34, IRL 37 and IRL 38)</p> <p><input checked="" type="checkbox"/></p> |
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|  |  | <p>letter'. This letter is signed by the Energy Manager at Exxaro Resources Ltd, and confirms that no order has been placed from the internal combustion engines: <i>The project team at Exxaro Resources Ltd proposed that due to the importance of CER revenue in the financial viability of the project, final approval from the Board of Directors for Capital Expenditure of the project should only be granted once a positive final validation report has been obtained from the DOE. A copy of the work order can therefore not be provided yet.</i></p> <p>With response to the gas engine supplier:</p> <p>Please refer to page 2 of the document 'Response letter'. This letter is signed by the Energy Manager at Exxaro Resources Ltd, and confirms that GE Jenbacher has been selected as the technology provider: <i>Exxaro Resources Ltd will place a formal order for the gas fired internal combustion engines with GE Jenbacher once capital approval has been granted, as Exxaro Resources Ltd cannot commit to such a contract unless such approval has been granted by the Board of directors of Exxaro Resources Ltd.</i></p> <p><i>However, taking into consideration the data supplied in the report titled "Namakwa Sands Gas Data Report" of December 2008, we confirm that 8 number of gas</i></p> |  |
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Table 1 is applicable to ACM0012, ver 4

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|  |  | <p><i>fired internal combustion engines to be installed in the project activity..</i></p> <p>With response to the final signed preventative maintenance contract:</p> <p>Please refer to page 2 of the document 'Response letter'. This letter is signed by the Energy Manager at Exxaro Resources Ltd, and states that a signed copy of the preventative maintenance cannot be provided. The reason for this is that a final preventative maintenance contract and preventative maintenance schedule can only be completed and signed between Exxaro Resources Ltd and GE Jenbacher once capital approval has been granted. (As discussed in the paragraph above, capital expenditure of the project will only be granted once a positive final validation report has been obtained from the DOE.) For this reason, Exxaro Resources Ltd cannot commit to such a contract unless the project is implemented.</p> <p>The document that the DOE received at the time of validation is the latest draft preventative maintenance contract: 'GE Jenbacher preventative maintenance contract'. The final version is not signed yet due to reasons discussed above.</p> |  |
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|  |  | <p><u>Response # 3</u></p> <p>Section A.2 of the PDD has been revised to state that the project will have a guaranteed electrical output of 13.6 MW at completion (1.698 MW x 8 engines).</p> <p>The electricity study report (reference document (57)) was written in August 2006 and is based on the installation of nine engines, which gives a total electrical output of 15.3 MW (1.698 MW x 9 engines). The project plan has been revised since then to instead install 8 engines, giving a total guaranteed electrical output of 13.6 MW.</p> <p>This document is a letter from Exxaro Resources Ltd stating that although no contract has yet been signed with Group Five or Jenbacher, the capital expenditure approval for the project was based on information, technical data, draft contracts, and quotations received from these two parties.</p> <p><u>Response # 4</u></p> <p>Exxaro Resources Ltd has confirmed that GE Jenbacher has been selected as the technology provider for this project. However, Exxaro cannot sign a con-</p> |  |
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|   |           | tract with GE Jenbacher until a positive validation report is received. Furthermore, Exxaro has confirmed that the capital approval for the project was based on the quotation received from Group Five. This quotation involves the installation of 8 GE Jenbacher engines.  |  |
| <b><u>Corrective Action Request No.20.</u></b><br>Provide the supportive to verify the mentioned Net calorific value of the annual average for WECM values. Also, clarify this parameter will be monitored internal or external laboratory. Further, elaborate the quality control procedure of the laboratory. | B.7.1.27. | No longer applicable – the use of waste gas for thermal energy has been excluded from the project activity.   | As thermal part of the project has been excluded from the boundary of the project activity therefore this issue is no longer relevant for the project.<br>(IRL 4 and IRL 83)<br><input checked="" type="checkbox"/>  |
| <b><u>Corrective Action Request No.21.</u></b><br>Project Proponent needs to clarify who are the interested and affected parties of the project activity?   | E.1.1     | A statement has been included in the revised PDD to clarify who the 'interested and affected parties' are. This statement refers to the 'Regulations in terms of Chapter 5 of the National Environmental Management Act, 1998 (No. R. 385)' and the 'Background Information Document'<br><br><u>Response # 2</u><br><br>This has been clarified in sections E.2 and E.3 of the revised PDD. | Project Proponent needs to clarify in the PDD that any comment (positive or negative) has been received or not during 30-days public comment period on the proposed project activity.<br><b><u>Final response from audit team:</u></b><br>Project proponent has included stakeholder comments received during 30-days public comment period for the proposed project activity. It has been observed that no negative comment has been received from stakeholder during public comment period.<br>This issue is now resolved.<br>(IRL# 43 and IRL 44) |

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|   |        |  | <input checked="" type="checkbox"/>  |
| <p><b><u>Corrective Action Request No.22.</u></b></p> <p>Project Proponent needs to include a statement which will clarify any stakeholder consultation is required or not by regulations/laws in the host country.</p>   | E.1.3. | <p>A paragraph has been included in the revised PDD which states: 'Stakeholder consultation is required in South Africa. According to the National Environmental Management Act, 1998, Chapter 5, Section 24:</p> <p>7. Procedures for the investigation, assessment and communication of the potential impact of activities must, as a minimum, ensure the following:</p> <p>d) Public information and participation, independent review and conflict resolution in investigation and assessment of impacts.'</p> <p>The National Environmental Management Act, 1998, was provided during the site visit.</p> | <p>Stakeholder consultation is required as per the National Environmental Management Act, South Africa and the same has been conducted by project proponent. The detail of stakeholder consultation has been included in the PDD.</p> <p>The details of the stakeholder consultation have been verified by DOE with supportive of stakeholder consultation meeting documents. This issue is now closed.</p> <p>(IRL# 43 and IRL 44)</p> <p><input checked="" type="checkbox"/></p> |
| <p><b><u>Clarification Request No. 1.</u></b></p> <p>PDD stated that the smelting operation consists of two closed DC arc furnaces which currently operating at 25 MW and 35 MW. However, also stated that plans are in place to upgrade these furnaces to 27 MW and 38 MW respectively. Are 27 MW and 38MW furnaces parts of any new expansion plan of project proponent and will project activity receive furnace off gases from these furnaces? Project Proponent needs to clarify</p> | A.1.2. | <p>27MW and 38MW furnaces are not part of Namakwa Sands' expansion plans. Section A.2 of the PDD has been revised to state: <i>Furnace 1 (design capacity of 25 MW) and Furnace 2 (design capacity of 35 MW).</i></p>  | <p>Project proponent has revised the design capacity of the furnace in the revised PDD. The Furnace 1 (design capacity of 25 MW) and Furnace 2 (design capacity of 35 MW) are the part of the project activity.</p> <p>This issue is now resolved.</p> <p>(IRL 10 and IRL 11)</p> <p><input checked="" type="checkbox"/></p>   |



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| the same with supportive.<br>Also, provide the supportive to verify the base process of the project activity.   |        |  |  |
| <b><u>Clarification Request No. 2.</u></b><br>PDD stated " <i>the emission factor for electricity sourced from the grid is 1.04 tCO<sub>2</sub>/MWh</i> ". Project Proponent needs to clarify the source of this statement.   | A.1.2. | The PDD has been updated with version 02.2.1 of the 'Tool to calculate the emission factor for an electricity system'. Please see supporting documents 'SAPP GEF report' and 'SAPP GEF calculations'.  | Project proponent has calculated the emission factor of the project activity as per 'Tool to calculate the emission factor for an electricity system' (version.2.2.1). The emission factor is still remain same as given in the published PDD after calculating as per new version of tool "Tool to calculate the emission factor for an electricity system" (version.2.2.1).<br>This issue is now resolved.<br>(IRL 72, IRL 82 and IRL 83)<br><input checked="" type="checkbox"/> |
| <b><u>Clarification Request No. 3.</u></b><br>PDD stated " <i>all power plant within the Southern African Power Pool (SAPP)</i> ". However, it has been noticed during the site visit that the power has been imported from "Eskom". Project Proponent needs to clarify who is the electricity supplier of project proponent with supportive? | A.1.2. | As discussed during the site visit, Namakwa Sands purchases its electricity from Eskom (South Africa's national electricity provider). This is supported by Namakwa Sands' monthly electricity bills. (Please refer to the folder 'Namakwa Sands Electricity Accounts', which was provided during the site visit.) | Project proponent is purchasing power from Eskom and same has been verified with submitted monthly electricity bills of Namakwa Sands.<br>This issue is now resolved.<br>(IRL 13)<br><input checked="" type="checkbox"/>   |
| <b><u>Clarification Request No. 4.</u></b>  | A.1.2. | Namakwa Sands purchases electricity from South   | Namakwa Sands purchases electricity  |

Table 1 is applicable to ACM0012, ver 4

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| <p>Project Proponent needs to provide the supportive which can demonstrate that project proponent is importing power in the plant from SAAP grid.</p> |  | <p>Africa's national electricity provider, Eskom. Eskom is physically connected to the Southern African Power Pool (SAPP).</p> <p>According to the 'Tool to calculate the emission factor for an electricity system' (Version 02.2.1), a project electricity system is defined by the power plants that are physically connected through transmission and distribution lines to the project activity and that can be displaced without significant transmission constraints.</p> <p>Therefore, for this project activity, the project electricity system comprises of all power plants within the Southern African Power Pool (SAPP). For this reason, the grid emission factor is calculated for the entire SAPP, of which Eskom forms a part.</p> <p>An extra sentence has been included in the revised PDD to clarify this point.</p> <p>For further information regarding Eskom's relationship with the SAPP, please refer to the following documents that were provided during the site visit:</p> <p>1) Report of the grid emission factor calculations for Southern Africa.</p> | <p>from South Africa's national electricity provider, Eskom. Eskom is physically connected to the Southern African Power Pool (SAPP). Same has been verified with the monthly electricity bills.</p> <p>This issue is now closed.<br/>(IRL 72)</p> <p><input checked="" type="checkbox"/></p> |
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|  |        | 2) Eskom and the SAPP (this reference has been included as a footnote in the revised PDD).   |   |
| <p><b><u>Clarification Request No. 5.</u></b></p> <p>As per PDD, Project proponent will import the generation equipment from developed countries. However, the name of the country is not defined and it is not clear whether the country does fall under Annex-1 or non annex country. Project Proponent needs to clarify the same.</p> <p>Further, who is the internal combustion equipment supplier? Project Proponent needs to clarify</p> | A.1.2. | <p>The project proponent will import the internal combustion engines from Austria, an Annex-1 country. The internal combustion engine supplier is GE Jenbacher.</p> <p>This information has been included in the revised PDD under section A.2.</p>  | <p>Project proponent will import the internal combustion engines from Austria, which is an Annex-1 country. The internal combustion engine supplier is GE Jenbacher. Though a contract still not signed with engine supplier. However, a self deceleration letter has been submitted by PP where it confirms that GE Jenbacher is selected as an engine supplier and contract will be signed with supplier after receiving a positive validation report from DOE.</p> <p>This issue is now resolved.</p> <p><input checked="" type="checkbox"/></p> |
| <p><b><u>Clarification Request No. 6.</u></b></p> <p>PDD stated <i>"The project aims to be the first-of-its-kind registered CDM project activity to operate the selected internal combustion engines on such low calorific gas at a smelter"</i>. Project proponent needs to provide the supportive document</p>   | A.1.2. | <p>The Namakwa Sands project demonstrates additionality through an investment analysis, using the 'Tool for the assessment and demonstration of additionality'. According to the statement A.1.2 of the PDD, the project activity aims to be the first registered South African CDM project of its kind in South Africa to generate a significant amount of electricity from low calorific</p> | <p>Project proponent has now been revised the first-of-its-kind statement with 'The project activity aims to be the first registered South African CDM project to generate electricity from waste gas at an ilmenite smelter'.</p> <p>This issue is now resolved.</p>   |

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| which can confirm that process involved in the project activity is the first-of-its-kind in the host country.   |        | value off-gas at a smelter. To avoid confusion with the term 'first of its kind', this statement has been revised to state: 'The project activity aims to be the first registered South African CDM project to generate electricity from waste gas at an ilmenite smelter'.                                | <input checked="" type="checkbox"/>  |
| <b><u>Clarification Request No. 7.</u></b><br>PDD stated <i>"The project will also contribute to foreign reserve earnings for South Africa via carbon credit sales revenue"</i> . How this statement relevant to project activity as a project is claiming carbon credits to remove the barriers which coming due to use of the environmentally friendly technologies in the project ? Project Proponent needs to clarify   | A.1.2. | This statement has been removed from the revised PDD, since the development of non-annex 1 countries is an inherent part of the CDM.   | As statement has removed from the revised PDD therefore this issue is no longer valid for the project. This issue is now resolved.<br>(IRL 83)<br><input checked="" type="checkbox"/>  |
| <b><u>Clarification Request No. 8.</u></b><br>PDD stated <i>"In early months of 2008. South Africa's electricity generators and supplier (eskom) carried out planned electricity supply interruptions"</i> . Project Proponent needs to elaborate further the meaning of this statement in context of project activity.<br>Also, PP needs to ensure that the the creations of jobs in the project activity are in line with the Saldanha Bay Municipality Integrated Devel- | A.1.2. | With response to paragraph 1:<br><br>This statement, together with the paragraph that pertains to the statement, has been removed from the revised PDD.<br><br>With response to paragraph 2:<br><br>According to Exxaro's 2009 Annual Report, 'it is Exxaro Resources Ltd's policy to actively recruit la- | PP has removed the statement in the revised PDD. Further, exxaro 2009 annual report to verify the creations of jobs in the project activity is in line with the Saldanha Bay Municipality's Integrated Development Plan (IDP) for 2006-2011.<br>This issue is now resolved.<br>(IRL 9 and IRL 60)<br><input checked="" type="checkbox"/> |

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| opment Plan (IDP) for 2006-2011, Project Proponent needs to provide the supportive evidence for the same.  |          | <p>bour from local communities wherever possible'. This statement has been included in the revised PDD.</p> <p>For this reason, the creation of jobs <i>is</i> in line with Saldanha Bay Municipality's Integrated Development Plan (IDP) for 2006-2011, which states that growing unemployment is one of the greatest challenges facing the municipality.</p> <p>The website references for Exxaro's 2009 Annual Report and Saldanha Bay Municipality's IDP have been included as footnotes in the revised PDD. These documents were also provided during the site visit..</p> |   |
| <p><b><u>Clarification Request No. 9.</u></b></p> <p>Project Proponent needs to provide the Letter Of Approval (LOA) for the project activity.</p>   | A.3.1.   | LOA Submitted   | <p>Project proponent has submitted LOA of the project. This issue is now resolved.</p> <p>(IRL 94)</p> <p><input checked="" type="checkbox"/></p> |
| <p><b><u>Clarification Request No. 10.</u></b></p> <p>PDD stated <i>"Test engine(s) from alternative technology suppliers may also be installed at the start of the project activity in order to evaluate the performance of the technology"</i>. It is not clear to DOE what is the relevancy of this statement in the project activity? Will project proponent go other alternative technology</p> | A.4.3.2. | This statement has been removed from the PDD. It is not relevant to the project activity.   | <p>As statement is now removed. Hence this issue is now resolved.</p> <p>(IRL 83)</p> <p><input checked="" type="checkbox"/></p>                  |

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| in near future? Project Proponent needs to clarify.   |         |   |  |
| <b><u>Clarification Request No. 11.</u></b><br>Project Proponent needs to ensure that the submitted supportive on training and maintenance procedure is the document of the equipment supplier for the project activity.  | A.4.3.8 | Please refer to 'GE Jenbacher's maintenance schedule', which has been sent together with this document.<br><br>In terms of training, the plant operators will start with a standard four day operator course ( <a href="http://information.jenbacher.com/training/site/pdf/TC%20Betreiberkurs%20EN.pdf">http://information.jenbacher.com/training/site/pdf/TC%20Betreiberkurs%20EN.pdf</a> ).<br><br>Thereafter, there will be on the job training from the South African based GE Jenbacher personnel ( <a href="http://information.jenbacher.com/training/site/pdf/TC%20Training%20on%20the%20job%20-%20Wartung%20EN.pdf">http://information.jenbacher.com/training/site/pdf/TC%20Training%20on%20the%20job%20-%20Wartung%20EN.pdf</a> ). | Project proponent has submitted GE Jenbacher's maintenance schedule' to verify the training and maintenance procedure of the project.<br><br>Addition to this, GE Jenbacher's personal will provide all required job training for the power plant personal during implementation and operation stage.<br><br>This issue is now resolved.<br>(IRL 37 and IRL 83)<br><input checked="" type="checkbox"/> |
| <b><u>Clarification Request No. 12.</u></b><br>Project Proponent needs to clarify why gas source emissions from cleaning of gas description of the Source: only in case waste gas cleaning is required and leads to emissions related to the energy requirement of the cleaning" is not part of the project activity? | B.3.10. | Gas cleaning has been included in the project boundary of the revised PDD.  | As gas cleaning has been considered under project boundary hence this issue is now resolved.<br><br><input checked="" type="checkbox"/>  |
| <b><u>Clarification Request No. 13.</u></b><br>Project proponent shall justify realistic and credible baseline alternatives in context of project activity scenario.  | B.4.1.  | The PDD has been explained the baseline scenarios per methodology ACM0012 Version 04.   | All realistic and credible baseline alternatives have been discussed in line with the applied methodology.<br><br>This issue is now resolved   |

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|  |        |   | <input checked="" type="checkbox"/>   |
| <p><b><u>Clarification Request No. 14.</u></b></p> <p>PDD stated under W3 condition that a neighbouring steel mill was the potential buyer and given the reason on how supply of gas to neighbouring steel mill was not possible? Project Proponent needs to provide the supportive to verify these reasons.</p> | B.4.5. | <p>With regards to the statement (under W3 in the PDD): <i>'The transport of waste gas to the buyer poses a significant safety risk'</i>, please refer to the 'Memorandum on the construction of the pipeline', that has been sent together with this protocol.</p> <p>This memorandum was written by the legal consulting firm, CLS Consulting Services (Pty) Ltd. The firm was requested to give its opinion on the facts presented regarding the legal liability in terms of Health and Safety during and after the construction of a pipeline for the transportation of carbon monoxide gas. The memorandum concludes with statement: 'It is to be advised that Exxaro should not head into this venture, whatever the feasibility, without considering the legal exposure towards health and safety of any person entering the site with the possible repercussion to boot'.</p> <p>For this reason, the sale of waste gas to a neighbouring steel mill is not a realistic and credible alternative.</p> | <p>Waste gas can't be transferred to the neighbouring steel mill due to legal liability in terms of Health and Safety during and after the construction of a pipeline for the transportation of waste (carbon monoxide) gas. Same has been verified with CLS Consulting Services (Pty) Ltd. letter.</p> <p>This issue is now resolved (IRL 35)</p> <p><input checked="" type="checkbox"/></p> |
| <p><b><u>Clarification Request No. 15.</u></b></p> <p>PDD stated " biomass not readily available in the vicinity of the proposed project activity". Provide the supportive to verify this statement.</p>   | B.4.6. | <p>The Namakwa Sands Smelter is located in an arid region with a mean annual precipitation of between 350-500mm (<a href="http://www.environment.gov.za/enviro-info/nat/images/rain.jpg">http://www.environment.gov.za/enviro-info/nat/images/rain.jpg</a>). These dry conditions mean</p>  | <p>Biomass availability in the Saldanha region is very low and the same has been verified by (<a href="http://www.environment.gov.za/enviro-info/nat/images/rain.jpg">http://www.environment.gov.za/enviro-info/nat/images/rain.jpg</a>) and docu-</p>  |

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|   |        | <p>that biomass is not readily available in the vicinity of the proposed project activity.</p> <p>The website reference has been included as a footnote in the revised PDD.</p> <p>An additional document regarding biomass availability in South Africa has been sent together with this protocol. (Reference document: 'Biomass availability in South Africa'.) This document is a report that demonstrates the low levels of biomass availability in the Saldanha region. Please refer to page 11, diagram 3.1.</p> <p>The report reference has been included as a footnote in the PDD.</p> | <p>ment Biomass availability in South Africa. Hence biomass cannot be an alternative for the project. This issue is now closed.</p> <p><input checked="" type="checkbox"/></p>   |
| <p><b><u>Clarification Request No. 16.</u></b></p> <p>PDD stated "The renewable energies employed would probably be wind, solar, hydro or waste energy. The production of electricity from these energies would be more expensive than purchasing it from the grid." Provide the supportive to verify this statement.</p> | B.4.6. | <p>The National Energy Regulator of South Africa (NERSA) published a document regarding its Renewable Energy Feed-In Tariffs (REFIT) Phase II. This document gives the cost of renewable energy generation technologies, compared with the cost of energy generation from coal, in South Africa..</p>  | <p>Cost of energy generation from wind, solar, hydro or waste energy is more as compared to the cost of energy generation from coal in South Africa. This information has been verified from the Renewable Energy Feed-In Tariffs (REFIT) Phase II of National Energy Regulator of South Africa (NERSA).</p> <p>This issue is now resolved (IRL 42)</p> <p><input checked="" type="checkbox"/></p> |



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| <p><b><u>Clarification Request No. 17.</u></b><br/>PDD stated under P12 " Cogeneration with a lower efficiency than the project activity does not make this alternative financially feasible" Project Proponent needs to elaborate why cogeneration with lower efficiency option is not feasible option?</p>   | <p>B.4.6.</p> | <p>A feasibility study was conducted for Namakwa Sands in August 2006. Two types of technologies were evaluated – gas engines and steam turbines. The less efficient steam turbines yielded a lower IRR than the gas engines, and there was less financially feasible. For this reason, cogeneration with a lower efficiency than the project is not viable.</p> <p>Please refer to page 27 of the feasibility study: ' Electricity study report' for the IRR comparisons.</p> | <p>According to the Electricity generation report from furnace off-gas at Namakwa Sands, Saldanha, less efficient steam turbines yielded a lower financial feasible than the gas engines therefore this could not be an alternative for the project.</p> <p>This issue is now resolved.<br/>(IRL 18)<br/><input checked="" type="checkbox"/></p> |
| <p><b><u>Clarification Request No. 18.</u></b><br/>PDD stated under H6 " Namakwa Sands does not generate any other waste gas so other waste energy would need to be imported. This would require a significant capital investment" Provide the supportive to verify this statement.</p> <p>Also, is waste energy import possible at plant location? Pls. elaborate this point.</p> | <p>B.4.7.</p> | <p>No longer applicable due – the use of waste gas for thermal energy has been excluded from the project activity due to problems with the applicability of ACM0012 version 04.</p>  | <p>Since thermal energy portion of the project is now not the part of the project activity therefore all heat options are now removed in the revised PDD.</p> <p>This issue is now resolved.<br/>(IRL 83)<br/><input checked="" type="checkbox"/></p>  |
| <p><b><u>Clarification Request No. 19.</u></b><br/>During site audit it has been observed that the financial closure of the project activity still not be done. Also, the values used for investment analysis are not latest value of the</p>  | <p>B.5.5.</p> | <p>Please refer to the latest investment analysis that has been sent together with this protocol, Further, refer to the following supporting documents that verify the investment analysis: 'Namakwa Sands capex', and 'Namakwa Sands opex'. 'Capital cost of the project.</p>   | <p>Project proponent has revised the investment analysis sheet and also provided the all necessary supportive to verify the mentioned values in the investment analysis sheet. The Group Five and GE Jenbacher/ provided de-</p>   |

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| equipment supplier. Project proponent needs to update the investment analysis of the project activity with latest equipment supplier data and shall also provide the supportive to verify this sheet. |           | <p>These are the capital costs for Group Five to implement the project.</p> <p>'Operating costs'. This is a letter from Prana Energy confirming the operational expenditure budget for the Namakwa Sands project.</p> | <p>tails have been used in the investment analysis though PP still not placed any work order to them. However, PP has confirmed that work order will be placed to these companies after receiving the positive validation report. Further, PP has submitted an independent chartered auditor letter who confirms that Group five quotation values has been considered during board approval time of the project activity.</p> <p>This issue is now resolved.</p> <p>(IRL# 53, IRL 64, IRL 65, IRL 66, IRL 67, IRL 73 and IRL 78)</p> <p><input checked="" type="checkbox"/></p> |
| <p><b><u>Clarification Request No. 20.</u></b></p> <p>Provide the supportive to verify the mentioned value of thermal parameters.</p>   | B.7.1.11. | No longer applicable due to problems with the applicability condition of the ACM0012 version 4. – the use of waste gas for thermal energy has been excluded from the project activity.                                | <p>As thermal energy portion has removed from the project therefore this parameter will not be included. This issue is now resolved.</p> <p>(IRL 83)</p> <p><input checked="" type="checkbox"/></p>   |
| <p><b><u>Clarification Request No. 21.</u></b></p> <p>Project Proponent needs to justify why measurement of quantity of waste gas is not required in the pro-</p>                                     | B.7.1.12  | The measurement of the quantity of waste gas has been included as a parameter in section B.7 of the revised PDD.  | <p>The parameter quantity of waste gas has now included in the revised PDD.</p> <p>This issue is now resolved.</p>  |

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| ject activity?  |         |  | (IRL 83)<br><br><input checked="" type="checkbox"/>   |
| <b><u>Clarification Request No. 22.</u></b><br>Project Proponent needs to submit the operation and management control procedure of the plant to verify the details mentioned under the monitoring plan of the project activity.<br>Also, clarify the emergency preparedness and document archiving procedure.   | B.7.2.1 | For the operation and management control procedure of the plant, please refer to the document 'Opex structure' that has been sent together with this protocol.<br><br>For emergency preparedness and the document archiving procedure at Namakwa Sands, please refer to the following documents that have been sent together with this protocol: 'Infrastructure Audit for Server, PABX & PLC Rooms at Namakwa Sands' and 'Procedure for daily tape backups'. These documents give a technical overview of the server room at Namakwa Sands and the procedures to ensure that in case of losing files (or a breakdown); there are backups from which the data can be restored. | Project proponent has submitted the document 'Opex structure' and 'Infrastructure Audit for Server, PABX & PLC Rooms at Namakwa Sands' to verify the emergency preparedness and operation and management control procedure of the plant. Hence, this issue is now resolved.<br>(IRL 34, IRL 37 and IRL 38)<br><input checked="" type="checkbox"/>   |
| <b><u>Clarification Request No. 23.</u></b><br><ul style="list-style-type: none"> <li>Project Proponent needs to provide the supportive to verify the starting date. Also, ensure that the starting date should be in line with EB 41 para 67.</li> <li>Also the MoU for the construction was signed on 11<sup>th</sup> April 2008 with 'Group Energy Five', why</li> </ul> | C.1.1.  | As per version 05 page 28 of the Glossary of CDM Terms, 'the start date shall be considered to be the date on which the project participant has committed to expenditures related to the implementation or related to the construction of the project activity'.<br><br>The Exxaro Resources Limited Board conditionally approved the capital expenditure for the project at a   | Board has approved (IRL 96) the full capital expenditure for the project on 12.01.2012 after receiving draft validation report on 15/12/2011. This approval is in line with board conditional approval on 17.08.2011 where it stated that the board will give approval on full capital expenditure after receiving a positive validation report from DOE as the revenue from carbon credits has |

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| <p>this is not been considered as the starting date of the project activity, Project Proponent needs to clarify.</p>  |                       | <p>Board meeting on 17/08/2011. The approval is conditional upon receiving a positive validation report as the revenue from carbon credits has been included in the financial model. Project proponent has received draft validation report on 15.12.2011 and then approved the full capital expenditure for the project on 12.01.2012.</p>  | <p>been included in the financial model. (IRL# 75 and IRL 96)<br/>This issue is now resolved.<br/><input checked="" type="checkbox"/></p>  |
| <p><b><u>Clarification Request No. 24.</u></b><br/>Why holding company cost are caused due to the CDM project?<br/>Also, IRR is negative with and without CDM revenue then why project proponent will continue this project?<br/>Clarify.</p> | <p>TR<br/>Comment</p> | <p><b>Holding company costs:</b><br/>The term holding company costs can also be referred to as managing costs. These holding company costs are included in the financial model of the project, as the implementation of this CDM project increases the amount of work that needs to be done at the holding company level (increases personnel costs, shared costs, training costs and office costs). In a different company structure, the holding company costs could have been carried as fixed costs, and be absorbed by the holding company. Please note that there is no provision for fixed costs in this financial model so there is no double counting of costs.</p> <p><b>IRR:</b><br/><br/>At the start of validation of this project (December 2010), the actual EUA price was between €13.68 and €14.85. (Please see the supporting document number (150) Carbon Credit price extracted from</p> | <p>The holding company costs are cost relate to the staff costs for the personnel that manage the project. These personnel are employed by the holding company. The project developer therefore used the terminology holding costs. The term holding costs in this instance can also be referred to as managing costs. This cost are considering by any project ( not only in CDM project) in host country either as a fixed cost or holding depends on the policy of the holding company. It has verified by DOE that there are no fixed cost considered on it so holding cost can be accepted in the investment calculation.</p> <p>Further, DOE has checked and verified that the cost is only for electricity generation as per the project description.</p> <p>Further, at the time of investment decision , project was considered</p> |

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|  |  | <p><a href="http://www.bluenext.eu/statistics/downloads.php">http://www.bluenext.eu/statistics/downloads.php</a>, attached hereto). Furthermore, according to a published document by the Commission of the European Communities in January 2009 (a relevant document at the commencement of validation), the price for credits bought by the EU was forecast as growing from €20 to €45 in the period from 2012 to 2020.</p> <p>(Source: Towards a comprehensive climate change agreement in Copenhagen {COM(2009) 39 final}, COMMISSION OF THE EUROPEAN COMMUNITIES, Brussels, 28.1.2009 - Extensive background information and analysis -PART 1).</p> <p>The Project Participant based their forecast of the CER price on the actual EUA price at that time, as well as the above mentioned price forecast from the European Union. The CER price forecast was sufficient to justify the capital cost of the project.</p> <p>It also must be noted that it is not a CDM requirement to show the project's IRR with the revenue from the sale of CERs. The CER price and CER revenue is irrelevant for the financial model in terms of the demonstration of additionally. Therefore, the IRR with the revenue from the sale of the CERs has been removed from the financial model.</p> | <p>CER price based on EUA price and was expected based on different forecast that CER price will increase and give positive IRR from benchmark. This has decide to continue the project.</p> <p>Also, according to the "Guidelines of the Assessment of Investment Analysis", it needs to be checked only project activity would be financially viable or not without the incentive of the CDM. In this project, IRR is negative with CDM revenue and same has demonstrated by project proponent. Therefore, project proponent response can be accepted and this issue is now resolved.</p> <p>☑</p> |
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**Table 3 Unresolved Corrective Action and Clarification Requests (in case of denials)**

| Clarifications and / or corrective action requests by validation team | Id. of CAR/CR | Explanation of Conclusion for Denial |
|---|---------------|--------------------------------------|
| -   | -             | -                                    |


## **Annex 2**

### **Information Reference List**


|                            |   |                |   |
|----------------------------|---|----------------|---|
| Final Report<br>14-12-2012 | Information Reference List<br><br>Use of waste gas at Namakwa Sands in South Africa | Page<br>1 of 8 | <br>South Asia |
|----------------------------|---|----------------|---|

| Reference No.       | Document or Type of Information   | Date of document      |                                |                |                    |                     |                       |                |                       |             |   |            |                      |            |   |             |   |  |
|---------------------|---|-----------------------|--------------------------------|----------------|--------------------|---------------------|-----------------------|----------------|-----------------------|-------------|---|------------|----------------------|------------|---|-------------|---|--|
| 1                   | <p>On-site interviews and inspections of the project site of the “Use of waste gas at Namakwa Sands in South Africa” by TUV SÜD validation team, Conducted on December 13-14, 2010.</p> <p><b><u>Validation team on site :</u></b></p> <table><tr><td>Nikunj Agarwal</td><td>TÜV SÜD Industrie Service GmbH</td></tr><tr><td>Supratik Dutta</td><td>TUV SUD South Asia</td></tr></table> <p><b><u>Interviewed persons :</u></b></p> <table><tr><td>Sachin Thakurpersad</td><td>Exxaro Resources Ltd.</td></tr><tr><td>Brian Wanoercf</td><td>Exxaro Resources Ltd.</td></tr><tr><td>Ereena Knan</td><td>Exxaro Resources Ltd. ( Metallurgy Student)</td></tr><tr><td>Riaan Smit</td><td>Exxaro Resources Ltd</td></tr><tr><td>Katie Ross</td><td>Promethium Carbon (PTY) LTD. (Consultant)</td></tr><tr><td>Robbie Louw</td><td>Promethium Carbon (PTY) LTD. (Consultant)</td></tr></table> | Nikunj Agarwal        | TÜV SÜD Industrie Service GmbH | Supratik Dutta | TUV SUD South Asia | Sachin Thakurpersad | Exxaro Resources Ltd. | Brian Wanoercf | Exxaro Resources Ltd. | Ereena Knan | Exxaro Resources Ltd. ( Metallurgy Student) | Riaan Smit | Exxaro Resources Ltd | Katie Ross | Promethium Carbon (PTY) LTD. (Consultant) | Robbie Louw | Promethium Carbon (PTY) LTD. (Consultant) |  |
| Nikunj Agarwal      | TÜV SÜD Industrie Service GmbH  |                       |                                |                |                    |                     |                       |                |                       |             |   |            |                      |            |   |             |   |  |
| Supratik Dutta      | TUV SUD South Asia  |                       |                                |                |                    |                     |                       |                |                       |             |   |            |                      |            |   |             |   |  |
| Sachin Thakurpersad | Exxaro Resources Ltd.   |                       |                                |                |                    |                     |                       |                |                       |             |   |            |                      |            |   |             |   |  |
| Brian Wanoercf      | Exxaro Resources Ltd.   |                       |                                |                |                    |                     |                       |                |                       |             |   |            |                      |            |   |             |   |  |
| Ereena Knan         | Exxaro Resources Ltd. ( Metallurgy Student)   |                       |                                |                |                    |                     |                       |                |                       |             |   |            |                      |            |   |             |   |  |
| Riaan Smit          | Exxaro Resources Ltd  |                       |                                |                |                    |                     |                       |                |                       |             |   |            |                      |            |   |             |   |  |
| Katie Ross          | Promethium Carbon (PTY) LTD. (Consultant)   |                       |                                |                |                    |                     |                       |                |                       |             |   |            |                      |            |   |             |   |  |
| Robbie Louw         | Promethium Carbon (PTY) LTD. (Consultant)   |                       |                                |                |                    |                     |                       |                |                       |             |   |            |                      |            |   |             |   |  |
| 2                   | UNFCCC homepage for the project<br><a href="http://cdm.unfccc.int/Projects/Validation/DB/AI93C0C9UI9NSD1OO5PDKQ7ESOCNLN/view.html">http://cdm.unfccc.int/Projects/Validation/DB/AI93C0C9UI9NSD1OO5PDKQ7ESOCNLN/view.html</a>  | -----                 |                                |                |                    |                     |                       |                |                       |             |   |            |                      |            |   |             |   |  |
| 3                   | Approved consolidated baseline and monitoring methodology ACM0012 “Consolidated baseline methodology for GHG emission reductions from waste energy recovery projects”, ACM0012 – Version 4.0  | EB 60                 |                                |                |                    |                     |                       |                |                       |             |   |            |                      |            |   |             |   |  |
| 4                   | “Tool to calculate the emission factor for an electricity system” (Version 02.2.1)  | -----                 |                                |                |                    |                     |                       |                |                       |             |   |            |                      |            |   |             |   |  |
| 5                   | Project Design Document (PDD) for CDM project “Use of waste gas at Namakwa Sands in South Africa” version 2.0   | 11.11.2010            |                                |                |                    |                     |                       |                |                       |             |   |            |                      |            |   |             |   |  |
| 6                   | Prior Consideration of the CDM form submitted to the UNFCCC   | 31.08.2010            |                                |                |                    |                     |                       |                |                       |             |   |            |                      |            |   |             |   |  |
| 7                   | Prior Consideration of the CDM form submitted to the Designated National Authority (DNA)  | 31.08.2010            |                                |                |                    |                     |                       |                |                       |             |   |            |                      |            |   |             |   |  |
| 8                   | Financial result reports ( 2007, 2008 and 2009) of the Exxaro Resources Ltd.  | Submitted on May 2011 |                                |                |                    |                     |                       |                |                       |             |   |            |                      |            |   |             |   |  |




|                            |   |                |   |
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| Reference No. | Document or Type of Information   | Date of document        |
|---------------|---|-------------------------|
| 9             | Exxaro Annual Report 2009   | 16.03.2010              |
| 10            | Technical Specification and main components manual (extracts) for Furnace1 from the manufacturer (ABB)  | Submitted on May 2011   |
| 11            | Technical Specification and main components manual (extracts) for Furnace 2 from the manufacturer (ABB)   | Submitted on May 2011   |
| 12            | Project implementation schedule   | Submitted on March 2012 |
| 13            | Electricity bills ( January 2008 to December 2008) for Namakwa Sands from Eskom Holdings limited  | Submitted on May 2011   |
| 14            | P&ID Diagram of the Namakwa Sands plant   | Submitted on May 2011   |
| 15            | Proposal for an evaluation study into the use of the furnace off-gas at Namakwa Sands from Promethium Carbon (PTY) LTD.   | 08.03.2006              |
| 16            | Boiler quotation from Babcock Africa Services (Pty) Ltd   | 24.07.2006              |
| 17            | Engine quotation from GE Jenbacher  | 07.08.2006              |
| 18            | Electricity study report on furnace off-gas at Namakwa Sands, Saldanha  | 31.08.2006              |
| 19            | Published article on Exxaro Resources Ltd acquires the Namakwa Sands business   | 19.01.2007              |
| 20            | Eskom Transmission feasibility quotation for connection of 9 x 2.097 MVA generators at Namakwa Sands Project  | 16.01.2008              |
| 21            | South African DNA letter for no objection for the Namakwa waste gas utilisation project   | 04.03.2008              |
| 22            | Memorandum of Understanding between Exxaro Coal (Pty) Ltd (a subsidiary of Exxaro Resources Ltd), Promethium Carbon (Pty) Ltd, and Group Five Energy (Pty) Ltd                                | 11.04.2008              |
| 23            | Minutes of the meeting between Exxaro and Promethium Carbon (PTY) LTD on CDM opportunities for the project activity.  | 25.06.2008              |
| 24            | Application notice for a basic assessment for a project activity at Namakwa Sands Smelter, Saldanha Bay.  | 22.10.2008              |
| 25            | A Background Information Document (BID) was released for a 30-day public comment period in order to provide interested and affected parties an opportunity to comment on the proposed project | 06.11.2008              |

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| Reference No. | Document or Type of Information  | Date of document      |
|---------------|--|-----------------------|
| 26            | An open day is held at the Skilpadsaal in Vredenburg, which provided the public with an opportunity to get more information regarding the proposed project   | 20.11.2008            |
| 27            | Request submitted to the Department of Environmental Affairs & Development Planning (DEA&DP) for a further six month extension to the submission timeframe for the final basic assessment report                         | 03.03.2010            |
| 28            | Contract agreement between Exxaro Resources Ltd. and Promethium Carbon (PTY) LTD. for CDM project  | 06.11.2007            |
| 29            | Maintenance procedure received from GE Jenbacher for the combustion gas engine   | Submitted on May 2011 |
| 30            | BOP Electrical load requirement for the project activity calculated by Group Five Energy (Pty) Ltd   | Submitted on May 2011 |
| 31            | Electricity consumption and utilization data for the Furnace 1 & 2, Exxaro Resources Ltd.  | Submitted on May 2011 |
| 32            | A report on Ilmenite smelting: the basics prepared by P.C. Pistorius   | Submitted on May 2011 |
| 33            | Global Decision 2008 Supply and Demand Side Resource Alternatives and Reference Case For Development of Third National Integrated Resource Plan for South Africa, submitted by National Energy Regulator of South Africa | 05.02.2008            |
| 34            | Infrastructure audit for server, PABX & PLC rooms at Namakwa Sands prepared by X-10-U-8 infrastructure consultants   | November 2008         |
| 35            | Memorandum with consulting services (Pty) Ltd. for the construction of the pipeline for the project  | Submitted on May 2011 |
| 36            | Draft Basic Assessment on Namakwa Sands for the project submitted to Arcus Gibb (Pty) Ltd  | 11.11.2010            |
| 37            | O&M structure at Namakwa Sands, Exxaro Resources Ltd.  | Submitted on May 2011 |
| 38            | Procedure for daily tape backup at Namakwa sands, Exxaro Resources Ltd.  | Submitted on May 2011 |
| 39            | Production reports ( 2008, 2009 and 2010) for Namakwa Sands plant, Exxaro Resources Ltd.   | Submitted on May 2011 |
| 40            | Project CAPEX prepared by the Group Five Engineering and Construction (Pty) Ltd.   | 22.12.2010            |
| 41            | A Synthesis Report on Biomass Energy Consumption and Availability in South Africa- A Report Prepared by ProBEC, Dr Oliver Damm and Ralph Triebel LHA Management Consultants  | February 2008         |

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| Reference No. | Document or Type of Information   | Date of document       |
|---------------|---|------------------------|
| 42            | RENEWABLE ENERGY FEED – IN TARIFFS PHASE II issued by the National Energy Regulator of South Africa (NERSA)   | 29.10.2009             |
| 43            | Stakeholder meeting notices, news paper advertisements, presentation comments and response  | Submitted on July 2011 |
| 44            | Environmental screening report for the project activity prepared by strategic Environmental Focus (Pty) Ltd.  | February 2008          |
| 45            | Feasibility Study Report of the project activity prepared by Promethium Carbon (PTY) LTD.   | February 2009          |
| 46            | Namakwa Sands gas data report prepared by Promethium Carbon (PTY) LTD.  | December 2008          |
| 47            | Memorandum of the investment review committee of Exxaro Resources Ltd. on the finalization for the feasibility study for the Namakwa Sands project  | 07.06.2011             |
| 48            | Technical specification of the combustion gas engine from GE Jenbacher  | Submitted on July 2011 |
| 49            | Combustion gas engine quotation from Group Five Engineering and Construction (Pty) Ltd.   | 28.03.2011             |
| 50            | Namakwa Sands plant Volume, Flow Rate and calorific Value Calculation from R& D Department of the Namakwa Sands   | 27.10.2010             |
| 51            | The natural gas industry in south Africa : Availability, sustainability and reliability of gas supply ( Book name: Energy efficiency made simple, chapter-4, author: Michel De Pontes, Michael Ellman and Germuishuys ) | Submitted on July 2011 |
| 52            | Characterization of the coal resources of South Africa by L.S. Jeffrey ( Book name: The Journal of The South African Institute of Mining and Metallurgy)  | Submitted on July 2011 |
| 53            | Aurco's self deceleration letter on independent charter accountancy firm and the member of South African Institute of Charter Accountants   | 06.07.2011             |
| 54            | Invoice copies of the fossil fuel, Engen Petroleum Limited  | Submitted on July 2011 |
| 55            | GE Jenbacher confirmation mail on the fair value of the combustion engine   | 08.10.2010             |
| 56            | Oil consumption and cost data from Engen Petroleum Limited  | 26.09.2008             |
| 57            | Operational expenditure budget for the project activity received from the prana energy, Exxaro Resources Ltd.   | 03.02.2011             |

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| Reference No. | Document or Type of Information   | Date of document               |
|---------------|---|--------------------------------|
| 58            | An article on indication of South African inflationary targets, South African reserve bank  | Submitted on July 2011         |
| 59            | Euro area inflation rate<br><a href="http://www.tradingeconomics.com/euro-area/inflation-cpi">http://www.tradingeconomics.com/euro-area/inflation-cpi</a>   | Last assessed on December 2011 |
| 60            | Saldanha Bay Municipality Integrated Development Plan 2006-2011<br><a href="http://www.capegateway.gov.za/Text/2008/4/idp_wc_saldanha_bay_2007.pdf">http://www.capegateway.gov.za/Text/2008/4/idp_wc_saldanha_bay_2007.pdf</a>  | Last assessed on December 2011 |
| 61            | Department of Environmental Affairs and Tourism. (2000, July). Environmental Potential Atlas for South Africa: Mean Annual Precipitation<br><a href="http://www.environment.gov.za/enviro-info/nat/images/rain.jpg">http://www.environment.gov.za/enviro-info/nat/images/rain.jpg</a>   | Last assessed on December 2011 |
| 62            | Informante, Simasiku on Caprivi link project and Hwange, Administrator<br><a href="http://www.informante.web.na/index.php?option=com_content&amp;task=view&amp;id=5570&amp;Itemid=108&amp;PHPSESSID=b4dcfee218fc205d8efdeb7968b06910">http://www.informante.web.na/index.php?option=com_content&amp;task=view&amp;id=5570&amp;Itemid=108&amp;PHPSESSID=b4dcfee218fc205d8efdeb7968b06910</a> | Last assessed on December 2011 |
| 63            | Escom fact sheet<br><a href="http://www.eskom.co.za/content/ES_0007SAfPowPoolRev5.pdf">www.eskom.co.za/content/ES_0007SAfPowPoolRev5.pdf</a>  | Last assessed on December 2011 |
| 64            | Eskom price forecast  | 24.02.2010                     |
| 65            | Eskom data on cost of the electricity for Namakwa smelter   | Submitted on October 2011      |
| 66            | Exarro WACC and Hurdle rate   | Submitted on October 2011      |
| 67            | Taxation in South Africa 2010/11, prepared by the South African Revenue service (SARS)  | Submitted on October 2011      |
| 68            | Correspondence between Exxaro Resources Ltd. and Department of Environmental Affairs (DEA) regarding Record of Decision (ROD) for the project activity, submitted by Exxaro Resources Ltd.  | Submitted on October 2011      |

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| Reference No. | Document or Type of Information  | Date of document          |
|---------------|--|---------------------------|
| 69            | An Article on Co-generation: A challenge for furnace off gas cleaning system ( Author: E.S. Schubert and RGottschling)   | Submitted on October 2011 |
| 70            | National Environment Management Air Quality Act.   | Submitted on July 2011    |
| 71            | Environment Authorization for the Namakwa Sands Co-generation project from the environmental affairs, Republic of South Africa   | 22.08.2011                |
| 72            | Grid emission factor for south Africa (Version.04) prepared by Promethium Carbon (PTY) LTD.  | October 2011              |
| 73            | Self declaration letter from Exxaro on board directors approved the capital expenditure for the Namkwa Sands project after considering the cost quotation and technical details provided by the Group Five Engineering and Construction (Pty) Ltd. and GE Jenbacher  | 07.09.2011                |
| 74            | Inflation Rate taken from the Monetary policy review of South African Reserve Bank   | May 2011                  |
| 75            | Conditional board approval for Namakwa Sands Co-generation project   | 17.8.2011                 |
| 76            | Perry's chemical Engineers Handbook  | Submitted on October 2011 |
| 77            | Auro Group (Pty) Ltd. ( CA registration no. 00297105) confirmation letter on capital cost of the project approved by board   | 11.11.2011                |
| 78            | Mac Murray Aldum Inc, ( Register auditors in South Africa with practice number 950890) confirmation letter on the following:<br><ol style="list-style-type: none"> <li>1. no laws in south Africa that dictate or require insurance cover for a project of this nature</li> <li>2. Tax allowance should be used pertaining the capital expenditure for this project as per the South African income tax act, ACT 58 of 1962 section 12B (Year1: 50%, Year 2: 30% and Year 3: 30%)</li> <li>3. Loss of the previous year should be considered when calculating tax liability for the current year. The principal of offsetting profits in specific year against an accumulated tax loss (should it exist) is correct. As per section 20 of the income tax act 58 of 1962</li> </ol> | 09.11.2011                |

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| Reference No. | Document or Type of Information   | Date of document           |
|---------------|---|----------------------------|
| 79            | Executive general manager report of Namakwa Sands from April 2009 to May 2010   | Submitted on October 2011  |
| 80            | Basic assessment report for the project prepared by the Arcus Gibb (Pty) Ltd  | July 2006                  |
| 81            | ADC (Pty) Ltd. (ECSA no. 20030135) confirmation letter on the plant data used for the calculation energy balance  | 27.10.2011                 |
| 82            | Consolidated spread sheet for Investment Analysis, emission reduction and energy balance, prepared by Exxaro Resources Ltd.   | 13.11.2012                 |
| 83            | Final PDD (Version.09)  | 13.11.2012                 |
| 84            | Tool for the demonstration and assessment of additionality (Version.6)  | -                          |
| 85            | "Guidelines on Common Practice" (Version 01.1)  | -                          |
| 86            | "Guidance on the Assessment of Investment Analysis" (version 05)  | -                          |
| 87            | Quotation for the construction of the project activity received from the Group Five Engineering and Construction (Pty) Ltd.   | 28.03.2011                 |
| 88            | National Energy Regualtor of South Africa (NERSA) consultation paper on Cogeneration regulatory rules and feed In tariffs   | 19.01.2011                 |
| 89            | Chief Electrical Engineer decleration letter on lifetime smelter operation of the Namakwa Sands.  | Submitted on February 2012 |
| 90            | A presentation of the Saldanha Bay Forum which was held on 19/11/2008   | Submitted on February 2012 |
| 91            | CDM website<br><a href="https://cdm.unfccc.in/">https://cdm.unfccc.in/</a>  |                            |
| 92            | Registration in terms of the amospheric pollution prevention act, 1965 (ACT 45 of 1965) of Namakwa Sands, Department of Environmental affairs and Tourism, republic of South Africa | 26.07.2004                 |

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| Reference No. | Document or Type of Information   | Date of document           |
|---------------|---|----------------------------|
| 93            | Screenshot of the trend display monitoring system of light fuel oil consumption against slagdryer, Exxaro Resources Ltd.                      | Submitted on February 2012 |
| 94            | Letter of Approval (LoA) from Department of Energy, Republic of South Africa; authorizing Exxaro Resources Limited as a project participants; | 01.03.2012                 |
| 95            | J.H. Selby consultant to the Minerals Industry (Independent expert letter on lifetime of furnaces of the smelter operation at Namakwa Plant.  | 05.03.2012                 |
| 96            | Full capital approval for the project activity, Exxaro Resources Limited.   | 12.01.2012                 |
| 97            | South African Income Tax Act, 1962, (Act 58 of 1962)  | Submitted on March 2012    |
| 98            | Lubricant supplier (Engen Petroleum Limited) confirmation mail on the oil cost.   | 26.10.2011                 |



South Asia

## **Annex 3**

### **Appointment Certificates**



## CERTIFICATE OF APPOINTMENT

Mr. Agarwal, Nikunj fulfills the requirements of the Certification Body "Environment and Energy" of TÜV SÜD South Asia Pvt Ltd to participate in audits.

| Qualification applicable to |          |    |     |     |       |
|-----------------------------|----------|----|-----|-----|-------|
| Standard                    | CDM      | GS | VCS | VER | Other |
| Date                        | 22.03.12 |    |     |     |       |

| Qualification as |         |           |          |             |                    |                                     |
|------------------|---------|-----------|----------|-------------|--------------------|-------------------------------------|
| Status           | Trainee | Validator | Verifier | Team Leader | Technical Reviewer | Technical Expert                    |
| Date             |         | 22.03.12  | 22.03.12 | 22.03.12    | 22.03.12           | 1.1,1.2, 3.1, 4.10, 13.1,13.2, 15.2 |

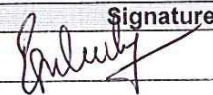
| Other qualification |            |   |   |   |   |       |
|---------------------|------------|---|---|---|---|-------|
| Country Expertise   |            |   |   |   |   |       |
| Region              | 1          | 2 | 3 | 4 | 5 | Other |
| Date                | 22.03.12   |   |   |   |   |       |
| Further countries   |            |   |   |   |   |       |
| Financial Expertise |            |   |   |   |   |       |
| Date                | 22.03.2012 |   |   |   |   |       |

| Qualification in technical areas                   |          |
|--|----------|
| Technical Area                                     | Date     |
| 1.2_Energy generation from renewable energy source | 22.03.12 |
| 13.1_Waste handling and disposal                   | 22.03.12 |
| 3.1_Energy demand                                  | 22.03.12 |
| 13.2_15.2_Animal waste management                  | 22.03.12 |
| 1.1_4.10_Thermal energy generation..               | 23.11.12 |
|  |          |

This appointment is valid until 28.02.2013 and is bound by internal requirements of the Certification Body "Environment and Energy" of TÜV SÜD South Asia Pvt Ltd.

In case of loss of validity of this certificate as per result of an assessment according to internal procedures or due to any other reason, it will be properly communicated to you.

Your Certificate has the internal reference no. CB-IND-CCP-0001/001.

| Date       | Signature  |
|------------|--|
| 23.11.2012 |  |
|            |  |
|            |  |
|            |  |





South Asia

# CERTIFICATE OF APPOINTMENT

Mr. Dutta, Supratik fulfills the requirements of the Certification Body "Environment and Energy" of TÜV SÜD South Asia Pvt Ltd to participate in audits.

| Qualification applicable to |          |    |     |     |       |
|-----------------------------|----------|----|-----|-----|-------|
| Standard                    | CDM      | GS | VCS | VER | Other |
| Date                        | 07.04.12 |    |     |     |       |

| Qualification as |         |           |          |             |                    |                  |
|------------------|---------|-----------|----------|-------------|--------------------|------------------|
| Status           | Trainee | Validator | Verifier | Team Leader | Technical Reviewer | Technical Expert |
| Date             |         | 07.04.12  | 07.04.12 |             |                    | 1.2              |

| Other qualification |          |   |   |   |   |       |
|---------------------|----------|---|---|---|---|-------|
| Country Expertise   |          |   |   |   |   |       |
| Region              | 1        | 2 | 3 | 4 | 5 | Other |
| Date                | 07.04.12 |   |   |   |   |       |
| Further countries   |          |   |   |   |   |       |
| Financial Expertise |          |   |   |   |   |       |
| Date                | 07.04.12 |   |   |   |   |       |

| Qualification in technical areas                   |          |
|--|----------|
| Technical Area                                     | Date     |
| 1.2_Energy generation from renewable energy source | 07.04.12 |
|  |          |
|  |          |
|  |          |
|  |          |
|  |          |

This appointment is valid until 28.02.2013 and is bound by internal requirements of the Certification Body "Environment and Energy" of TÜV SÜD South Asia Pvt Ltd.

In case of loss of validity of this certificate as per result of an assessment according to internal procedures or due to any other reason, it will be properly communicated to you.

Your Certificate has the internal reference no. CB-IND-CCP-0012/001.

| Date                              | Signature |
|-----------------------------------|-----------|
| 21.11.2012: Extension of Validity |           |
|                                   |           |
|                                   |           |
|                                   |           |





South Asia

# CERTIFICATE OF APPOINTMENT

Mr. Habbu, Ajit fulfills the requirements of the Certification Body "Environment and Energy" of TÜV SÜD South Asia Pvt Ltd to participate in audits.

| Qualification applicable to |          |    |     |     |       |
|-----------------------------|----------|----|-----|-----|-------|
| Standard                    | CDM      | GS | VCS | VER | Other |
| Date                        | 21.11.12 |    |     |     |       |

| Qualification as |         |           |          |             |                    |                  |
|------------------|---------|-----------|----------|-------------|--------------------|------------------|
| Status           | Trainee | Validator | Verifier | Team Leader | Technical Reviewer | Technical Expert |
| Date             |         |           |          |             |                    | 1.1, 4.10        |

| Other qualification |          |   |   |   |   |       |
|---------------------|----------|---|---|---|---|-------|
| Country Expertise   |          |   |   |   |   |       |
| Region              | 1        | 2 | 3 | 4 | 5 | Other |
| Date                | 21.11.12 |   |   |   |   |       |
| Further countries   |          |   |   |   |   |       |
| Financial Expertise |          |   |   |   |   |       |
| Date                |          |   |   |   |   |       |

| Qualification in technical areas   |            |
|------------------------------------|------------|
| Technical Area                     | Date       |
| 1.1_4.10_Thermal energy generation | 21.11.2012 |
|                                    |            |
|                                    |            |
|                                    |            |
|                                    |            |
|                                    |            |

This appointment is valid until 28.02.2013 and is bound by internal requirements of the Certification Body "Environment and Energy" of TÜV SÜD South Asia Pvt Ltd.

In case of loss of validity of this certificate as per result of an assessment according to internal procedures or due to any other reason, it will be properly communicated to you.

Your Certificate has the internal reference no. CB-IND-CCP-0016/001.

| Date       | Signature |
|------------|-----------|
| 21.11.2012 |           |
|            |           |
|            |           |
|            |           |





South Asia

# CERTIFICATE OF APPOINTMENT

Mr. Mitterwallner, Robert fulfills the requirements of the Certification Body "Environment and Energy" of TÜV SÜD South Asia Pvt Ltd to participate in audits.

| Qualification applicable to |          |    |     |     |       |
|-----------------------------|----------|----|-----|-----|-------|
| Standard                    | CDM      | GS | VCS | VER | Other |
| Date                        | 23.03.12 |    |     |     |       |

| Qualification as |         |           |          |             |                    |                     |
|------------------|---------|-----------|----------|-------------|--------------------|---------------------|
| Status           | Trainee | Validator | Verifier | Team Leader | Technical Reviewer | Technical Expert    |
| Date             |         | 23.03.12  | 23.03.12 | 23.03.12    | 23.03.12           | 1.2, 4.1, 4.3, 13.1 |

| Other qualification |          |   |          |   |   |       |
|---------------------|----------|---|----------|---|---|-------|
| Country Expertise   |          |   |          |   |   |       |
| Region              | 1        | 2 | 3        | 4 | 5 | Other |
| Date                | 23.03.12 |   | 23.03.12 |   |   |       |
| Further countries   |          |   |          |   |   |       |
| Financial Expertise |          |   |          |   |   |       |
| Date                |          |   |          |   |   |       |

| Qualification in technical areas                   |          |
|--|----------|
| Technical Area                                     | Date     |
| 1.2_Energy generation from renewable energy source | 23.03.12 |
| 4.1_Cement sector                                  | 23.03.12 |
| 4.3_Iron and steel sector                          | 23.03.12 |
| 13.1_Waste handling and disposal                   | 23.03.12 |
|  |          |
|  |          |

This appointment is valid until 28.02.2013 and is bound by internal requirements of the Certification Body "Environment and Energy" of TÜV SÜD South Asia Pvt Ltd.

In case of loss of validity of this certificate as per result of an assessment according to internal procedures or due to any other reason, it will be properly communicated to you.

Your Certificate has the internal reference no. CB-IND-CCP-0030/001.

| Date                              | Signature |
|-----------------------------------|-----------|
| 21.11.2012: Extension of Validity |           |
|                                   |           |
|                                   |           |



# CERTIFICATE OF APPOINTMENT

Mr. Wei, Jianquan fulfills the requirements of the Certification Body "Environment and Energy" of TÜV SÜD South Asia Pvt Ltd to participate in audits.

| Qualification applicable to |          |    |     |     |       |
|-----------------------------|----------|----|-----|-----|-------|
| Standard                    | CDM      | GS | VCS | VER | Other |
| Date                        | 22.07.12 |    |     |     |       |

| Qualification as |         |           |          |             |                    |                  |
|------------------|---------|-----------|----------|-------------|--------------------|------------------|
| Status           | Trainee | Validator | Verifier | Team Leader | Technical Reviewer | Technical Expert |
| Date             |         |           |          |             |                    | 4.3              |

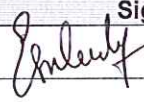
| Other qualification |   |   |   |   |          |       |
|---------------------|---|---|---|---|----------|-------|
| Country Expertise   |   |   |   |   |          |       |
| Region              | 1 | 2 | 3 | 4 | 5        | Other |
| Date                |   |   |   |   | 22.07.12 |       |
| Further countries   |   |   |   |   |          |       |
| Financial Expertise |   |   |   |   |          |       |
| Date                |   |   |   |   |          |       |

| Qualification in technical areas |          |
|----------------------------------|----------|
| Technical Area                   | Date     |
| 4.3_Iron and steel sector        | 22.07.12 |
|                                  |          |
|                                  |          |
|                                  |          |
|                                  |          |
|                                  |          |

This appointment is valid until 28.02.2013 and is bound by internal requirements of the Certification Body "Environment and Energy" of TÜV SÜD South Asia Pvt Ltd.

In case of loss of validity of this certificate as per result of an assessment according to internal procedures or due to any other reason, it will be properly communicated to you.

Your Certificate has the internal reference no. CB-IND-CCP-0052/001.

| Date                              | Signature   |
|-----------------------------------|---|
| 21.11.2012: Extension of Validity |  |
|                                   |   |
|                                   |   |
|                                   |   |





South Asia

## CERTIFICATE OF APPOINTMENT

Mr. Syed, Ali Bukhari Mahmood fulfills the requirements of the Certification Body "Environment and Energy" of TÜV SÜD South Asia Pvt Ltd to participate in audits.

| Qualification applicable to |          |    |     |     |       |
|-----------------------------|----------|----|-----|-----|-------|
| Standard                    | CDM      | GS | VCS | VER | Other |
| Date                        | 07.04.12 |    |     |     |       |

| Qualification as |         |           |          |             |                    |                  |
|------------------|---------|-----------|----------|-------------|--------------------|------------------|
| Status           | Trainee | Validator | Verifier | Team Leader | Technical Reviewer | Technical Expert |
| Date             |         |           |          |             |                    | 1.1, 4.1, 4.10,  |

| Other qualification |          |   |   |   |   |       |
|---------------------|----------|---|---|---|---|-------|
| Country Expertise   |          |   |   |   |   |       |
| Region              | 1        | 2 | 3 | 4 | 5 | Other |
| Date                | 07.04.12 |   |   |   |   |       |
| Further countries   |          |   |   |   |   |       |
| Financial Expertise |          |   |   |   |   |       |
| Date                |          |   |   |   |   |       |

| Qualification in technical areas      |          |
|---------------------------------------|----------|
| Technical Area                        | Date     |
| 1.1_4.10_Thermal energy generation... | 07.04.12 |
| 4.1_Cement sector                     | 07.04.12 |
|                                       |          |
|                                       |          |
|                                       |          |
|                                       |          |

This appointment is valid until 28.02.2013 and is bound by internal requirements of the Certification Body "Environment and Energy" of TÜV SÜD South Asia Pvt Ltd.

In case of loss of validity of this certificate as per result of an assessment according to internal procedures or due to any other reason, it will be properly communicated to you.

Your Certificate has the internal reference no. CB-IND-CCP-0064/001.

| Date                              | Signature |
|-----------------------------------|-----------|
| 21.11.2012: Extension of Validity |           |
|                                   |           |
|                                   |           |
|                                   |           |





South Asia

## CERTIFICATE OF APPOINTMENT

Mr. Agrafiotis, Georgios fulfills the requirements of the Certification Body "Environment and Energy" of TÜV SÜD South Asia Pvt Ltd to participate in audits.

| Qualification applicable to |          |    |     |     |       |
|-----------------------------|----------|----|-----|-----|-------|
| Standard                    | CDM      | GS | VCS | VER | Other |
| Date                        | 22.03.12 |    |     |     |       |

| Qualification as |         |           |          |             |                    |                  |
|------------------|---------|-----------|----------|-------------|--------------------|------------------|
| Status           | Trainee | Validator | Verifier | Team Leader | Technical Reviewer | Technical Expert |
| Date             |         | 22.03.12  | 22.03.12 |             |                    | 1.2, 13.1        |

| Other qualification |          |   |          |   |   |       |
|---------------------|----------|---|----------|---|---|-------|
| Country Expertise   |          |   |          |   |   |       |
| Region              | 1        | 2 | 3        | 4 | 5 | Other |
| Date                | 22.03.12 |   | 22.03.12 |   |   |       |
| Further countries   |          |   |          |   |   |       |
| Financial Expertise |          |   |          |   |   |       |
| Date                | 22.03.12 |   |          |   |   |       |

| Qualification in technical areas                   |          |
|--|----------|
| Technical Area                                     | Date     |
| 13.1_Waste handling and disposal                   | 22.03.12 |
| 1.2_Energy generation from renewable energy source | 22.03.12 |
|  |          |
|  |          |
|  |          |
|  |          |

This appointment is valid until 28.02.2013 and is bound by internal requirements of the Certification Body "Environment and Energy" of TÜV SÜD South Asia Pvt Ltd.

In case of loss of validity of this certificate as per result of an assessment according to internal procedures or due to any other reason, it will be properly communicated to you.

Your Certificate has the internal reference no. CB-IND-CCP-0002/001.

| Date                              | Signature |
|-----------------------------------|-----------|
| 21.11.2012: Extension of Validity |           |
|                                   |           |
|                                   |           |
|                                   |           |