

ASSESSMENT

REGARDING POST REGISTRATION CHANGES

THE INTERNATIONAL BANK FOR
RECONSTRUCTION AND DEVELOPMENT
(IBRD) AS TRUSTEE OF THE PROTOTYPE
CARBON FUND (PCF)

*DURBAN LANDFILL-GAS-TO-ELECTRICITY PROJECT –
MARIANNHILL AND LA MERCY LANDFILLS*

Report No: 8000441647 – 14/152

Date: 2015-07-15

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Project:	Title:		Registr. date:	UNFCCC-No.:
	<i>Durban Landfill-gas-to-electricity project – Mariannhill and La Mercy Landfills</i>		2006-12-15	0545
Project Participant(s):	Host Country PP – Name:		Host Party:	
	Durban Solid Waste (DSW) – eThekweni municipality		South Africa	
	Investor PP(s) – Name(s):		Investor Party(ies)	
	Netherlands' Ministry of Infrastructure and the Environment (IenM); Electrabel S.A.; Netherlands' Ministry of Economic Affairs, Agriculture and Innovation (EL&I); Government of Finland – Ministry of Foreign Affairs of Finland; Fortum Corporation; RWE Power AG; Chubu Electric Power Co. Inc; The Chugoku Electric Power Co. Inc; Kyushu Electric Power Co. Inc.; Mitsubishi Corporation; Tohoku Electric Power Co. Inc.; The Tokyo Electric Power Co. Inc.; Shikoku Electric Power Co. Inc; Japan International Cooperation Agency (JICA); Mitsui & Co. Ltd.; Government of Norway – Ministry of Foreign Affairs; Norsk Hydro ASA; Statoil ASA; Deutsche Bank AG; BP Alternative Energy International Ltd; GDF SUEZ; Government of Sweden - Swedish Energy Agency;		Netherlands, Finland, Germany, Japan, Norway, United Kingdom of Great Britain and Northern Ireland, France, Sweden	
	International Bank for Reconstruction and Development (IBRD) as Trustee of the Prototype Carbon Fund (PCF)		Bilateral and Multilateral Funds	
Applied methodology/ies:	Title:		No.:	Scope:
	Methodology: ACM0001: "Large-scale Consolidated Methodology: Flaring or use of landfill gas", Standardized Baseline: "Standardized baseline: Grid Emission Factor for the Southern African power pool",		ACM0001 ver. 15.0 ASB0001 ver. 01.0	13/13.1
Post Registration Changes:	Type of requested changes		Number of changes	Prior Approval required
	<input type="checkbox"/> Temporary deviations from the MP		-	<input type="checkbox"/>
	<input type="checkbox"/> Temporary deviations from the MM		-	<input type="checkbox"/>
	<input checked="" type="checkbox"/> Corrections that do not affect the project		12	<input type="checkbox"/>
	<input type="checkbox"/> Change to the start date of the crediting p.		-	<input type="checkbox"/>
	<input checked="" type="checkbox"/> Permanent changes from the MP		10	<input checked="" type="checkbox"/>
	<input type="checkbox"/> Permanent changes from the MM		-	<input type="checkbox"/>
	<input type="checkbox"/> Design changes to the project activity/PoA		-	<input type="checkbox"/>
<input type="checkbox"/> Changes specific to A/R		-	<input type="checkbox"/>	
Revised PDD:	Title:	Version:	Attached in TC:	Attached clean:

	Durban Landfill-gas-to-electricity project – Mariannhill and La Mercy Landfills	4	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Assessment team / Technical Review and Final Approval	Assessment Team:		Technical review:	Final approval:
	Stefan Winter (TL); Gregor Kochaniewicz (TM)		Christina Stöhr (OR), Martin Saalman	Martin Saalman
Assessment Opinion:	<input checked="" type="checkbox"/>	The post registration changes require prior Approval by the Board		
	<input type="checkbox"/>	The post registration changes do not require prior Approval by the Board		
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Abbreviations

CA	Corrective Action / Clarification Action
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CL	Clarification Request
CO₂	Carbon Dioxide
CO_{2e}	Carbon Dioxide Equivalent
CP	Certification Program
DNA	Designated National Authority
EB	CDM Executive Board
GHG	Greenhouse Gas(es)
PA	Project Activity
PDD	Project Design Document
PoA	Programme of Activities
PRC	Post Registration Changes
QC/QA	Quality Control/Quality Assurance
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation and Verification Standard

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1 OBJECTIVE / SCOPE

The International Bank for Reconstruction and Development (IBRD) as Trustee of the Prototype Carbon Fund (PCF) has commissioned the TÜV NORD JI/CDM Certification Program (CP) to assess post registration changes of the project

“Durban Landfill-gas-to-electricity project – Mariannhill and La Mercy Landfills”

This report serves for all kind of post registration changes as defined in the PS.

2 GENERAL CHARACTERISTICS

2.1 Project Characteristics

Essential data of the project is presented in the following Table 2-1.

Table 2-1: Project Characteristics

Item	Data
Project title	Durban Landfill-gas-to-electricity project – Mariannhill and La Mercy Landfills
Project type	<input checked="" type="checkbox"/> Standard <input type="checkbox"/> PoA
Project size	<input checked="" type="checkbox"/> Large Scale <input type="checkbox"/> Small Scale
Project Scope (according to UNFCCC sectoral scope numbers for CDM)	<input type="checkbox"/> 1 Energy Industries (renewable- /non-renewable sources)
	<input type="checkbox"/> 2 Energy distribution
	<input type="checkbox"/> 3 Energy demand
	<input type="checkbox"/> 4 Manufacturing industries
	<input type="checkbox"/> 5 Chemical industry
	<input type="checkbox"/> 6 Construction
	<input type="checkbox"/> 7 Transport
	<input type="checkbox"/> 8 Mining/Mineral production
	<input type="checkbox"/> 9 Metal production
	<input type="checkbox"/> 10 Fugitive emissions from fuels (solid, oil and gas)
	<input type="checkbox"/> 11 Fugitive emissions from production and consumption of halocarbons and hexafluoride
	<input type="checkbox"/> 12 Solvents use
	<input checked="" type="checkbox"/> 13 Waste handling and disposal
	<input type="checkbox"/> 14 Afforestation and Reforestation
	<input type="checkbox"/> 15 Agriculture
	<input type="checkbox"/> 16 Carbon capture and storage
Applied Methodology	<i>Methodology: ACM0001: “Large-scale Consolidated Methodology: Flaring or use of landfill gas”, Standardized Baseline: “Standardized baseline: Grid Emission Factor for the Southern African power pool”</i>
Technical Area(s)	13.1: Solid waste and waste water
CDM registration No.	0545
Crediting period	<input checked="" type="checkbox"/> Renewable Crediting Period (7 y) <input type="checkbox"/> Fixed Crediting Period (10 y)

For a detailed project description please refer to the registered PDD and/or the latest verification report.

2.2 Overview of Post Registration Changes

Within this report post registration changes as listed in Table 2-2 are assessed.

Table 2-2: Overview Post Registration Changes

#	Applicable as of / from - to	Type of post registration change ¹⁾	Description
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#	Applicable as of / from - to	Type of post registration change ¹⁾	Description
1	-	TDfrMP	-
2	-	TDfMM	-
3	2013-12-15	CrPDD	<p>The PDD has been corrected for the following points as identified during last onsite audit by DOE:</p> <ol style="list-style-type: none"> 1. A.4: Correction of indication of involvement of Parties and IBRD as Bilateral and Multilateral Fund as per latest MOC. 2. Page 24 of PDD: The description for $p_{H20,t,Sat}$ is updated to be consistent with related tool for gaseous stream. 3. Page 30: The reference to Parameter Carbon Emission Factor CEF is deleted as not used any longer. 4. Page 31 of PDD: Parameter indication of grid emission factor is updated to be consistent between equation and description below the equation in the PDD ($EF_{EL,j,y}$ and $EF_{grid,y}$). Similar for parameter TDL. 5. B.6.2: Value for methane density is updated as it is given with 0.0007168 tCH₄/m³CH₄ in the PDD whereas the related tool states 0.716 kgCH₄/m³CH₄ which is also applied in ER calculation. 6. B.6.2: Parameter f is now revised to f_y and the description is updated to be consistent with related tool. 7. B.6.2: Parameter description for parameter η_{PJ} is updated to be consistent with related methodology. Further PDD is updated for the source of data and choice of data it is referred to ACM0001. 8. B.6.2: Description for each waste type under parameter DOC_i is updated to be consistent with related tool. 9. B.6.2: Parameter $CEF_{electricity,y}$ has been changed to parameter $EF_{EL,k,y}$. 10. B.6.2: Values applied for parameter $\eta_{Flare,m}$ have been updated to be consistent with the related tool. 11. B.7.1: Parameter $EC_{PJ,y}$: The description is corrected from "Quantity" of elec consumed in line with related the methodology which states "Amount". 12. B.7.1: Parameter Management of SWSD: Clarification is provided under measurement method w.r.t. the abbreviation "the PE".
4	-	ChSD	-
5	2013-12-15	PCfrMP	<p>The monitoring plan has been updated w.r.t. the following points and issues:</p> <ol style="list-style-type: none"> 1. Flow diagram has been updated to include the measurement points in PDD w.r.t. actual conditions found onsite 2. Removal of three parameters for monitoring of LFG volume on wet basis as the LFG is monitored on dry basis. ($V_{LFGsent_flare,y,wb}$, $V_{LFGtotal,y,wb}$ and $V_{LFGEL,y,wb}$) 3. Revision of QA/QC and additional comment for parameter w.r.t volumetric flow of LFG 4. The reg PDD is updated w.r.t. the parameter as per tool "Project emissions from flaring" ver 2 SPEC_{flare} in section B.6.2. The tool states that the flare specifications have to be

#	Applicable as of / from - to	Type of post registration change ¹⁾	Description
			documented in the CDM-PDD. 5. The monitoring plan as per reg PDD B.7.1 is updated w.r.t. the parameter $p_{H2O,t,Sat}$ as indicated in related tool for gaseous stream. 6. Parameter T_t : The QA/QC procedure is updated to be consistent with the “tool to determine the mass flow of a greenhouse gas in a gaseous stream”. Besides the source of data is updated in line onsite observation. Finally the monitoring frequency is also corrected. 7. Parameter P_t : The QA/QC procedure is updated to be consistent with the “tool to determine the mass flow of a greenhouse gas in a gaseous stream”. Finally the monitoring frequency is also corrected. 8. Parameter $EG_{PJ,y}$: The measurement procedure is updated to be consistent with the related methodology. Further the determination of net elec. is further specified in line with the onsite observation where the elec. import is deducted from the export generated by the gas engine via bi-directional meter. 9. Parameter $Op_{flare,h}$: As per onsite only a flame detection is used for determination of the flare operation however two criteria are mentioned in PDD. 10. Ex-ante fixed parameter OX has been deleted as already parameter OX_{top_layer} in line with methodology ACM0001 is given.
6	-	PCfMM	-
7	-	CoPD	-
8	-	CstAR	-

- ¹⁾
- TDfrMP : Temporary deviation from registered monitoring plan
 - TDfMM : Temporary deviation from the monitoring methodology
 - CrPDD : Corrections to the registered PDD
 - ChSD : Change to the start date of the crediting period
 - PCfrMP : Permanent changes from registered Monitoring Plan
 - PCfMM : Permanent changes from Monitoring Methodology
 - CoPD : Changes to the project design of a registered project activity / PoA
 - CstAR : Changes specific to afforestation or reforestation

2.3 Assessment team members and technical reviewers

On the basis of a competence analysis and individual availabilities an assessment team, consistent of one team leader and one additional team members, were appointed. Furthermore also the personnel for the technical review and the final approval were determined.

The list of involved personnel, the tasks assigned and the qualification status are summarized in the table 2-3 below.

Table 2-3: Involved Personnel

	Name	Company	Function ¹⁾	Qualification Status ²⁾	Scheme competence ³⁾	Technical competence ⁴⁾	Verification competence ⁵⁾	Host country Competence	On-site visit
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Stefan Winter	TN CERT GmbH	TL	SA	<input checked="" type="checkbox"/>	13.1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Gregor Kochaniewicz	TN Rwanda	TM ^{A)}	LA	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/> Mr. <input checked="" type="checkbox"/> Ms.	Christina Stöhr	TN CERT GmbH	OR ^{B)}	LA	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Martin Saalman	TN CERT GmbH	TR/FA ^{B)}	SA	<input checked="" type="checkbox"/>	13.1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	-

¹⁾ TL: Team Leader; TM: Team Member, TR: Technical review; OT: Observer-Team, OR: Observer-TR; FA: Final approval

²⁾ GHG Auditor Status: A: Assessor; LA: Lead Assessor; SA: Senior Assessor; T: Trainee; TE: Technical Expert

³⁾ GHG auditor status (at least Assessor)

⁴⁾ As per S01-MU03 or S01-VA070-A2 (such as 1.1, 1.2, ...)

⁵⁾ In case of verification projects

A) Team Member: GHG auditor (at least Assessor status), Technical Expert (incl. Host Country Expert or Verification Expert), not ETE

B) No team member

2.4 Assessment Steps

The *assessment of post registration changes* consisted of the following steps:

- Appointment of team members and technical reviewers
- A desk review of the registered and revised PDD^{/PDD/} submitted by the client and additional supporting documents
- On-Site assessment (if required)

- Background investigation and follow-up interviews with personnel of the project developer and its contractors,
- Resolution of corrective actions (CARs / CLs) (if any)
- Final reporting
- Technical review
- Final approval.

In this case all activities were carried out as part of the 6th verification of this project activity.

2.5 Review of Documents

The registered as well as the revised PDD and supporting background documents related to the project design and the post registration changes were reviewed.

As far as required the assessment team used additional documentation by third parties like host party legislation, technical reports referring to the project design or to the basic conditions and technical data.

2.6 Follow-up Interviews

The validation team has carried out interviews in order to assess the information included in the project documentation and to gain additional information regarding the compliance of the project with the relevant criteria applicable for CDM.

During validation the validation team has performed interviews to confirm selected information and to resolve issues identified in the document review. The main topics of the interviews are summarized in table 2-4.

Table 2-4: Interviewed persons and interview topics

Interviewed Persons / Entities	Interview topics
Project proponent representatives Project consultant	<ul style="list-style-type: none">- Details of the project validation and earlier verifications- Project history- Technical details of plant- Intended / implemented changes from the previous project design- Impact of changes on the additionality justification- Impact on the monitoring of the project- Editorial issues of the revised PDD

A comprehensive list of all interviewed persons is part of section 7 'References'.

2.7 Resolution of Clarification and Corrective Action Requests

2.7.1 Definition

A **Corrective Action Request (CAR)** will be established where:

- mistakes have been made in assumptions, application of the methodology or the project documentation which will have a direct influence the project results,
- the requirements deemed relevant for validation of the intended / implemented changes,
- there is a risk that the changes cannot be approved by the UNFCCC or that emission reductions would not be able to be verified and certified after the implementation of the changes.

A **Clarification Request (CL)** will be issued where information is insufficient, unclear or not transparent enough to establish whether a requirement is met.

2.7.2 Assessment

After reviewing all relevant documents and taken all other relevant information into account, the assessment team issues all findings (in the course of a draft report, if applicable) and hands over the findings to the project proponent in order to respond on the issues raised and to revise the documentation accordingly.

The final reporting step starts after resolution of the raised CARs and CLs. In case the findings from CARs and CLs cannot be resolved by the project proponent or the proposed action related to the FARs raised cannot be assessed as adequate, no positive assessment opinion can be issued by the validation team.

The CAR(s) / CL(s) / FAR(s) are documented in the context of the respective chapters.

2.8 Technical review

Before submission of the final assessment report a technical review is carried out. The technical reviewer is a competent GHG auditor being appointed for the scope this project falls under. The technical reviewer is not considered to be part of the verification team and thus not involved in the decision making process up to the technical review.

As a result of the technical review process the assessment opinion as prepared by the validation team leader may be confirmed or revised. Furthermore reporting improvements might be achieved.

2.9 Final approval

After successful technical review of the final report an overall (esp. procedural) assessment of the requested post registration changes will be carried out by a senior assessor located in the accredited premises of TÜV NORD.

Only after this step the notification or the report can be forwarded to the UNFCCC (in case of a positive validation opinion).

3 CHANGES THAT DO NOT AFFECT THE PROJECT DESIGN

3.1 Assessment of Changes

Requested Deviation / Change #1			
Type of change(s):	<input type="checkbox"/> Temporary Deviation from Monitoring Plan <input type="checkbox"/> Temporary Deviation from Monitoring Methodology <input checked="" type="checkbox"/> Corrections that do not affect the project design <input type="checkbox"/> Permanent Change from Monitoring Plan <input type="checkbox"/> Permanent Change from Monitoring Methodology <input type="checkbox"/> Changes specific to afforestation or reforestation		
A. Description of post registration change			
Start Date: Please provide the start date of the change	2013-12-15	End Date: Please provide the end date of the change, if applicable	-
Description: Please give a detailed description of the change(s)	The PDD has been corrected for the following points as identified during last onsite audit by DOE: <ol style="list-style-type: none"> 1. A.4: Correction of indication of involvement of Parties and IBRD as Bilateral and Multilateral Fund as per latest MOC. 2. Page 24 of PDD: The description for $p_{H20,t.Sat}$ is updated to be consistent with related tool for gaseous stream. 3. Page 30: The reference to Parameter Carbon Emission Factor CEF is deleted as not used any longer. 4. Page 31 of PDD: Parameter indication of grid emission factor is updated to be consistent between equation and description below the equation in the PDD ($EF_{EL,i,y}$ and $EF_{grid,y}$). Similar for parameter TDL. 5. B.6.2: Value for methane density is updated as it is given with 0.0007168 tCH₄/m³CH₄ in the PDD whereas the related tool states 0.716 kgCH₄/m³CH₄ which is also applied in ER calculation. 6. B.6.2: Parameter f is now revised to f_v and the description is updated to be consistent with related tool. 7. B.6.2: Parameter description for parameter η_{PJ} is updated to be consistent with related methodology. Further PDD is updated for the source of data and choice of data it is referred to ACM0001. 8. B.6.2: Description for each waste type under parameter DOC_i is updated to be consistent with related tool. 9. B.6.2: Parameter $CEF_{electricity,y}$ has been changed to parameter $EF_{EL,k,y}$. 10. B.6.2: Values applied for parameter $\eta_{Flare,m}$ have been updated to be consistent with the related tool. 11. B.7.1: Parameter $EC_{PJ,y}$: The description is corrected from "Quantity" of elec consumed in line with related the methodology which states "Amount". 12. B.7.1: Parameter Management of SWSD: Clarification is provided under measurement method w.r.t. the abbreviation "the PE". 		

Requested Deviation / Change #1	
B. Assessment of post registration change – Corrections	
Correctness: Please assess whether the corrected information (incl. ex-ante values) is an accurate reflection of actual project information.	The updated PDD has been checked and based on onsite visit, interview with PP as well as document check against updated PDD as well as methodology the PDD is correctly updated accordingly. All mistakes identified have been corrected.
MP/MM Compliance : Please check whether the corrected parameters are in accordance with the MM and/or MP.	By check of related methodology with updated PDD it is confirmed that the changes are in compliance with the monitoring plan and monitoring methodology and related tools.
Appendix 1 PS: Check whether the affect the design of the PA.	The changes do not affect the design of the project and are mentioned in Appendix 1 of the PS.
C. Revised PDD	
Rev. of PDD: Check whether the changes have been fully addressed in a revised PDD.	<input checked="" type="checkbox"/> The changes have correctly been reflected in the revised PDD. <input type="checkbox"/> A revision of the PDD is not required (in case of temp. changes). <input checked="" type="checkbox"/> The revised PDD has been forwarded in (i) track-change and (ii) clean version.
D. Prior Approval	
Prior approval: Assess whether the change requires prior approval of the board	<input type="checkbox"/> <i>The post registration change requires prior approval</i> <input checked="" type="checkbox"/> <i>The post registration change does not require prior approval</i>

Requested Deviation / Change #2			
Type of change(s):	<input type="checkbox"/> <i>Temporary Deviation from Monitoring Plan</i> <input type="checkbox"/> <i>Temporary Deviation from Monitoring Methodology</i> <input type="checkbox"/> <i>Corrections that do not affect the project design</i> <input checked="" type="checkbox"/> <i>Permanent Change from Monitoring Plan</i> <input type="checkbox"/> <i>Permanent Change from Monitoring Methodology</i> <input type="checkbox"/> <i>Changes specific to afforestation or reforestation</i>		
A. Description of post registration change			
Start Date: Please provide the start date of the change	2013-12-15	End Date: Please provide the end date of the change, if applicable	-

Requested Deviation / Change #2

Description:

Please give a detailed description of the change(s)

The monitoring plan has been updated w.r.t. the following points and issues:

1. Flow diagram has been updated to include the measurement points in PDD w.r.t. actual conditions found onsite
2. Removal of three parameters for monitoring of LFG volume on wet basis as the LFG is monitored on dry basis. ($V_{LFGsent_flare,y,wb}$, $V_{LFGtotal,y,wb}$ and $V_{LFGEL,y,wb}$)
3. Revision of QA/QC and additional comment for parameter w.r.t volumetric flow of LFG as well as specification of monitoring frequency
4. The reg PDD is updated w.r.t. the parameter as per tool "Project emissions from flaring" ver 2 SPEC_{flare} in section B.6.2. The tool states that the flare specifications have to be documented in the CDM-PDD.
5. The monitoring plan as per reg PDD B.7.1 is updated w.r.t. the parameter $p_{H20,t,Sat}$ as indicated in related tool for gaseous stream.
6. Parameter T_i : The QA/QC procedure is updated to be consistent with the "tool to determine the mass flow of a greenhouse gas in a gaseous stream". Besides the source of data is updated in line onsite observation. Finally the monitoring frequency is also corrected.
7. Parameter P_i : The QA/QC procedure is updated to be consistent with the "tool to determine the mass flow of a greenhouse gas in a gaseous stream". Finally the monitoring frequency is also corrected.
8. Parameter $EG_{PJ,y}$: The measurement procedure is updated to be consistent with the related methodology. Further the determination of net elec. is further specified in line with the onsite observation where the elec. import is deducted from the export generated by the gas engine via bi-directional meter.
9. Parameter $Op_{flare,h}$: As per onsite only a flame detection is used for determination of the flare operation however two criteria are mentioned in PDD.
10. Ex-ante fixed parameter OX has been deleted as already parameter OX_{top_layer} in line with methodology ACM0001 is given.

B. Assessment of post registration change – Permanent changes from MP or MM

Requested Deviation / Change #2

MM compliance:

Please check in case of changes to the registered MP, whether they are in compliance with the MM.

1. The update of the flow diagram has no direct impact on any regulation from the methodology. As per instructions to fill the PDD a diagram showing all monitoring points has to be provided I section B.3 of the PDD. However during site visit it has been identified that the diagram is not up-to-date with actual conditions. The diagram has therefore been updated accordingly which is checked during onsite visit and project layout diagram. The updated monitoring plan/diagram is therefore in line with the related methodology.
2. The three parameters are not required as the project applies Option A of the related tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" ver 2. Option A on page 5 of the tool states that a gas is considered as dry if it can be demonstrated that the temperature of the gas is less than 60°C at the flow measurement point. DOE has checked the temperature measurement equipment (parameter Tt) and can confirm that it is installed close to the flow meter. Further DOE checked the supporting documents such as DCS and ER spreadsheet and can therefore confirm that during last years the temperature was never above 60°C. Based on that the exclusion of parameters for flow on wet basis is considered in line with applied requirements and therefore those parameters are obsolete.
3. The monitoring plan contains three parameters for volumetric flow of LFG. LFG to flare, LFG for electricity generation and total LFG. All on dry basis (see point 2 just before). The flow meters will be calibrated against primary device as required by related tool. However for two of the meters the description "will be conducted by the manufacturer or by those delegated by the manufacturer" has been deleted to prevent misunderstandings. The wording "is mandatory" is also deleted as it is clear that the stated procedure has to be done. Further it is added under additional comment that the values are automatically provided by the measurement equipment in standardized cubic meter and the SCADA system converts the values to normalized cubic meters. This is changed due to a finding during onsite visit. The procedure is in line with the methodology and related tool. And correct as per practice found during site visit. Further specification is provided that due to measurement on dry basis no further monitoring of T and p is required. As per onsite related tool the gas is considered dry if below 60°C see point 2 just before. This has been demonstrated by checking related values from monitoring system. Also the T measurement point is close to the volume flow point as checked during site visit. See also CAR A1 below w.r.t assessment of updated QA/QC procedure. DOE considers the calibration conducted by an manufacturer as sufficient as the related manufacturer holds related ISO/IEC 17025 accredited facilities around the world which has been checked by technical specs as well as is stated on each calibration certificate and known by the DOE as also located in Germany and conducted hundreds of audits where their equipment is used. Recording values every minute is deemed sufficient and as per actual practice found during site visit. From the minute value daily and monthly values are calculated as found during site visit and check of docs.
4. In the updated PDD provides now the specifications of the installed flare in line with the related tool "Project emissions from flaring" ver 2. The specifications provided have been checked with the technical specifications of the manufacturer and found consistent. The monitoring plan is now in line with the tool.

Requested Deviation / Change #2	
	<p>5. The monitoring plan has been updated to be in line with the requirement of the related tool “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” ver 2. Therefore the monitoring plan is now in compliance with the tool.</p> <p>6. and 7. The PDD has been correctly updated w.r.t. the requirements of the related tool. The monitoring plan is now in compliance with the tool.</p> <p>8. The PDD has been correctly updated w.r.t. the requirements of the related tool. The monitoring plan is now in compliance with the methodology and actual conditions found onsite.</p> <p>9. As per ACM0001 the requirement states as following: For each equipment unit j using <i>the LFG</i> monitor that the plant is operating in hour h by the monitoring any one or more of the following three parameters:</p> <p>(a) Temperature. Determine the location for temperature measurements and minimum operational temperature based on manufacturer's specifications of the burning equipment. Document and justify the location and minimum threshold in the PDD;</p> <p>(b) Flame. Flame detection system is used to ensure that the equipment is in operation; (c) Products generated. Monitor the generation of steam for the case of boilers and air-heaters and glass for the case of glass melting furnances. This option is not applicable to brick kilns.</p> <p>Opj,h=0 when:</p> <p>(a) One of more temperature measurements are missing or below the minimum threshold in hour h (instantaneous measurements are made at least every minute);</p> <p>(b) Flame is not detected continuously in hour h (instantaneous measurements are made at least every minute);</p> <p>(c) No products are generated in the hour h.</p> <p>Otherwise, Opj,h=1</p> <p>The related methodology clearly stated that any one of the three stated requirements is sufficient to satisfy the monitoring requirement. As the PP has installed a flame detection system which is given as point (b) above the deletion of the criteria for temperature has no impact on the compliance with the related methodology.</p> <p>10. Deletion of parameter OX is considered ok as parameter OX_{top_layer} is already given in line with related methodology ACM0001 version 15. Due to this the parameter was provided twice. The deletion increases transparency and reduces redundancy.</p>
<p>Later version of MM:</p> <p>Please check in cases where compliance with a later version of the MM is demonstrated that the conservativeness of the monitoring and verification is not affected.</p>	Not applicable as the applied methodology is the latest available version.
<p>Accuracy:</p> <p>Please give a detailed assessment whether the change is likely to lead to a reduction in the accuracy of</p>	<p>1. The change leads to an accurate description of actual conditions</p> <p>2. See above under MM compliance. As Option A page 5 of related tool is applied the three parameters are obsolete and the monitoring plan covers all requirements to monitor the LFG on dry basis. The deletion does</p>

Requested Deviation / Change #2	
the ER calculation.	<p>therefore not reduce the accuracy of the results or the monitoring plan.</p> <p>3. The measurement procedure applied is the same as before, against a primary device. As the related manufacturer holds ISO/IEC 17025 accredited facilities around the world no reduction in accuracy is expected. Besides the installed equipment has a tolerance limit of $\pm 1.5\%$ and the certificate showed max error of 0.58% at 10% flow and -0.09% at 88.5% flow. The equipment is therefore deemed adequate and sufficient for the related measurement task. Besides the monitoring plan is updated as per actual practice esp. w.r.t. value output from the equipment and the conversion in the SCADA system. Monitoring frequency of every minute is also deemed sufficient as in line with the system used and as per actual practice. Further specification is provided that due to measurement on dry basis no further monitoring of T and p is required.</p> <p>4. The change leads to higher accuracy as now the specifications are clearly mentioned in the PDD and can be easier assessed by any DOE during upcoming verifications.</p> <p>5. As the parameter was previously not mentioned, the monitoring plan is now more accurate than before. However it is to be mentioned that the value has been monitored and recorded and related requirements for ER calculation have been always conducted in a correct way. Only the parameter was not provided in section B.7.1 of PDD which has been now corrected.</p> <p>6. , 7., 8., 9. and 10. The changes lead to an accurate description of the actual conditions found during onsite visit and as per provisions in related tool or methodology.</p>
Conservative-ness: Please give a detailed assessment whether conservative assumptions or discount factors have been applied to ensure that ER will not be overestimated.	<p>1. Not applicable</p> <p>2. Not applicable</p> <p>3. See point before under accuracy.</p> <p>4. Not applicable</p> <p>5. Not applicable. See above under accuracy.</p> <p>6. Not applicable</p> <p>7. Not applicable</p> <p>8. Not applicable</p> <p>9. Not applicable</p> <p>10. Not applicable</p>
Appendix 1 PS: Check if the changes fall under one of the scenarios of appendix 1 of the PS.	The changes do not fall under any scenario as per Appendix 1 of PS.
C. Revised PDD	
Rev. of PDD: Check whether the changes have been fully addressed in a revised PDD.	<p><input checked="" type="checkbox"/> The changes have correctly been reflected in the revised PDD.</p> <p><input type="checkbox"/> A revision of the PDD is not required (in case of temp. changes).</p> <p><input checked="" type="checkbox"/> The revised PDD has been forwarded in (i) track-change and (ii) clean version.</p>
D. Prior Approval	

Requested Deviation / Change #2

Prior approval:

Assess whether the change requires prior approval of the board

☒ The post registration change requires prior approval

☐ The post registration change does not require prior approval

3.2 Related Findings

The following table(s) include all raised CARs and CLs and the assessments of the same by the assessment team.

Finding	A1	
Classification	<input checked="" type="checkbox"/> CAR	<input type="checkbox"/> CL
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	<p>Section B.7.1 of the updated PDD mentions for all volume parameters under QA/QC that the periodic calibration will be conducted by the manufacturer or by those delegated by the manufacturer. However this is not in line with tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" ver 2 which requires as following:</p> <p>"Periodic calibration against a primary device provided by an independent accredited laboratory is mandatory. Calibration and frequency of calibration is according to manufacturer's specifications"</p>	
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	<p>Paragraph 279 c) of the CDM validation and verification standard (version 07.0) states that the equipment should be:</p> <p><i>"[...] controlled and calibrated in accordance with the monitoring plan, the applied methodology, the applied standardized baseline, the Board guidance, local/national standards, or as per the manufacturer's specification"</i></p> <p><i>As per the CDM Validation and Verification Standard v 07.0, the flow meters will be calibrated as per manufacturer' specifications.</i></p>	
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	<p>Not ok. The tool mandatorily requires that the measurement equipment is periodically calibrated against a primary device provided by an independent accredited laboratory.</p>	
Corrective Action #2	<p>PDD has been updated accordingly.</p>	

Finding	A1
DOE Assessment #2	The deletion of the related description has been revised. QA/QC now again states that periodic calibration against a primary device provided by an independent accredited entity such as the manufacturer is conducted. The DOE has checked related technical specification as well as calibration report of the installed meters by Endress+Hauser which indicate that the manufacturer operates an ISO/IEC 17025 accredited calibration facilities in Reinach (Germany), Cernay (France), Greenwood (USA), Aurangabad (India) and Suzhou (P.R. China). Based on that the DOE considers the applied QA/QC procedure that the periodic calibration is conducted against a primary device provided by an independent accredited entity such as the manufacturer as in line with the related tool as well as UNFCCC requirements. Finding closed.
Conclusion <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed

4 CHANGE TO THE START DATE OF THE CREDITING PERIOD

The post registration changes do not fall under this category.

5 CHANGES TO THE PROJECT / PROGRAMME DESIGN

The post registration changes do not fall under this category.

6 SUMMARY OF ASSESSMENT OPINIONS

The below listed changes have occurred after the registration of the project / PoA.

<i>Type of Change occurred</i>	<i>Total No. of changes</i>	<i>No. of changes which require prior approval</i>
<input type="checkbox"/> Temporary deviations from the MP		
<input type="checkbox"/> Temporary deviations from the MM		
<input checked="" type="checkbox"/> Corrections that do not affect the project	12	0
<input type="checkbox"/> Change to the start date of the crediting p.		
<input checked="" type="checkbox"/> Permanent changes from the MP	10	10
<input type="checkbox"/> Permanent changes from the MM		
<input type="checkbox"/> Design changes to the project activity / PoA		
<input type="checkbox"/> Changes specific to AR projects		

The above listed post registration changes require prior approval of the Board.

Essen, 2015-07-15



Stefan Winter
TÜV NORD JI/CDM CP
Assessment Team Leader

Essen, 2015-07-15



Martin Saalman
TÜV NORD JI/CDM CP
Final Approval

7 REFERENCES

Table 7-1: Documents provided by the project participant

Reference	Document
/ICC/	Certificate of Calibration of Thermocouple Probe, Serial No 3397084/3397085/3397086/3397087/3397087/3397089/, dated 2013-12-11 Certificate of Calibration (Gascard NG), dated 2013-11-12; Certificate of Calibration (Gascard NG), dated 2013-08-22; Certificate of Calibration (Gascard NG), dated 2014-03-13; Calibration of Gas Cylinder 2013-02-04; Calibration of Gas Cylinder 2014-01-19; Calibration Certificate by Endress+Hauser for flow meter 1 and flow meter 2 Proline t-mass 65F dated 2015-03-11;
/CAUD/	Permit Compliance Audit of the Mariannhill G:L:B+ Landfill Site Located on Sub Lot 79 of Zeenoegat No 937, Kwazulu Natal: Permit No: B33/2/1920/27/1/P241, dated July 2014.
/COM/	Contingency Management Plan. Cleansing and Solid Waste DSW, Mariannhill Landfill Site
/DAT/	MH Site Record Sheet from 2013-12 to 2014-09
/DPR/	CDM Data Processing: Step by Step Methodology (Envitech Solution)
/DSR/	Daily site record sheet (Envitech Solution)
/ELEB/	Monthly Electricity Billing spreadsheet
/ELER/	Monthly Electricity Reading by metering department
/ESK/	Eskom Integrated Results for the year ended 31 March 2014
/FMA/	Test Report: Mariannhill Landfill Flow Meter Audits, dated 2014-01-30,
/GMR/	GAS WELL MONITORING REPORT: MARIANNHILL LANDFILL SITE
/HRT/	Heat Rate Testing – GE Jenbacher 320 Series Engines, dated February 2014
/LPL/	Mariannhill overall gas wells October 2014 (drawing)
/MCL/	Methodology for the Calculation of CERs for the Durban/World Bank CDM

Reference	Document
	Landfill Gas to Electricity Project (Version 4, August 2014)
/WDR/	Waste delivery record
/MR/	Durban Landfill-gas-to-electricity project – Mariannhill and La Mercy Landfills; MR version 01; 2014-01-28
/OPR/	Durban Gas to Electricity CDM Project: Operation & Maintenance (Minutes of Meeting 51 Held on 17 June 2014)
/REC/	Mariannhill Monthly Report 2014B 22 13_15-Excel
/TS/	Technical data sheets/specifications for the <ul style="list-style-type: none"> • Resistance Thermometers, Model TR200 (data sheet) • Pressure Transmitters PTX 7900 Series (data sheet) • GA5000 Portable gas analyser (technical specification); • Biogas 5000 Gas Analyser. Operating Manual; • Gascard NG infrared Gas Monitoring Users Manual • Series 353FT Insertion Mass Flow Transmitter User's Guide • E+H Proline t-mass 65F thermal mass flowmeter
/TRAIN/	Trainings records: <ul style="list-style-type: none"> • Certificate; Field Tech Basic Training, training dates: 03.05.2010 to 07.05.2010 • Operation and Maintenance SC Flare Stack • Operation and Maintenance Gas Booster
/XLS/	Initial Emission reduction calculation summary spreadsheet Initial monthly CDM Data spreadsheets including raw data from the digital control system by Envitech Solutions

Table 7-2: Background investigation and assessment documents

Reference	Document
/ACM1/	ACM0001 ver 15, "Large-scale Consolidated Methodology: Flaring or use of landfill gas" Standardized baseline „Grid emission factor for the Southern African power pool" version 1.0
/TOOL/	<ul style="list-style-type: none"> • Methodological Tool: "Emissions from solid waste disposal sites", Version 06.0.1; • Methodological Tool: "Project and leakage emissions from transportation of freight", Version 01.1.0;

Reference	Document
	<ul style="list-style-type: none"> • Methodological Tool: “Project emissions from flaring” Version 02.0.0; • Methodological Tool: “Tool to calculate project or leakage CO2 emissions from fossil fuel combustion”, Version 02; • Methodological Tool: “Tool to determine the baseline efficiency of thermal or electric energy generation systems”., Version 01: • Methodological Tool: “Tool to determine the mass flow of a greenhouse gas in a gaseous stream”, Version 02.0.0
/CPM/	TÜV NORD JI / CDM CP Manual (incl. CP procedures and forms)
/GRC/	NRS 057 SANA 474 (South African Grid Code)
/IPCC/	<ol style="list-style-type: none"> 1. 1996 IPCC Guidelines for National Greenhouse Gas Inventories: work book 2. 2006 IPCC Guidelines for National Greenhouse Gas Inventories: work book
/KP/	Kyoto Protocol (1997)
/MA/	Decision 3/CMP. 1 (Marrakesh – Accords)
/MRT/	Monitoring Report Form (CDM-MR-FORM), Version 4.0
/PDD/	<p>Project Design Document for CDM project: “Durban landfill-Gas-to-Electricity Project – Mariannhill and La Mercy Landfills” PDD version 03; 2014-01-28</p> <p>Updated Project Design Document for CDM project: “Durban landfill-Gas-to-Electricity Project – Mariannhill and La Mercy Landfills” PDD version 04; 2015-06-30</p>
/PS/	CDM Project Standard (Version 7.0)
/VAL/	Validation Report for CDM project “Durban landfill-Gas-to-Electricity Project – Mariannhill and La Mercy Landfills” for Renewal of Crediting Period, version 02, dated 2014-01-31
/VVS/	CDM Validation and Verification Standard (Version 07.0)

Table 7-3: Websites used

Reference	Link	Organisation
/dna-HP/	http://www.energy.gov.za/files/esources/kyoto/kyoto_frame.html	DNA of South Africa

Reference	Link	Organisation
/unfccc/	http://cdm.unfccc.int	UNFCCC
/ipcc/	www.ipcc-nggip.iges.or.jp	IPCC publications

Table 7-4: List of interviewed persons

Reference	Moi ¹		Name	Organisation / Function
/IM01/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms	Marc Wright	D.S.W./ Project Engineer
/IM01/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms	Richard Winn	D.S.W./Environmental Assets Management
/IM01/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms	Logan Modley	eThekweni Municipality D.S.W/Engineer
/IM01/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms	Sanjeeth Sewcharran	eThekweni Municipality/ Electrical Engineer
/IM02/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Brendon Jewaskiewicz	Envitech/Managing Director
/IM02/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Ryan Lidegue	Peters Plant Hire/Gas engine technician
/IM02/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Jon Pass	Wilson & Pass Inc./Technical and admin advice to D.S.W.
/IM02/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Robin Bissett	Environeaka/ Air Quality and Emissions
/IM02/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Grant Pearson	SLR Consulting/Principal
/IM02/	V	<input type="checkbox"/> Mr. <input checked="" type="checkbox"/> Ms.	Claudia Barrera	The World Bank/Carbon Finance Specialist
/IM02/	V	<input type="checkbox"/> Mr. <input checked="" type="checkbox"/> Ms.	Patricia Marcos Huidobro	The World Bank/Carbon Finance Specialist

¹⁾ Means of Interview: (Telephone, **E**-Mail, **V**isit)

APPENDIX

- A1:** Assessment of Financial Parameters
- A2:** Assessment of Barrier analysis
- A3:** Competence statements of involved personnel


APPENDIX 1: ASSESSMENT OF FINANCIAL PARAMETERS

Not applicable

APPENDIX 2: ASSESSMENT OF BARRIER ANALYSIS

Not applicable

APPENDIX 3: STATEMENTS OF COMPETENCE OF INVOLVED PERSONNEL



Statement of Competence
Appointment and authorization according to the procedures
of the TÜV NORD JI/CDM Certification Program

Mr. Grzegorz Kochaniewicz


SCHEME	STATUS	VALID UNTIL
CDM	Lead Assessor Validator/Verification	2016-01-24
VCS / ISO 14064-2	Lead Assessor	2016-01-24

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA	TR SUBCATEGORIES
1.2	Renewable Energies	1.2.1 Hydro 1.2.2 Wind 1.2.3 Geothermal 1.2.4 Solar
3.1	Energy Demand	
14.1	Forestry	

173 – Rev. 5, Date: 2014-12-12

173_S01-VAB02-F20_2014-12-12_mf.doc S01-VAB02-F20 rev3 / 2012-05-25



Statement of Competence
Appointment and authorization according to the procedures
of the TÜV NORD JI/CDM Certification Program

Mr. Stefan Winter


SCHEME	STATUS	VALID UNTIL
CDM	Senior Assessor (Validation, Verification) Technical Reviewer	2017-07-27
VCS	Senior Assessor (Validation, Verification) Technical Reviewer	2017-07-27

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA	TR SUBCATEGORIES
1.1	Thermal energy generation	
1.2	Renewable Energy	1.2.1 Hydro 1.2.2 Wind 1.2.3 Geothermal 1.2.4 Solar 1.2.5 Tidal
2.2	Heat distribution	
3.1	Energy demand	
13.1	Waste handling and disposal	13.1.1 Waste management 13.1.2 Waste water management
13.2	Animal waste management	
15.2	Animal waste management	

163 – Rev. 3, Date: 2014-07-28

163_S01-F003_2014-07-28_mf.doc S01-F003 rev1 / 2011-08-02



Statement of Competence
Appointment and authorization according to the procedures
of the TÜV NORD JI/CDM Certification Program

Mr. Martin Saalmann

SCHEME	STATUS	VALID UNTIL
CDM	Senior Assessor (Validation, Verification) Technical Reviewer	2015-05-15
Ji	Senior Assessor Technical Reviewer	2015-05-15
VCS / ISO 14064-2	Senior Assessor Technical Reviewer	2015-05-15

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA	TR SUBCATEGORIES
1.2	Renewable energies	1.2.4 Solar
13.1	Waste management and disposal	13.1.1 Waste management 13.1.2 Waste water management

022 – Rev. 4, Date: 2012-05-16

022_S01-F003_2012-05-16 rev4 S01-F003 rev2 / 2012-04-05