VALIDATION REPORT
for the Renewal of Crediting Period of the CDM Project Activity

EnviroServ Waste Management (Pty) Ltd.

EnviroServ Chloorkop Landfill Gas Recovery Project

In

South Africa

Report No:*CCL287/RCP/ECLGRP/20140710*

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I. PROJECT DATA

Project title:	EnviroServ Chloorkop Landfill Gas Recovery Project		
Host party:	South Africa		
Project location:	EnviroServ Chloorkop landfill site, Ekurhuleni Metropolitan Municipality, Gauteng Province, South Africa		
Methodology:	ACM0001 ,"Flaring or use of landfill gas" version 15		
Sectoral Scope/Technical Area	13/13.1	**Scale:**	☒Large Scale ☐Small Scale
Date of registration/version and date of registered PDD	UNFCCC ref number: 0925, registration date: 27/04/2007, PDD version 05 and dated 05/02/2007		
Revised PDD(to be submitted for renewal of CP):	Version 05, dated 13/04/2015		
Average emission reductions:	Estimated:*73,041tCO$_2$e/yr*		
GHG reducing measure/technology:	The project activity is the installation of vertical and horizontal wells to extract the landfill gas. The EnviroServ Chloorkop Landfill consists of 6 cells.These extraction wells are connected via a circular network of pipelines to the Flaring system. GHG emission reductions due to methane destruction from landfill gas in flares, which otherwise would have been vented in the atmosphere.		

Party	Project participants	Party considered a project participant	Contract party
South Africa(Host)	EnviroServ Waste Management (Pty) Ltd.	No	☒

II. VALIDATIONTEAM(compliance of § 155 (e) of VVS)

Verification Team			Role							
Full name	Affiliation	Appointed for Sectoral Scopes (Technical Areas)	Team leader	Acting/trainee Team Leader	Local Expert	Team Member (Auditor)	Technical Expert	Acting/Trainee Tech. Expert	Trainee Auditor	Technical Reviewer
Anubhav Dimri	India	1.1,1.2,3.1, 13.1	X							
Barun Kumar	India	1.2, 3.1,13.1		X		X	X			
Witness Netshitumbu	India	--			X					
Amit Anand	India	1.2,3.1,8.1, 13.1,14.1								X

III. VALIDATION REPORT

Validation Phases and Status:

☒ Desk Review ☒ Follow up interviews, On Site Assessment

☒ Resolution of outstanding issues ☒ Corrective Actions / Clarifications Requested

☒ Full Approval and Submission for renewal of crediting period ☐ Rejected

Validation Report	**Version**	**Date**
	Version 01	**17/09/2014**
	Version 02	**20/10/2014**
	Version 03	**11/12/2014**
	Version 04	**16/04/2015**
Final Approval Date	**Approval**	**Distribution**
Date: 02/06/2015	**By: Amit Anand**	☒ No distribution without permission from the Client or responsible organizational unit ☐ Limited Distribution ☐ Unrestricted distribution

Abbreviations

BAU	Business As Usual
CA	Corrective Action / Clarification Action
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CAR	Corrective Action Request
CCIPL	Carbon Check (India) Private Ltd.
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CL	Clarification Request
CO_2	Carbon Dioxide
CO_{2e}	Carbon Dioxide Equivalent
DOE	Designated Operational Entities
DVR	Draft Validation Report
EB	CDM Executive Board
EF	Emission Factor
FA	Final Approval
FAR	Forward Action Request
FVR	Final validation Report
GSC	Global Stakeholder Consultation
GHG	Greenhouse gas(es)
GWh	Giga Watt Hour
IPCC	Intergovernmental Panel onClimateChange
LFG	Landfill Gas
MWh	Mega Watt Hour
MRR	Monthly Reading Records
OSV	On Site Visit
QC/QA	Qualitycontrol/Qualityassurance
RCP	RenewalofCreditingPeriod
TA	Technical Area
TR	Technical Review
UNFCCC	United Nations Framework Convention onClimateChange
VVS	Validation and Verification Standard

Validation Opinion - Summary(compliance of § 154 of VVS)

The validation team assigned by the DOE has been assigned[1] by "EnviroServ Waste Management (Pty) Ltd." to perform the validation of Renewal of Crediting Period for the project "EnviroServ Chloorkop Landfill Gas Recovery Project", UNFCCC registration No. 0925. The validation was performed on the basis of UNFCCC criteria for the Clean Development Mechanism. The scope of the validation is defined as an independent and objective review of the project design document, the validity of methodology used, the project's baseline study, estimated emission reductions and monitoring plan and other relevant documents. The information in these documents is reviewed against CDM Validation and Verification Standard (Version 07), Kyoto Protocol requirements, CDM Executive Board /UNFCCC rules.

The report is based on the assessment of the project design document undertaken through stakeholder consultations, application of standard auditing techniques including but not limited to document reviews, site visit, stakeholder interviews, review of the applicable methodology and its underlying formulae and calculations.

Validation methodology and process

The validation has been performed as described in the VVS version 7.0 and constitutes the following steps:

- Desk review of the registered PDD on the UNFCCC website
- Desk review of the revised PDD and the relevant documents
- Follow-up Interviews
- Issuance of Validation Report

Validation criteria

The following CDM requirements have been considered:
- Article 12 of the Kyoto Protocol,
- Modalities and procedures for CDM (Marrakech Accords) Para 49(a)
- Subsequent decisions by the COP/MOP and CDM Executive Board
- Host country criteria (National and/or Sectoral policies)
- Criteria given to provide for consistent project operations, monitoring and reporting.

The project correctly applies the baseline and applicable monitoring methodology ACM0001 version15, "Flaring or use of landfill gas".

The project results in reductions of CO_2equivalent emissions that are real, measurable and give long-term benefits to the mitigation of climate change. It is demonstrated that the project is continued to be not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity.

The monitoring plan provides for the monitoring of the project's emission reductions. The monitoring arrangements described in the monitoring plan are feasible within the project design and it is CCIPL's opinion that the project participants are able to monitor as per the monitoring plan.

The total emission reductions from the project are estimated to be 511,289 t of CO_2e over a 7-year crediting period, averaging 73,041 t of CO_2e annually. The emission reduction forecast has been checked and it is deemed likely that the stated amount is achieved given the underlying assumptions do not alter.

The validation protocol describes total of (07) findings, which include:
(03) Corrective Action Requests (CARs);

[1] Subsequent to the transfer of accreditation from CarbonCheck (Pty) Ltd to Carbon Check (India) Private Ltd., an addendum to the contract was signed between Carbon Check (India) Private Ltd. and EnviroServ Waste Management (Pty) Ltd.

(04) Clarification Requests (CLs);
(00) Forward Action Requests (FARs); and all findings are closed.

CCIPL concludes that the CDM Project Activity “EnviroServ Chloorkop Landfill Gas Recovery Project” in South Africa, as described in the PDD (version05, date13/04/2015), meets all relevant requirements of the UNFCCC for CDM project activities including article 12 of the Kyoto Protocol, the modalities and procedures for CDM (Marrakesh Accords) Para 49 (a) and the subsequent decisions by the COP/MOP and CDM Executive Board. The selected baseline and monitoring methodologies (ACM0001, Version 15) are applicable to the project and correctly applied. The CCIPL therefore requests the approval of the renewal of the crediting period for the registered CDM project with UNFCCC.

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1. INTRODUCTION

The Project Participant (EnviroServ Waste Management (Pty) Ltd.) has commissioned Carbon Check (India) Private Ltd., to perform an independent validation of the CDM Project Activity "EnviroServ Chloorkop Landfill Gas Recovery Project" in South Africa (hereafter referred to as "project activity").This report summarises the findings of the validation of the project, performed on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. The term "UNFCCC criteria" refers to Article 12 of the Kyoto Protocol, the CDM modalities and procedures or the simplified modalities and procedures for small-scale CDM project activities (as applicable) and the subsequent decisions by the CDM Executive Board. This report contains the findings and resolutions from the validation and a validation opinion.

1.1 Objective

The purpose of a validation is to have an independent third party assess the project design (renewal of crediting period). In particular, the project's baseline, emission reductions, monitoring plan, and the project's compliance with relevant host Party criteria (National and/or Sectoral policies) and UNFCCC guidelines are validated in order to confirm that the project design, as documented, is sound and reasonable and meets the identified criteria. Validation is a requirement for all CDM projects for intended generation of certified emission reductions (CERs).

1.2 Scope

The validation scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against the relevant criteria (see above) and decisions by the CDM Executive Board, including the approved baseline and monitoring methodology. The validation team has, based on the recommendations in the Validation and Verification Standard employed (latest version) a rule-based approach, focusing on the identification of significant risks for project implementation and the generation of CERs.

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

While carrying out the validation, CCIPL determines if the project activity complies with the requirements of §37 of the CDM M&P, the applicability conditions of the selected methodology (latest at the time of renewal of crediting period), guidance issued by the Board and also assess the claims and assumptions made in the PDD without limitation on the information provided by the project participants.

2. METHODOLOGY

The validation consists of the following four phases:

I A desk review of the project design documents
II On-site visit and follow-up interviews with project stakeholders
III Reference to available information's relating to projects or technologies similar projects under validation and review based on the approved methodology being applied of the appropriateness of formulae and accuracy of calculations.
IV The resolution of outstanding issues and the issuance of the final validation report and opinion.

The following sections outline each step in more detail.

2.1 Desk review**(compliance of § 23 (a)of VVS)**

The following table outlines the documentation reviewed during the validation:

Ref no.	*Reference Document*
/1/	Revised PDD, version 02, 22/08/2014
/2/	Emission reduction spread sheet corresponding to /02/
/3/	Final revised PDD version 05, 13/04/2015.
/4/	Emission reduction spread sheet corresponding to /03/
/5/	Letter of Approval from host country DNA dated 26/11/2013

Background documents:

Ref no.	*Reference Document*
/B01/	1. Validation and Verification Standard version 07 2. Project Standard version 07 3. Project Cycle Procedure version 07
/B02/	AM0011, version 02 ,"Landfill gas recovery with electricity generation and no capture or destruction of methane in the baseline scenario",
/B03/	ACM0001 , "Flaring or use of landfill gas" version 15
/B04/	Registered PDD (version 05 and dated 05/02/2007) and corresponding validation report.
/B05/	'Minimum Requirements for Waste Disposal by Landfill' (published in 2005)
/B06/	Documents available on UNFCCC website corresponding to verifications of the project activity.
/B07/	"Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period", version 03.0.1
/B08/	Websites referenced: 1. http://cdm.unfccc.int 2. http://www.ipcc-nggip.iges.or.jp/ 3. https://maps.google.com/ 4. http://www.sawic.org.za/ 5. https://www.environment.gov.za/ 6. http://sawic.environment.gov.za
/B09/	Standardized baseline: Grid emission factor for the Southern African Power Pool (Version 01.0).

2.2 Follow-up actions and interviews **(compliance of § 23 (b) of VVS)**

The project representatives interviewed via telephone:

	Name	Organization	Topic
/i/	Mynhardt Cronje	EnviroServ Waste Management (Pty) Ltd.	• Status of the project and any modifications with respect to the registered PDD. • Applicability of selected methodology. • National policies and changes • Baseline of the project and its updates • Emission Factors and their updates • Monitoring plan and changes.
/ii/	Silvana Claassen	Promethium Carbon	• Status of the project and any modifications with respect to the registered PDD. • Applicability of selected methodology. • National policies and changes • Baseline of the project and its updates • Emission Factors and their updates • Monitoring plan and changes.

2.3 Resolution of outstanding issues

The objective of this phase of the validation is to resolve any outstanding issues (issues that require further elaboration, research or expansion), which need be clarified prior to Carbon Check (India) Private Ltd' conclusion opinion on the project design. In order to ensure transparency a validation protocol is customized for the project. The protocol shows in transparent manner criteria (requirements), means of validation and the results from validating the identified criteria.

The validation protocol serves the following purposes:

- It organizes, details and clarifies the requirements a CDM project is expected to meet CDM requirements;
- It ensures a transparent validation process where the validator will document how a particular requirement has been validated and the result of the validation.
- It ensures that the issues are accurately identified, formulated, discussed and concluded in the validation report.
- It ensures the determination of achieving credible emission reductions from the project activity.

The validation protocol consists of two tables. The different columns in these tables are described in the figure below. The completed validation protocol for this project is enclosed in Appendix A to this report.

Findings established during the validation can either be seen as a non-fulfillment of CDM criteria or where a risk to the fulfillment of project objectives is identified. Corrective action requests (CAR) are issued, where:

- ✓ The project participants have made mistakes that will influence the ability of the project activity to achieve real, measurable, verifiable and additional emission reductions;
- ✓ The applicable CDM requirements have not been met;
- ✓ There is a risk that emission reductions cannot be monitored or calculated.

A request for clarification (CL) may be issued if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

A forward action request (FAR) is raised during validation to highlight issues related to project implementation that require review during the first verification of the project activity. FARs shall not relate to the CDM requirements for registration.

Reference to Table 1(i.e. tables of findings) and preliminary and final opinion of the DOE on every particular requirement listed in table 1.

Validation Protocol Table 1: Requirement checklist				
Checklist Item	***ValidationTeam Comment (MoV, Findings, comments, references, data sources)***	***Reference***	***Draft Conclusion***	***Final Conclusion***
The checklist items in Table 1 are linked to the various requirements the project should meet. The checklist is organised in various sections. Each section is then further sub-divided as per the requirements of the topic and the individual project activity.	*The section is used to elaborate and discuss the checklist item in detail. It includes the assessment of the Validation team and how the assessment was carried out. The reporting requirements of the VVS and Project Standard shall be covered in this section.*	*Gives reference to the information source on which the assessment is based on*	*Assessment based on evidence provided if the criterion is fulfilled (OK), or a CAR, CL or FAR israised (see below). The assessment refers to the draft Validation stage.*	*In case a corrective action or a clarification request the final assessment at the final Validation stage is given.*

The findings of validation process are summarized in the tables below.

Finding (reference section of table 1)			
Classification	☐ CAR	☐ CL	☐ FAR
Description of finding*(DOE)*			
Corrective Action or clarification #1 *(PP shall write a detailed and clear corrective action or further information for clarification as per finding)*			
DOE Assessment #1 *The assessment shall encompass all open issues in the finding. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*			
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the first periodic verification ☐ Outstanding finding (not closed) ☐ The finding is closed		

2.4 Internal quality control

The final validation report has passed a technical review and quality reviewer before being submitted to the project participant and UNFCCC Executive Board. The technical review was performed by a technical reviewer qualified in accordance with CCIPL's qualification scheme for CDM validation and verification.

2.5 Validation Team**(compliance of § 155(e) of VVS)**

Carbon Check has appointed a competent team as per the Accreditation Standard and Carbon Check internal procedures, the team is outlined below:

Validation Team	Type of Involvement

Full name	Location	Appointed for Sectoral Scopes (Technical Areas)	Supervising the work	Desk review	Interview	Report and protocol Writing	Technical Expert Input	Reporting Support	Technical Reviewer
AnubhavDimri	India	1.1,1.2,3.1, 13.1	X	X	X				
Barun Kumar	India	1.2, 3.1,13.1		X	X	X	X		
Witness Netshitumbu	India	--						X	
AmitAnand	India	1.2, 3.1,8.1,13.1,14.1							X

3. VALIDATION FINDINGS(COMPLIANCE OF § 155(B) OF VVS)

The findings of the validation are stated in the following sections. The validation criteria (requirements), the means of validation and the results from validating the identified criteria are documented in more detail in the validation protocol in Appendix A.

The final validation findings relate to the project design (renewal of crediting period) as documented and described in the revised and resubmitted project design documentation.

3.1 Project Description

The CDM project activity involves the active collection of LFG through installed vertical wells and horizontal collectors, maintaining negative pressure in the collection system. Vertical wells and horizontal collectors were installed in six waste cells. In waste disposal cells provided with horizontal collectors for gas collection, once there is sufficient waste in the cell (between 8 and 10m), the first layer of collectors is installed. Subsequent waste is then piled on these collectors until sufficient waste has been placed (a further 8 to 10m of waste) for the next layer of horizontal collectors to be installed. The project activity involves two flares installed on the site with flow meters for eachofthe flares. Each flare has a capacityof 2,000 Nm^3/h. A thermal mass flow meter (Proline t-mass 65) measurestheflow rate of methane to flare. A GIR5000 gas analyzer is installed for eachofthe flares for measuring the methane concentration in the landfill gas. A thermocouple is fitted to each of the flares to measure the flare temperature. The verified physical features during the OSV are:

- Flares: 2 (Flare 1 and Flare 2)
- Blowers: 2 (Flare 1 and Flare 2)
- Number of cells: 6 (3 Vertical (1, 2 and 3) and 3 horizontal (4, 5 and 6)
- Emergency Diesel Generator (for power)

The vertical wells and horizontal piping are connected to one or more headers and a blower for centralized gas collection, with condensate knockout pots. The collected LFG is destroyed using two enclosed flares. The waste accepted includes general (or domestic) waste, garden waste, soil and builder's rubble. The monitoring system includes/3/ flow measurement, gas analyzing, and temperature measurement devices, as well as a centralized controlling unit and a telemetry system for transmission of data from the project site to a website managed by a sub-contracted entity. It was confirmed during OSV that the project involves collection and destruction of LFG released from the collection wells at the landfill.

The above assessment on project description is based on the knowledge of the project from the initial validation /B04/, subsequent verifications /B06/ and the confirmation (through interviews /I-i/) from the project participant.

4. BASELINE AND MONITORING METHODOLOGY

4.1 Applicability of the selected methodology to the project activity

At the time of registration of the project activity, the project applied approved baseline and monitoring methodology AM0011 ver. 2 –"Landfill gas recovery with electricity generation and no capture or destruction of methane in the baseline scenario". This methodology was subsequently replaced byACM0001, "Flaring or use of landfill gas". PP has correctly applied the applicable and valid methodology at the time of renewal of crediting period i.e. ACM0001. This is incompliance with the requirement of § 287 (b) of PS, version 07.

The applicability of the methodology has been assessed based on the knowledge of the project from the initial validation, subsequent verifications and the interviews from the project participant.

The validation team determined the applicability of methodology ACM0001 (version 15) as follows:

Applicability condition of the methodology (ACM0001), Version 15	**Criteria fulfilled**	**Assessment by the validation team**
The methodology is applicable under the following conditions: (a) Install a new LFG capture system in a new or existing SWDS where no LFG capture system was installed prior to the implementation of the project activity; or	☒ Yes ☐ No	Validation team confirms that the project activity is the installation of a new landfill gas capture system at an existing SWDS where no LFG capture system was installed prior to the implementation of the project activity. This been assessed based on the knowledge of the project from the initial validation /B04/, subsequent verifications/B06/ and the confirmation (through interviews /I-i/) from the project participant.
(b) Make an investment into an existing LFG capture system to increase the recovery rate or change the use of the captured LFG, provided that: (i) The captured LFG was vented or flared and not used prior to the implementation of the project activity; and (ii) In the case of an existing active LFG capture system for which the amount of LFG cannot be collected separately from the project system after the implementation of the project activity and its efficiency is not impacted on by the project system: historical data on the amount of LFG capture and flared is available;	☒ Yes ☐ No	The project activity is the installation of a new LFG capture system in an existing SWDS where no LFG capture system was installed prior to the implementation of the project activity. Therefore condition (b) is not relevant.
(c) Flare the LFG and/or use the captured LFG in any (combination) of the following ways: i. Generating electricity; ii. Generating heat in a boiler, air heater or kiln (brick firing only) or glass melting furnace;2 and/or iii. Supplying the LFG to consumers through a natural gas distribution	☒ Yes ☐ No	Validation team confirms that LFG is captured in the project activity and then flared.This been assessed based on the knowledge of the project from the initial validation /B04/, subsequent verifications/B06/ and the confirmation (through interviews /I-i/) from the project participant.

Applicability condition of the methodology (ACM0001), Version 15	Criteria fulfilled	Assessment by the validation team
network; iv. Supplying compressed/liquefied LFG to consumers using trucks;3		
(d) Do not reduce the amount of organic waste that would be recycled in the absence of the project activity.	☒ Yes ☐ No	The implementation of the project activity does not imply any change in the waste received at the landfill and has not reduced the amount of organic waste that would have been recycled in the absence of the project activity. This has been assessed based on the knowledge of the project from the initial validation/B04/, subsequent verifications/B06/ and the confirmation (through interviews /I-i/) from the project participant. Validation Team further reviewed a letter from the division/company responsible for collecting and depositing of waste at Chloorkop Landfill (attached as a part of appendix 3 of the revised PDD) ,which confirms that *"EnviroServ Chloorkop Landfill Gas Recovery Project did not and will also continue to not imply any change to the waste received at the landfill and therefore has not reduced the amount of organic waste that would have been recycled in the absence of the project activity*. Such a letter from the company dealing with waste management in South Africa could be categorized as other additional sources. In addition to that validation team based on review of South African Waste Information Centre (SAWIC) /B08-6/ further confirms that recycling of organic waste is not a common/widely used practice in South Africa and in the region of the project and thus validation team concluded that the project do not reduces the amount of organic waste that would be recycled in the absence of the project activity.
The methodology is only applicable if the application of the procedure to identify the baseline scenario confirms that the most plausible baseline scenario is:		
(a) Atmospheric release of the LFG or capture of LFG and destruction through flaring to comply with regulations or contractual requirements, to address safety and odour concerns, or for other	☒ Yes ☐ No	Validation team confirms that the baseline scenario for the project is the atmospheric release of the LFG. This conclusion has been made based on the fact that no regulations or

Applicability condition of the methodology (ACM0001), Version 15	Criteria fulfilled	Assessment by the validation team
reasons; and		contractual requirements, prescribing capturing of LFG and/or flaring thereof, exist currently. Validation team based on review of draft 'Minimum Requirements for Waste Disposal by Landfill' (published in 2005 and constituting the most recent legislation on landfill site management available in South Africa) /B05/ confirms that this regulation does not categorically specify that it is a mandatory requirement to actively capture, flare, or destroy LFG at every landfill in South Africa. The said draft requirements provide guidelines to ensure safety on site (i.e. reducing the risk of explosions) by limiting LFG accumulation via passive ventilation.
(b) In the case that the LFG is used in the project activity for generating electricity and/or generating heat in a boiler, air heater, glass melting furnace or kiln; (i) For electricity generation: that electricity would be generated in the grid or in captive fossil fuel fired power plants; and/or (ii) For heat generation: that heat would be generated using fossil fuels in equipment located within the project boundary.	☒ Yes ☐ No	In the project activity, the LFG is captured and flared and not used for other purposes.This been assessed based on the knowledge of the project from the initial validation/B04/, subsequent verifications/B06/ and the confirmation (through interviews /I-i/) from the project participant.
This methodology is not applicable: (a) In combination with other approved methodologies. For instance, ACM0001 cannot be used to claim emission reductions for the displacement of fossil fuels in a kiln or glass melting furnace, where the purpose of the CDM project activity is to implement energy efficiency measures at a kiln or glass melting furnace;	☒ Yes ☐ No	The project activity does not apply any methodologies in addition to ACM0001 (Version 15.0), checked and confirmed by the validation team.
(b) If the management of the SWDS in the project activity is deliberately changed during the crediting in order to increase methane generation compared to the situation prior to the implementation of the project activity.	☒ Yes ☐ No	The management of the SWDS shall not be deliberately changed in order to increase methane generation. This been assessed based on the knowledge of the project from the initial validation/B04/, subsequent verifications /B06/ and the confirmation (through interviews /I-i/) from the project participant.

The assessment of the project's compliance with the applicability criteria of the methodology ACM0001 (version 15) as documented in the PDD, which are evaluated in detail under

assessment above in this report. Thus the validation teams confirm the applicability of the selected methodology to the proposed CDM project activity.

The assessment above confirms to the requirement of § 359 (b) of VVS, version 07.

4.2 Project Boundary

The project boundary of the project activity includes the site where the LFG is captured and Sites where the LFG is flared or used (e.g. flare, power plant, boiler, air heater, glass melting furnace, kiln, natural gas distribution network or biogas processing facility). The boundary was assessed considering information gathered from the initial validation /B04/, subsequent verifications /B06/ and the confirmation (through interviews /I-i/) from the project participant.

Validation team confirms that the project boundary for the CDM project activity is in accordance with the applied methodology /B04/ and the sources and gases within the boundary have been considered in a clear manner as detailed below:

a) For the purpose of determining project activity emissions, it includes:

- CO_2 emissions from on-site electricity use
- Emissions from flaring;

b) For the purpose of determining baseline emissions, it includes the following emissions sources:

- CH_4 emissions from decomposition of waste at the landfill site;

c) The spatial extent of project comprises:

- All equipment installed and used as part of the project activity for the landfill and landfill gas collection system;
- Flaring, facilities installed and used as part of the project activity;
- All equipment installed and used as part of electricity generation facilities installed and used as part of the project activity;

Validation team based on the above confirms that the project boundary for the project activity as documented in the PDD /02/ is justified for the project activity and are fully in line with the requirements set by the applied methodology /B03/.The sources and gases within the boundary have been considered in a clear manner.

The assessment above confirms to the requirement of § 359 (b) of VVS, version 07.

5. BASELINE SCENRAIO

As per the registered PDD, the methodology used was AM0011 (version 02) and the baseline was identified as the continuation of the current practice of atmospheric release of the landfill gas (LFG). The Methodology AM0011 prescribes the baseline as atmospheric release of the landfill gas. At the time of registration of the project activity, the project applied approved baseline and monitoring methodology AM0011 ver. 2 - Landfill gas recovery with electricity generation and no capture or destruction of methane in the baseline scenario. This methodology was subsequently replaced by “ACM0001, “Flaring or use of landfill gas”. PP has correctly applied the applicable and valid methodology at the time of renewal of crediting period i.e. ACM0001. ACM0001, version 15, provides an option for the simplified baseline and PP has opted for the same. The consideration of Simplified procedures to identify the baseline scenario and demonstrate additionality, as specified in section 5.3.1 (§20 – 24) of the applied methodology ACM0001 (version 15.0) /B02/ for demonstration of additionality is deemed to correct and thus acceptable to the validation team.

As required by § 359 (a) of VVS, version 07, validation team has checked (a) The impact of new relevant national and/or sectoral policies and circumstances on the baseline taking into account relevant guidance from the Board with regard to renewal of the crediting period at the

time of requesting renewal of crediting period. The assessment has been carried out as per the tool "assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period" /B07/.

Are there any relevant mandatory national and/or sectoral policies for the project activity? Which have come into effect after the submission of project for validation or the submission of the previous request for renewal of the crediting period and are applicable at the time of requesting renewal of the crediting period?	☒ Yes ☐ No	There is a regulation on waste disposal by Landfill namely draft 'Minimum Requirements for Waste Disposal by Landfill' (published in 2005 and constituting the most recent legislation on landfill site management available in South Africa) /B05/. The said draft requirements provide guidelines to ensure safety on site (i.e. reducing the risk of explosions) by limiting LFG accumulation via passive ventilation. Validation team based on review of draft 'Minimum Requirements for Waste Disposal by Landfill' /B05/ confirms that this regulation does not categorically specify that it is a mandatory requirement to actively capture, flare, or destroy LFG at every landfill in South Africa and thus it can be confirmed that this regulation does not affect the original baseline of the project as described in the registered PDD.

5.1 Assessment of Baseline Validity

Step 1: Assess the validity of the current baseline for the next-crediting period:

The assessment is carried out by the DOE validation team to assess the impact of national and/or sectoral policies and circumstances existing at the time of requesting renewal of the crediting period on the registered baseline GHG emissions, without reassessing the baseline scenario.

Step 1.1: Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies:

Does the present chosen baseline in the renewal crediting period PDD complies with the relevant mandatory national and/or sectoral policies	☒ Yes ☐ No	Validation team confirms that the baseline scenario for the project is the atmospheric release of the LFG. The present chosen baseline in the renewal of crediting period of PDD complies with the relevant mandatory national and/or sectoral policies. This conclusion has been made based on the fact that no regulations or contractual requirements, prescribing capturing of LFG and/or flaring thereof, exist currently.
If «NO» above → are these national and/or sectoral policies enforced and commonly practiced in the region/country?	☐ Yes ☐ No	NA

Step 1.2: Assess the impact of circumstances:

As per the registered PDD –the methodology used was AM0011(version 02) and the baseline was identified as the continuation of the current practice of atmospheric release of the landfill gas (LFG). The Methodology AM0011 prescribes the baseline as atmospheric release of the landfill gas. At the time of registration of the project activity, the project applied approved baseline and monitoring methodology AM0011 ver. 2 - Landfill gas recovery with electricity generation and no capture or destruction of methane in the baseline scenario. This methodology was subsequently replaced by ACM0001, “Flaring or use of landfill gas”. PP has correctly applied the applicable and valid methodology at the time of renewal of crediting period i.e. ACM0001. ACM0001, version 15, provides an option for the simplified baseline and PP has opted for the same. The consideration of Simplified procedures to identify the baseline scenario and demonstrate additionality, as specified in section 5.3.1 (§20 – 24) of the applied methodology ACM0001 (version 15.0) /B02/ for demonstration of additionality is deemed to correct and thus acceptable to the validation team. Baseline as per the adoption of ACM0001, version 15, would remain the same i.e. the atmospheric release of the LFG. This it can be concluded that there are no circumstances for the revised PDD which affects the baseline of the project.

Step 1.3: Assess whether the continuation of use of current baseline equipment(s) or an investment is the most likely scenario for the crediting period for which renewal is requested:

Validation team confirms that the baseline scenario for the project is the atmospheric release of the LFG. This conclusion has been made based on the fact that no regulations or contractual requirements, prescribing capturing of LFG and/or flaring thereof, exist currently.

Validation team based on review of draft ‘Minimum Requirements for Waste Disposal by Landfill’ (published in 2005 and constituting the most recent legislation on landfill site management available in South Africa) /B05/ confirms that this regulation does not categorically specify that it is a mandatory requirement to actively capture, flare, or destroy LFG at every landfill in South Africa. The said draft requirements provide guidelines to ensure safety on site (i.e. reducing the risk of explosions) by limiting LFG accumulation via passive ventilation.
Validation team confirms that the continuation of use of current baseline equipment(s) or an investment is the most likely scenario for the crediting period for which renewal is requested.

Step 1.4: Assessment of the validity of the data and parameters:

Data and parameters have been updated due to the adoption of ACM0001, version 15.

Step 2: update the current baseline and the data and parameters:

NA

Step 2.1 update the current baseline:

NA

Step 2.2 update the data and parameters:

Data and parameters have been updated due to the adoption of ACM0001, version 15.

5.2 Conclusion of assessment of Baseline validity

Validation team confirms that the original baseline scenario still remains valid.

5.3 GHG Emission Reductions

At the time of registration of the project activity, the project applied approved baseline and monitoring methodology AM0011 ver. 2 - Landfill gas recovery with electricity generation and no capture or destruction of methane in the baseline scenario. This methodology was subsequently replaced by ACM0001, "Flaring or use of landfill gas". PP has correctly applied the applicable and valid methodology at the time of renewal of crediting period i.e. ACM0001. PP has revised the calculation of emission reductions as per the requirement of ACM0001, version 15. Emission reduction calculation was correctly and conservatively demonstrated by the PP according to the methodology ACM0001 (version 15) and associated tools. All values used in the PDD are considered reasonable and conservative in the context of the renewal of crediting period of the CDM project activity. The baseline methodology has been applied correctly to calculate project emissions, baseline emissions and emission reductions. All estimates of the baseline and project can be replicated using the data and parameter values provided in the PDD. CL 4 was raised in this regards and successfully closed.

Baseline Emissions:

The baseline emissions are determined according to equation (1)of the applied methodology as given below:

$$BE_y = BE_{CH_4,y} + BE_{EC,y} + BE_{HG,y} + BE_{NG,y}$$

Where:

BE_y	Baseline emissions in year *y* (tCO_2e/y)
$BE_{CH_4,y}$	Baseline emissions of methane from the SWDS in year *y* (tCO_2e/y)
$BE_{EC,y}$	Baseline emissions associated with electricity generation in year *y* (tCO_2/y)
$BE_{HG,y}$	Baseline emissions associated with heat generation in year *y* (tCO_2/y)
$BE_{NG,y}$	Baseline emissions associated with natural gas use in year *y* (tCO_2/y)

As there is no electricity or heat generation in the baseline and also natural gas use is not applicable for the project activity:

$BE_{EC,y}$, $BE_{HG,y}$, and $BE_{NG,y}$are 0.

Hence $BE_y = BE_{CH_4,y}$

Baseline emissions of methane from the SWDS are determined according to equation (2) of the applied methodology:

$$BE_{CH4} = ((1 - OX_{top_{layer}}) \times F_{CH4,PJ,y} - F_{CH,BL,y}) \times GWP_{CH4}$$

Where:

$BE_{CH_4,y}$	Baseline emissions of methane from the SWDS in year *y* (tCO_2e/y)
$OX_{top\ layer}$	Fraction of methane in the LFG that would be oxidized in the top layer of the SWDS in the baseline (dimensionless)
$F_{CH4,PJ,y}$	Amount of methane in the LFG which is flared in the project activity in year *y* (tCH_4/y)

$F_{CH4,BL,y}$	Amount of methane in the LFG that would be flared in the baseline in year *y* (tCH_4/y)
GWP_{CH4}	Global warming potential of CH_4 ($tCO_2e/t\ CH_4$)

For the purposes of these calculations, and in accordance with the applied methodology, the following values are applied:

OX_{top_layer} = 0.1 (default value as per applied methodology);
$F_{CH4,BL,y}$= 0 (as in the baseline no requirements to destroy methane were existing and neither was the LFG captured and destroyed prior to implementation of the project activity, as per the applied methodology, paragraph 39 and 40);
GWP_{CH4}= 25 (as per Decision 24/CP.19, paragraph 2).

$F_{CH4,PJ,y}$ is determined as per equation 3 of the applied methodology as follows:

$$F_{CH4,PJ,y} = F_{CH4,flared,y} + F_{CH4,EL,y} + F_{CH4,HG,y} + F_{CH4,NG,y}$$

Where:

$F_{CH4,PJ,y}$	Amount of methane in the LFG which is flared and/or used in the project activity in year y (tCH_4/yr)
$F_{CH4,flared,y}$	Amount of methane in the LFG which is destroyed by flaring in year y (tCH_4/yr)
$F_{CH4,EL,y}$	Amount of methane in the LFG which is used for electricity generation in year y (tCH_4/yr)
$F_{CH4,HG,y}$	Amount of methane in the LFG which is used for heat generation in year y (tCH_4/yr)
$F_{CH4,NG,y}$	Amount of methane in the LFG which is sent to the natural gas distribution network and/or to the trucks in year y (tCH_4/yr)

Validation team confirms thatthere is no electricity or heat generation in the baseline and also natural gas use is not applicable for the project activity and accordingly the requirement as per paragraph 33(a) of the applied methodology ACM0001, Version 15.0 that "*the gaseous stream the tool shall be applied to the LFG delivery pipeline to each item of electricity generation or heat generation equipment j, or the natural gas distribution system, or the trucks*" is not applicable for the project activity.

Hence

$F_{CH4,EL,y}$, $F_{CH4,\ HG,y}$, and $F_{CH4,NG,y}$ are considered as 0.

$F_{CH4,flared,y}$ is determined as the difference between the amount of methane supplied to the flare(s) and any methane emissions from the flare(s), using equation 4 of the applied methodology as follows:

$$F_{CH4,flared,y} = F_{CH4,sent_{flare},y} - \frac{PE_{flare,y}}{GWP_{CH4}}$$

Where:

$F_{CH4,flared,y}$	Amount of methane in the LFG which is destroyed by flaring in year y(tCH_4/yr)
$F_{CH4,sent\_flare,y}$	Amount of methane in the LFG which is sent to the flare in year y (tCH_4/yr)
$PE_{flare,y}$	Project emissions from flaring of the residual gas stream in year y (tCO_2e/yr)
GWP_{CH4}	Global Warming Potential of CH_4 (tCO_2e/tCH_4)

$F_{CH4,sent\_flare,y}$ is determined directly using the "Tool to determine the mass flow of agreenhouse gas in a gaseous stream" (Version 02.0.0), applying the requirements described

in paragraph 33(b), (c), (d) and (e) andwhere the gaseous stream the tool shall be applied to is the LFG delivery pipeline to the flares. As per paragraph 33 of the applied methodology, the following requirements apply:

(a) The gaseous stream the tool shall be applied to is the LFG delivery pipeline to the flares.
(b) CH_4 is the greenhouse gas for which the mass flow should be determined.
(c) The simplification offered for calculating the molecular mass of the gaseous stream is valid (equations (3) or (17) in the tool).
(d) The mass flow should be calculated on an hourly basis for each hour h in year y.
(e) The mass flow calculated for hour h is 0 if the equipment is not working in hour h ($Op_{j,h}$ = not working), the hourly values are then summed to a yearly unit basis.

The mass flow of CH_4 in a gaseous stream ($F_{CH4,sent\_flare,y}$) is determined through measurement of the flow and volumetric fraction of the gaseous stream as per the applied "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" version 02.0.0.

Option B from Table 1 of the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" version 02.0.0 has been used as the measurement option for gaseous stream as the gas analyser(GIR 5000) used in the project activity measures the volumetric fraction of methane in the LFG on dry basis and the flow meter measures the gas on wet basis,

As per the above applied tool Option B, absolute humidity is a parameter required. Further PP has applied Option 2 of the tool to determine the absolute humidity by assuming the gaseous stream is dry or saturated in a simplified conservative approach which is acceptable.

Accordingly moisture content of the gas stream is assumed to be at saturation absolute humidity ($m_{H2O,t,db,sat}$) and is calculated using equation (4) of the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (Version 02.0.0):

$$m_{H2O,t,db,Sat} = \frac{p_{H2O,t,Sat} \times MM_{H2O}}{(P_t - p_{H2O,t,Sat}) \times MM_{t,db}}$$

Where:

$m_{H2O,t,db,sat}$ = Saturation absolute humidity in time interval *t* on a dry basis (kg H_2O/kg dry gas)
$p_{H2O,t,Sat}$ = Saturation pressure of H_2O at temperature T_t in time interval *t* (Pa)
T_t = Temperature of the gaseous stream in time interval *t* (K) (to be monitored)
P_t = Absolute pressure of the gaseous stream in time interval *t* (Pa)
MM_{H2O} = Molecular mass of H_2O (kg H_2O/kmol H_2O) = 18.0152 kg/kmol
$MM_{t,db}$ = Molecular mass of the gaseous stream in a time interval *t* on a dry basis (kg dry gas/kmol dry gas) (to be monitored)

As per the above applied tool, $MM_{t,db}$is estimated using equation (3) of the tool as below:

$$MM_{t,db} = \sum_k (v_{k,t,db} \times MM_k)$$

Where:

$MM_{t,db}$ = Molecular mass of the gaseous stream in time interval t on a dry basis (kg dry gas/kmol dry gas)
$v_{k,t,db}$ = Volumetric fraction of gas *k* in the gaseous stream in time interval *t* on a dry basis (m^3 gas k/m^3 dry gas)
MM_k = Molecular mass of gas *k* (kg/kmol)
k = All gases, except H_2O, contained in the gaseous stream (e.g. N_2, CO_2, O_2, CO, H_2, CH_4, N_2O, NO, NO_2, SO_2, SF_6 and PFCs)

Now equation (3) of the tool requires measuring the volumetric fraction of all gases (k) in the gaseous stream. However, as a simplification approach, the volumetric fraction of only CH_4 must be monitored and the difference to 100% may be considered as pure Nitrogen. Validation team confirms that this approach is acceptable as per the applied methodology and the tool.

Option B of the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream", version 02.0.0, refers to equations (5) and (6) of this tool to determine the mass flow of CH_4, ($F_{CH4,sent\_flare,y}$) as given below:

$$F_{i,t} = V_{t,db} \times v_{i,t,db} \times \rho_{i,t}$$

Where

$$\rho_{i,t} = \frac{P_t \times MM_i}{R_u \times T_t}$$

Where:

$F_{i,t}$ = Mass flow of greenhouse gas *i* in the gaseous stream in time interval *t* (kg gas/h)
$V_{t,db}$ = Volumetric flow of the gaseous stream in the time interval t on a dry basis (m^3 dry gas/h)
$v_{i,t,db}$ = Volumetric fraction of greenhouse gas I in the gaseous stream in a time interval *t* on a dry basis (m^3 gas *i*/m^3 dry gas)
$\rho_{i,t}$ = Density of greenhouse gas *i* in the gaseous stream in interval *t* (kg gas i/m^3 gas $_i$)
P_t = Absolute pressure of the gaseous stream in time interval *t* (Pa)
MM_i = Molecular mass of greenhouse gas *i* (kg/kmol)
R_u = Universal ideal gases constant (Pa.m^3/kmol.K)
T_t = Temperature of the gaseous stream in time interval *t* (K)

The volumetric flow of the gaseous stream in time interval t on a dry basis ($V_{t,db}$) is determined by converting the measured volumetric flow from wet to dry basis according to equation (7) of the above tool as below:

$$V_{t,db} = V_{t,wb}/(1 + v_{H2O,t,db})$$

Where:

$V_{t,db}$ = Volumetric flow of the gaseous stream in time interval *t* on a dry basis (m^3 dry gas/h)
$V_{t,wb}$ = Volumetric flow of the gaseous stream in time interval *t* on a wet basis (m^3 wet gas/h)
$v_{H2O,t,db}$ = Volumetric fraction of H_2O in the gaseous stream in time interval *t* on a dry basis (m^3 H_2O/m^3 dry gas)

The volumetric fraction of H_2O in time interval *t* on a dry basis ($v_{H2O,t,db}$) is estimated according to equation (8) of the above tool as below:

$$v_{H2O,t,db} = \frac{m_{H2O,t,db} \times MM_{t,db}}{MM_{H2O}}$$

Where:

$V_{H2O,t,db}$ = Volumetric fraction of H_2O in the gaseous stream in time interval *t* on a dry basis (m^3 H_2O/m^3 dry gas)
$M_{H2O,t,db}$ = Absolute humidity in the gaseous stream in time interval *t* on dry basis (kg H_2O/kg dry gas)
$MM_{t,db}$ = Molecular mass of the gaseous stream in time interval *t* on a dry basis (kg dry gas/kmol dry gas)

MM_{H2O} = Molecular mass of H_2O (kg H_2O/kmol H_2O)

Validation team confirms the determination of the amount of methane in the LFG which is sent to the flare($F_{CH4,sent\_flare,y}$) is in accordance with the applied methodological "Tool to determine the mass flow of a greenhouse gas in a gaseous stream", version 02.0.0,

$PE_{flare,y}$is determined using the methodological tool "Project emissions from flaring". As LFG is flared through more than one flare, $PE_{flare,y}$will be the sum of the emissions for each flare determined separately.

The calculation procedure in the applied tool "Project emissions from flaring" version 02.0.0determines the project emissions from flaring the residual gas ($PE_{flare,y}$) based on the flare efficiency ($\eta_{flare,m}$) and the mass flow of methane to the flare ($F_{CH4,RG,m}$) which involves the following three steps:

Step 1: Determination of the methane mass flow in the residual gas

The mass flow of methane in the residual gaseous stream in the minute *m*is determined in accordance with the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" version 02.0.0 as described above and found to be appropriate by the validation team.

Step 2: Determination of flare efficiency

The project activity involves enclosed low height flare. Out of the two options available as per the methodological tool "Project emissions from flaring" version 02.0.0, PP has chosen the Option B (Measure the flare efficiency) for minute m ($\eta_{flare,m}$).

As per the above applied methodological tool, for enclosed flares that are defined as low height flares, the flare efficiency in the minute *m* ($\eta_{flare,m}$) shall be adjusted, as a conservative approach, by subtracting 0.1 from the efficiency as determined in Options B which the PP has adopted and hence deemed appropriate by the validation team.

Option B: Measured flare efficiency

The flare efficiency in the minute *m* is a measured value ($\eta_{flare,m} = \eta_{flare,calc,m}$) when the following conditions are met to demonstrate that the flare is operating:

1) The temperature of the flare ($T_{EG,m}$) and the flow rate of the residual gas to the flare ($F_{RG,m}$) is within manufacturer's specification for the flare ($SPEC_{flare}$) in minute *m*;
2) The flame is detected in minute *m* ($Flame_m$); and

Otherwise $\eta_{flare,m}$ is 0%.

PP has further chosen Option B.1 :Biannual measurement of the flare efficiency which is determined as per equation 1 of the above tool as given below:

$$\eta_{flare,calc,y} = 1 - \frac{1}{2}\sum_{t=1}^{2}\left(\frac{F_{CH4,EG,t}}{F_{CH4,RG,t}}\right)$$

Where:

$\eta_{flare,calc,y}$	= Flare efficiency in the year y
$F_{CH4,EG,t}$	= Mass flow of methane in the exhaust gas of the flare on a dry basis at reference conditions in the time period *t* (kg)
$F_{CH4,RG,t}$	= Mass flow of methane in the residual gas on a dry basis at reference conditions in the time period *t* (kg)
t	= The two time periods in year *y* during which the flare efficiency is measured, each a minimum of one hour and separated by at least six months

$F_{CH4,EG,t}$ is measured according to an appropriate national or international standard. $F_{CH4,RG,t}$ is calculated according to Step 1, and consists of the sum of methane flow in the minutes *m* that make up the time period *t*.

Step 3: Calculation of project emissions from flaring

Project emissions from flaring are calculated as the sum of emissions for each minute *m* in year *y*, based on the methane mass flow in the residual gas ($F_{CH4,RG,m}$) and the flare efficiency ($\eta_{flare,m}$), as per equation (15) of the above methodological tool as given below:

$$PE_{flare,y} = GWP_{CH4} \times \sum_{m=1}^{525600} F_{CH4,RG,m} \times \left(1 - \eta_{flare,m}\right) \times 10^{-3}$$

Where:

$PE_{flare,y}$ = Project emissions from flaring of the residual gas in year *y* (tCO_2e)
GWP_{CH4} = Global warming potential of methane valid for the commitment period (tCO_2e/tCH_4)
$F_{CH4,RG,m}$ = Mass flow of methane in the residual gas in the minute *m* (kg)
$\eta_{flare,m}$ = Flare efficiency in minute *m*

Ex ante estimation of $F_{CH4,PJ,y}$

$F_{CH4,PJ,y}$has been determined ex ante according to equation (5) of the applied methodology as given below:

$$F_{CH4,PJ,y} = \eta_{PJ} \times \frac{BE_{CH4,SWDS,y}}{GWP_{CH4}}$$

Where:

GWP_{CH4}	Global Warming Potential of CH_4 (tCO_2e/tCH_4)
η_{PJ}	Efficiency of the LFG capture system that will be installed in the project activity
$BE_{CH4,SWDS,y}$	Amount of methane in the LFG that is generated from the SWDS in the baseline scenario in year *y* (tCO_2e/y)

$BE_{CH4,SWDS,y}$is determined using the methodological tool "Emissions from solid waste disposal sites" version 06.0.1. PP has applied the guidance as per applied methodology, paragraph 38, of the tool.

<u>Procedure to determine methane emissions from the SWDS:</u>

The amount of methane generated from disposal of waste at the Solid Waste Disposal Site (SWDS) is calculated based on a first order decay (FOD) model.

The amount of methane generated from disposal of waste at the SWDS is calculated for the year *y* ($BE_{CH_4,SWDS,y}$) using equation (1) from the above applied tool equation (1):

$$BE_{CH_4,SWDS,y} = \varphi_y.\left(1 - f_y\right).GWP_{CH_4}.(1 - OX).\frac{16}{12}.F.DOC_{f,y}.MCF_y.\sum_{x=1}^{y}\sum_{j} W_{j,x}.DOC_j.e^{-k_j(y-x)}.(1 - e^{-k_j})$$

Where:

φ_y	Model correction factor to account for model uncertainties for year *y*

f_y	Fraction of methane captured at the SWDS and flared, combusted or used in another manner that prevents the emissions of methane to the atmosphere in the year *y*
GWP_{CH_4}	Global Warming Potential of CH_4 (tCO_2e/tCH_4)
OX	Oxidation factor (reflecting the amount of methane from SWDS that is oxidised in the soil or other material covering the waste)
F	Fraction of methane in the SWDS gas (volume fraction)
$DOC_{f,y}$	Fraction of degradable organic carbon (DOC) that decomposes under the specific conditions occurring at the SWDS for year *y* (weight fraction)
MCF_y	Methane correction factor for the year *y*
$W_{j,x}$	Amount of solid waste type *j* disposed or prevented from disposal in the SWDS in the year *x* (tons)
DOC_j	Fraction of degradable organic carbon in the waste type *j* (weight fraction)
k_j	Decay rate for the waste type *j* (l/yr)
j	Type of residual waste or types of waste in the MSW
x	Years in the time period in which waste is disposed at the SWDS, extending from the first year in the time period (*x* = 1) to year *y* (*x* = *y*) (*x* = 1) to the year *y* for which avoided emissions are calculated (*x* = *y*)
y	Year of the crediting period for which methane emissions are calculated (*y* is a consecutive period of 12 months)

Validation team confirms that the ex-ante calculation of $F_{CH4,PJ,y}$ has been done in accordance with the applied methodology and the applicable tool.

Project Emissions

The project emissions are calculated in accordance with equation (22) of the applied methodology as given below:

$$PE_y = PE_{EC,y} + PE_{FC,y} + PE_{DT,y}$$

Where:

PE_y	Project emissions in year y (tCO_2/y)
$PE_{EC,y}$	Emissions from consumption of electricity due to the project activity in year *y* (tCO_2/y)
$PE_{FC,y}$	Emissions from consumption of fossil fuels due to the project activity, for purpose other than electricity generation, in year y (tCO_2/y)
$PE_{DT,y}$	Emissions from distribution of compressed/liquefied LFG using trucks, in year y (tCO_2/y)

The project activity does not consume any fossil fuels hence $PE_{FC,y}$is 0
Project emissions from distribution of compressed/liquefied LFG using trucks is not applicable as all the LFG captured will be flared on-site and hence $PE_{DT,y}$.is 0.

Project emissions from consumption of electricity due to the project activity are calculated in accordance with equation (1) of the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" Version 01 as given below:

$$PE_{EC,y} = \sum_j EC_{PJ,j,y} \times EF_{EL,j,y} \times (1 + TDL_{j,y})$$

Where:

$PE_{EC,y}$	Project emissions from electricity consumption in year y (tCO_2e/yr)
$EC_{PJ,j,y}$	Quantity of electricity consumed by the project electricity consumption source j in year y (MWh/yr)
$EF_{EL,j,y}$	Emission factor for electricity generation for source j in year y (tCO_2/MWh)
$TDL_{j,y}$	Average technical transmission and distribution losses for providing electricity to source j in year y

Option A1 of the above tool has been appropriately selected for the project activity for determination of the emission factor $EF_{EL,j,y}$:

$EF_{EL,j,y} = EF_{grid,CM,y}$ = 0.9488 tCO_2e/MWh as provided by the Standardized baseline "Grid emission factor for the Southern African power pool" version 01.0.

The value for the Average technical transmission and distribution losses ($TDL_{j,y}$) has been derived from Eskom's annual report which is deemed appropriate by the validation team.

Leakage

No leakage effects are accounted for under the applied methodology.

Emission Reductions

The emission reductions of the project activity are calculated using equation (25) of the applied methodology:

$$ER_y = BE_y - PE_y$$

The assessment above confirms to the requirement of § 359 (b) of VVS, version 07.

5.4 Monitoring

At the time of registration of the project activity, the project applied approved baseline and monitoring methodology AM0011 ver. 2 - Landfill gas recovery with electricity generation and no capture or destruction of methane in the baseline scenario. This methodology was subsequently replaced by ACM0001, "Flaring or use of landfill gas". PP has correctly applied the applicable and valid methodology at the time of renewal of crediting period i.e. ACM0001. PP has revised the monitoring plan of the project as per the requirement of ACM0001, version 15. The project-monitoring plan is in compliance with the monitoring methodology ACM0001 (version 15).

The assessment above confirms to the requirement of §138of VVS, version 07.Validation team has applied a two-step assessment process(as defined in §139 (a) and §139 (b) of VVS, version 07) to meet the above requirement.

5.4.1 Parameters determined ex-ante

The parameters that are to be monitored ex-ante are:

Parameter	Value Applied	Validation Remarks
OX_{top_layer} Fraction of methane that would be oxidized in the	0.1	Default value based on the applied methodology ACM0001 version 15.0.0. Consistent with how oxidation is accounted for in the methodological tool

top layer of the SWDS in the baseline.		"Emissions from solid waste disposal sites" version 06.0.1.
GWP_{CH4} Global warming potential of CH_4	25tCO_2e/tCH_4	The latest COP/MOP decision (Decision 24/CP.19, paragraph 2) stipulates that "*from 2015 until a further decision is adopted by the Conference of the Parties, the global warming potential values used by Parties included in Annex I to the Convention (Annex I Parties) ... shall be those listed in the column entitled "Global warming potential for given time horizon" in table 2.14 of the errata to the contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, based on the effects of greenhouse gases over a 100-year time horizon, as contained in annex III*"; This means that from 2015 the value 25 shall be used for the GWP of methane. Accordingly validation confirms that the value of GWP of methane has been appropriately updated by the PP and found to be acceptable.
η_{PJ} Efficiency of the LFG capture system that will be installed in the project Activity	0.5	Default value based on the applied methodology ACM0001 version 15.0.0.
φ_y	0.75	Default value as per table

Default value for the model correction factor to account for model uncertainties		3 of the tool “Emissions from solid waste disposal sites.” version 06.0.1. CCIPL has validated that Application A of the tool is followed in the ex-ante calculation and therefore 0.75 is the correct value to be applied according to the tool.
OX Oxidation factor (reflecting the amount of methane from SWDS that is oxidized in the soil or other material covering the waste)	0.1	Default value as per an extensive review of published literature on this subject, including the IPCC Guidelines for National Greenhouse Gas Inventories, as per Version 06.0.1 of the ‘Emissions from solid waste disposal sites’.
F Fraction of methane in the SWDS gas (volume fraction)	0.5	CCIPL has validated that this value is correctly applied according to the tool “Emissions from solid waste disposal sites.” version 06.0.1.
$DOC_{f,default}$ Default value for the fraction of degradable organic carbon (DOC) in MSW that decomposes in the SWDS	0.5	Default value as per the IPCC 2006 Guidelines for National Greenhouse Gas Inventories. CCIPL has validated that this value is correctly applied according to the tool “Emissions from solid waste disposal sites.” version 06.0.1.
$MCF_{default}$ Methane correction factor	1.0	CCIPL has validated that this value is correctly applied according to the tool “Emissions from solid waste disposal sites.” version 06.0.1.

DOC_j Fraction of degradable organic carbon in the waste type *j*	Wood and wood products	43		Default value as per the tool "Emissions from solid waste disposal sites." version 06.0.1.
	Pulp, paper and cardboard (other than sludge)	40		
	Food, food waste, beverages and tobacco (other than sludge)	15		
	Textiles	24		
	Garden, yard and park waste	20		
	Glass, plastic, metal, other inert waste	0		
k_j Decay rate for the waste type *j*	Pulp, paper, cardboard (other than sludge), textiles	0.04		Default value as per the tool "Emissions from solid waste disposal sites." version 06.0.1.
	Wood, wood products and straw	0.02		
	Other (nonfood) organic putrescible garden and park waste	0.05		
	Food, food waste, sewage sludge, beverages and tobacco	0.06		
EF_{EL} Emission factor for electricity generation	0.9688			CCIPL has validated that this value is correctly applied according to the Standardized baseline: Grid emission factor for the Southern African Power Pool (Version 01.0) /B09/.
Wj.x Amount of solid waste type j disposed in the SWDS in year x – Domestic Waste	430,536 tonnes annually			CCIPL has validated the historical records of landfill operation, aggregated into annual figures and provided by PP. This value is correctly applied according to the methodology and tool.
P_n Total pressure at normal conditions	101,325 Pa			CCIPL has validated that this value is correctly applied according to the Tool to determine the mass flow of a greenhouse gas in a gaseous stream. Version 02.0.0.
T_n Temperature	273.15 K			CCIPL has validated that this value is correctly

<table>
<tr><td>at normal conditions</td><td></td><td>applied according to the Tool to determine the mass flow of a greenhouse gas in a gaseous stream. Version 02.0.0.</td></tr>
<tr><td>R_u

Universal ideal gases constant</td><td>8,314 Pa.m^3/kmol.K</td><td>CCIPL has validated that this value is correctly applied according to the Tool to determine the mass flow of a greenhouse gas in a gaseous stream. Version 02.0.0.</td></tr>
<tr><td>MM_i

Molecular mass of greenhouse gas i</td><td><table>
<tr><th>Compound</th><th>Structure</th><th>Molecular mass (kg/kmol)</th></tr>
<tr><td>Carbon dioxide</td><td>CO_2</td><td>44.01</td></tr>
<tr><td>Methane</td><td>CH_4</td><td>16.04</td></tr>
<tr><td>Nitrous oxide</td><td>N_2O</td><td>44.02</td></tr>
<tr><td>Sulfur hexafluoride</td><td>SF_6</td><td>146.06</td></tr>
<tr><td>Perfluoromethane</td><td>CF_4</td><td>88.00</td></tr>
<tr><td>Perfluoroethane</td><td>C_2F_6</td><td>138.01</td></tr>
<tr><td>Perfluoropropane</td><td>C_3F_8</td><td>188.02</td></tr>
<tr><td>Perfluorobutane</td><td>C_4F_{10}</td><td>238.03</td></tr>
<tr><td>Perfluorocyclobutane</td><td>c-C_4F_8</td><td>200.03</td></tr>
<tr><td>Perfluoropentane</td><td>C_5F_{12}</td><td>288.03</td></tr>
<tr><td>Perfluorohexane</td><td>C_6F_{14}</td><td>338.04</td></tr>
</table></td><td>CCIPL has validated that this value is correctly applied according to the Tool to determine the mass flow of a greenhouse gas in a gaseous stream. Version 02.0.0.</td></tr>
<tr><td>MM_k

Molecular mass of gas k</td><td><table>
<tr><th>Compound</th><th>Structure</th><th>Molecular mass (kg/kmol)</th></tr>
<tr><td>Nitrogen</td><td>N_2</td><td>28.01</td></tr>
<tr><td>Oxygen</td><td>O_2</td><td>32.00</td></tr>
<tr><td>Carbon monoxide</td><td>CO</td><td>28.01</td></tr>
<tr><td>Hydrogen</td><td>H_2</td><td>2.02</td></tr>
<tr><td>Nitric oxide</td><td>NO</td><td>30.01</td></tr>
<tr><td>Nitrogen dioxide</td><td>NO_2</td><td>46.01</td></tr>
<tr><td>Sulfur dioxide</td><td>SO_2</td><td>64.06</td></tr>
</table></td><td>CCIPL has validated that this value is correctly applied according to the Tool to determine the mass flow of a greenhouse gas in a gaseous stream. Version 02.0.0.</td></tr>
<tr><td>MM_{H2O}
Molecular mass of water</td><td>18.0152 kg/kmol</td><td>CCIPL has validated that this value is correctly applied according to the Tool to determine the mass flow of a greenhouse gas in a gaseous stream. Version 02.0.0.</td></tr>
</table>

$SPEC_{flare}$ Manufacturer's flare specifications for temperature, flow rate and maintenance schedule	a) The minimum and maximum inlet flow rate is 50 – 2000 Nm3/h b) The minimum and maximum operating temperature is 1000 - 1150°C 5.4.2 c)The maximum duration between maintenance events is provided by the manufacturer by means of an overview of maintenance tasks and frequency and is provided in the technical manual to the installed flares.Different tasks have different maintenance frequencies. Some maintenance tasks have to be performed daily (maximum duration in days between maintenance events is 1), e.g. condensate drain valves; whereas only every six months (maximum duration in days between maintenance events is 182) e.g. the condition of all cables and connectors needs to be checked and replaced in case of any defective items. The enclosed flares will require a complete overhaul after prolonged operations, and it is recommended that this should be carried out at least at once every three years.	CCIPL has validated that the specification values are correctly applied according to the Flare manufacturer specifications; assessed based on the knowledge of the project from the initial validation /B04/, subsequent verifications /B06/ and the confirmation (through interviews /I-i/) from the project participant.

5.4.3 Parameters monitored ex-post

The parameters that are to be monitored ex-post are:

Parameter	Observation / Assessment
Management of SWDS	The design and operational conditions of the EnviroServ Chloorkop Landfill Gas Recovery Project will be annually monitored on the basis of different sources such as: - Original design of the landfill; - Technical specifications for the management of the SWDS; - Applicable local or national regulations As required by ACM0001,(version 15), it will be ensured that the management of the SWDS in the project activity is deliberately not changed during the crediting in order to increase methane generation compared to the situation prior to the implementation of the project activity.
$Op_{j,h}$ Operation of the equipment that consumes the LFG	For each equipment unit *j* using the LFG monitor that the plant is operating in hour *h* by the monitoring any one or more of the following three parameters:

	(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; (b) Flame - Flame detection system is used to ensure that the equipment is in operation; (c) Products generated – Not applicable for the project activity as there is not product generated (like heat) The equipment will be maintained and calibrated as per the manufacturer's recommendation. Validation team deemed this appropriate and in accordance with the applied monitoring methodology.
$EG_{EC,y}$ Amount of electricity consumed by the project activity in year y	Electricity consumption will be continuously monitored which includes electricity consumed for the operation of the LFG capture system (blowers) and for the operation of the two flare installations. The electricity meters will be maintained and calibrated as per the manufacturer's recommendation. Validation team deemed this appropriate and in accordance with the applied monitoring methodology..
CAPEX and OPEX Total investment to implement the project and total cost to operate the project.	This will include the EPC and maintenance costs at the first issuance request after each phase of the project is fully implemented. The data provided will be from an independent financial auditor. Validation team deemed this appropriate and in accordance with the applied monitoring methodology.
TDL_y Average technical transmission and distribution losses for providing electricity	This data will be obtained from grid operator annually and the most recent data will be used. Validation team deemed this appropriate.
$Flame_m$ Flame detection of flare in the minute m	Detection of flame recorded with an every minute frequency as a minute that the flame was on, otherwise recorded as a minute that the flame was off. This will be measured using a fixed installation optical flame detector / Ultra Violet detector / Infra Red. The monitoring equipment will be maintained and calibrated as per the manufacturer's recommendation. Validation team deemed this appropriate and in accordance with the applied monitoring methodology tool, "Project emissions from flaring", version 02.0.0.

$V_{t,wb}$ Volumetric flow of the gaseous stream in time interval *t* on a wet basis	Continuous monitoring will be done at actual temperature and pressure. Calibration will be asper manufacturer specifications. Validation team confirms that this is as per the applied Options B of the applied "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (Version 02.0.0) and hence appropriate.
$V_{t,db}$ Volumetric flow of the gaseous stream in time interval *t* on a dry basis	This parameter is calculated as per equation number 7 of "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (Version 02.0.0)based on the wet basis flow measurement plus water concentration measurement. Validation team deemed calculation of this parameter appropriate.
$v_{i,t,db}$ Volumetric fraction of greenhouse gas $_i$in a time interval $_t$ on a dry basis.	Continuously monitored by a gas analyser on dry basis. Validation team deemed calculation of this parameter appropriate.
T_t Temperature of the gaseous stream in time interval *t*.	Continuous monitoring with instrument with recordable electronic signal will be done. Calibration and its frequency will be as per Manufacturer specifications will be followed. Validation team confirms that this is as per the applied "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (Version 02.0.0) and hence appropriate.
P_t Pressure of the gaseous stream in absolute terms in time interval *t*	Continuous monitoring with instrument with recordable electronic signal will be done. Calibration and its frequency will be as per Manufacturer specifications will be followed. Validation team confirms that this is as per the applied "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (Version 02.0.0) and hence appropriate.
$p_{H2O,t,sat}$ Saturation pressure of H_2O at temperature T_t in time interval *t*	This parameter is solely a function of the gaseous stream temperature $T_t$and sourced from Fundamentals of Classical thermodynamics; Gordon J. Van Wylen, Richard E. Sonntag and Borgnakke; 4th Edition 1994, John Wiley & Sons, Inc. for a total pressure equal to 101,325 Pa. Validation team confirms that this is as per the applied "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (Version 02.0.0) and hence appropriate.
$v_{k,t,db}$ Volumetric fraction of gas *k* in the gaseous stream in time interval *t* on a dry basis.	Continuously monitored by a gas analyser on dry basis. Validation team deemed calculation of this parameter appropriate.
$F_{CH4,EG,t}$ Mass flow of methane in the exhaust gas of the flare on a dry basis at reference conditions in the time period *t.*	The project involves enclosed flares and Option B.1 of "Project emissions from flaring", version 02.0.0 has been applied for measurement of flare efficiency. This is measured biannually in accordanceto an appropriate nationalor international

	standarde.g. UKs Technical Guidance LFTGN05 by an accredited third party.The time period *t* over which the mass flow is measured must be a tleast one hour.The average flow rate tothe flare during the time period *t* must be greater than the average flow rate observed for the previous six months. Validation team confirms monitoring of this parameter in accordance with "Project emissions from flaring", version 02.0.0 and appropriate.
$T_{EG,m}$ Temperature in the exhaust gas of the enclosed flare in minute *m*.	Temperature in the exhaust gas is measured by appropriate temperature measurement equipment with an every-minute frequency. Measurements outside the operational temperature specified by the manufacturer may indicate that the flare is not functioning correctly and may require maintenance. Flare manufacturers must provide suitable monitoring ports for the monitoring of the temperature of the flare. These would normally be expected to be in the middle third of the flare. Where more than one temperature port is fitted to the flare, the flare manufacturer must provide written instructions detailing the conditions under which each location shall be used and the port most suitable for monitoring the operation of the flare according to manufacturer's specifications for temperature. Validation team confirms monitoring of this parameter in accordance with "Project emissions from flaring", version 02.0.0 and appropriate.
$Maintenance_y$ Maintenance events completed in year *y*	Record the date that maintenance events were completed in year *y*. Records of maintenance logs must include all aspects of the maintenance including the details of the person(s) undertaking the work, parts replaced, or needing to be replaced, source of replacement parts, serial numbers and calibration certificates. Validation team confirms monitoring of this parameter in accordance with "Project emissions from flaring", version 02.0.0 and appropriate.

For same CAR 2 and 3 was raised and successfully closed. In summary, the parameters determined ex-post has been presented correctly according to requirements and are considered in accordance with the applied methodology and tools /B02/, which have come into effect after the submission of the project activity for validation and are applicable at this moment, the time of requesting renewal of crediting period.

APPENDIX A

Carbon Check
Validation for renewal of crediting period-List of findings

EnviroServ Chloorkop Landfill Gas Recovery Project
in
South Africa

Report No. CCL287/RCP/ECLGRP/20140710

Table-1:List of findings **(compliance of** § 148 bof VVS)

Finding	**CAR 01**		
Classification	☒ CAR	☐ CL	☐ FAR
Description of finding *(DOE)*	The provided information is not sufficient in section A.1 of the PDD. PP is requested to provide the information as required by Instructions for filling out the project design document form for CDM project activities.		
Corrective Action or clarification #1 *(PP shall write a detailed and clear corrective action or further information for clarification as per finding)*	Section A.1 of the revised PDD has been updated to provide a brief description of: - the scenario existing prior to the implementation of the project activity including the type of facility where the project activity will take place (i.e. an existing solid waste disposal site); - the baseline scenario which is the atmospheric release of LFG; - the estimated annual average and total GHG emission reductions (i.e. 61 273 and 428 910 tCO_2e respectively) for the chosen crediting period (i.e. 19/01/2015 – 18/01/2022); a description of the project activity providing an understanding of the nature of the project and its implementation (2nd crediting period for methane-destruction through flaring LFG at an existing landfill); - a summary of the scope of activities/measures that are to be implemented (i.e. "*The installed technology consists of wells in the landfill, a gas collection system connecting the wells and two flare installations connected to the gas collection system. Each flare installation consists of a blower that draws the gas from the wells and the gas collection system, and the flare itself.*"); and – information of the project scale and type.		
DOE Assessment #1 *The assessment shall encompass all open issues in the finding. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	The PP has updated the section A.1 of the PDD as required by Instructions for filling out the project design document form for CDM project activities and found in line with requirement. Hence, CAR 1 Is closed.		
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the next periodic verification ☐ Outstanding finding (not closed) ☒ The finding is closed		

Finding	CAR 02		
Classification	☒ CAR	☐ CL	☐ FAR
Description of finding *(DOE)*	Monitoring plan of the project is not as per the applied methodology and not all data and parameter as required by the applied methodology /B02/ has been provided in the PDD /01/. Few parameters for e.g. $EG_{EC,y}$ is missing.		
Corrective Action or clarification #1 *(PP shall write a detailed and clear corrective action or further information for clarification as per finding)*	Section B.7.1. of the revised PDD has been updated in order to include all parameters to be monitored as required by the applied methodology and applicable tools. The parameters **"$EG_{EC,y}$"** (Amount of electricity consumed by the project activity in year y), **"CAPEX and OPEX"** (Total investment to implement the project and total cost to operate the project), **"TDL_y"** (Average technical transmission and distribution losses for providing electricity), **"$Flame_m$"** (Flame detection of flare in the minute *m*), "$V_{t,wb}$" (Volumetric flow of the gaseous stream in time interval *t* on a wet basis),**"$V_{i/k,t,db}$"** (Volumetric fraction of greenhouse gas *i/k* in a time interval *t* on a dry basis), "T_t" (Temperature of the gaseous stream in time interval *t), "P_t"*(Absolute pressure of the gaseous stream in time interval *t*), "$p_{H2O,t,sat}$" (Saturation pressure of H_2O at temperature T_t in time interval *t), "*$F_{CH4,EG,t}$" (Mass flow of methane in the exhaust gas of the flare on a dry basis at reference conditions in the time period *t*),"$T_{EG,m}$" (Temperature in the exhaust gas of the enclosed flare in minute *m*), and "Maintenance" (Maintenance events completed in year *y)* have been added to the PDD in Section B.7.1. The parameters **"EF_{EL}"** (Emission facto for electricity generation, as required by the applied methodological tool "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (Version 01)), **"R_u"** (Universal ideal gases constant), **"MM_i"** (Molecular mass of greenhouse gas *i*), **"MM_k"** (Molecular mass of gas *k*), **"MM_{H2O}"** (Molecular mass of water), **"P_n"** (Total pressure at normal conditions),**"T_n"** (Temperature at normal conditions)and "$SPEC_{flare}$" (Manufacturer's flare specifications for temperature, flow rate and maintenance schedule)have been added to Section B.6.2. of the revised PDD.		
DOE Assessment #1 *The assessment shall encompass all open issues in the finding. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	PP has updated the section B.7.1 of the revised PDD, as per applied methodology and tools, same has been crosscheck and found inline and appropriate. Hence CAR 2 is closed.		

Finding	CAR 02
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the next periodic verification ☐ Outstanding finding (not closed) ☒ The finding is closed

Finding	CAR 03		
Classification	☒ CAR	☐ CL	☐ FAR
Description of finding *(DOE)*	Exclusion of PE in section B.6.1 of the PDD on account electricity consumption is not justified and hence not acceptable.		
Corrective Action or clarification #1 *(PP shall write a detailed and clear corrective action or further information for clarification as per finding)*	Section B.6.1. has been updated by including project emissions from consumption of electricity due to the project activity and accordingly project emissions have been calculated ex-ante in accordance with equation (1) of the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (Version 01).		
DOE Assessment #1 *The assessment shall encompass all open issues in the finding. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	PP has updated the section B.6.1 of the PDD and found appropriate. Hence this is acceptable to the Validation team.		
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the next periodic verification ☐ Outstanding finding (not closed) ☒ The finding is closed		

Finding	CL 01		
Classification	☐ CAR	☒ CL	☐ FAR
Description of finding *(DOE)*	As per § 361 of VVS version 07, the DOE shall check that the names of the project participants included in the request for renewal of crediting period are consistent with the names of the registered project participants for the project activity. As per the project page name of the PP is "EnviroServ Waste Management Ltd.", however name of the PP in the revised PDD (Cp section A.4 and appendix 1) is mentioned as "EnviroServ Waste Management Ltd). PP is requested to clarify the inconsistency.		

Finding	CL 01
Corrective Action or clarification #1 *(PP shall write a detailed and clear corrective action or further information for clarification as per finding)*	The name of the registered PP on the UNFCCC project page is "EnviroServ Waste Management (Pty) Ltd". The title-page and Sections A.4. and Appendix 1 of the revised PDD have been updated in order to use the name of the PP in a consistent manner.
DOE Assessment #1 *The assessment shall encompass all open issues in the finding. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	PP has updated and revised the name of the PP on cover page, section A.4 and appendix 1 of the PDD. And same has been found correct.
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the next periodic verification ☐ Outstanding finding (not closed) ☒ The finding is closed

Finding	CL 02		
Classification	☐ CAR	☒ CL	☐ FAR
Description of finding *(DOE)*	Review of section B.3 of the revised PDD reveals that though the PP has not intended to supply of LFG through a natural gas distribution network or using trucks in the project activity however it states/marked/checked "yes" for gases CH4" and CO_2. PP is requested to clarify the situation.		
Corrective Action or clarification #1 *(PP shall write a detailed and clear corrective action or further information for clarification as per finding)*	DOE has pointed out correctly that the first table of Section B.3. of the revised PDD showed that the project boundary included the gases CO_2 and CH_4 due to emissions from distribution of LFG using trucks in the project activity. In spite of the transportation of the compressed/liquefied LFG from the biogas processing facility to consumers is not applicable. PP has changed the first table in Section B.3. in order to reflect that the GHG emissions from distribution of LFG using trucks are not included in the project activity.		
DOE Assessment #1 *The assessment shall encompass all open issues in the finding. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	PP has revised the table in stating that GHG emissions from distribution of LFG using trucks are not included in the project activity in section B.3 of the PDD and same has been acceptable to the Validation team. Hence CL is closed.		

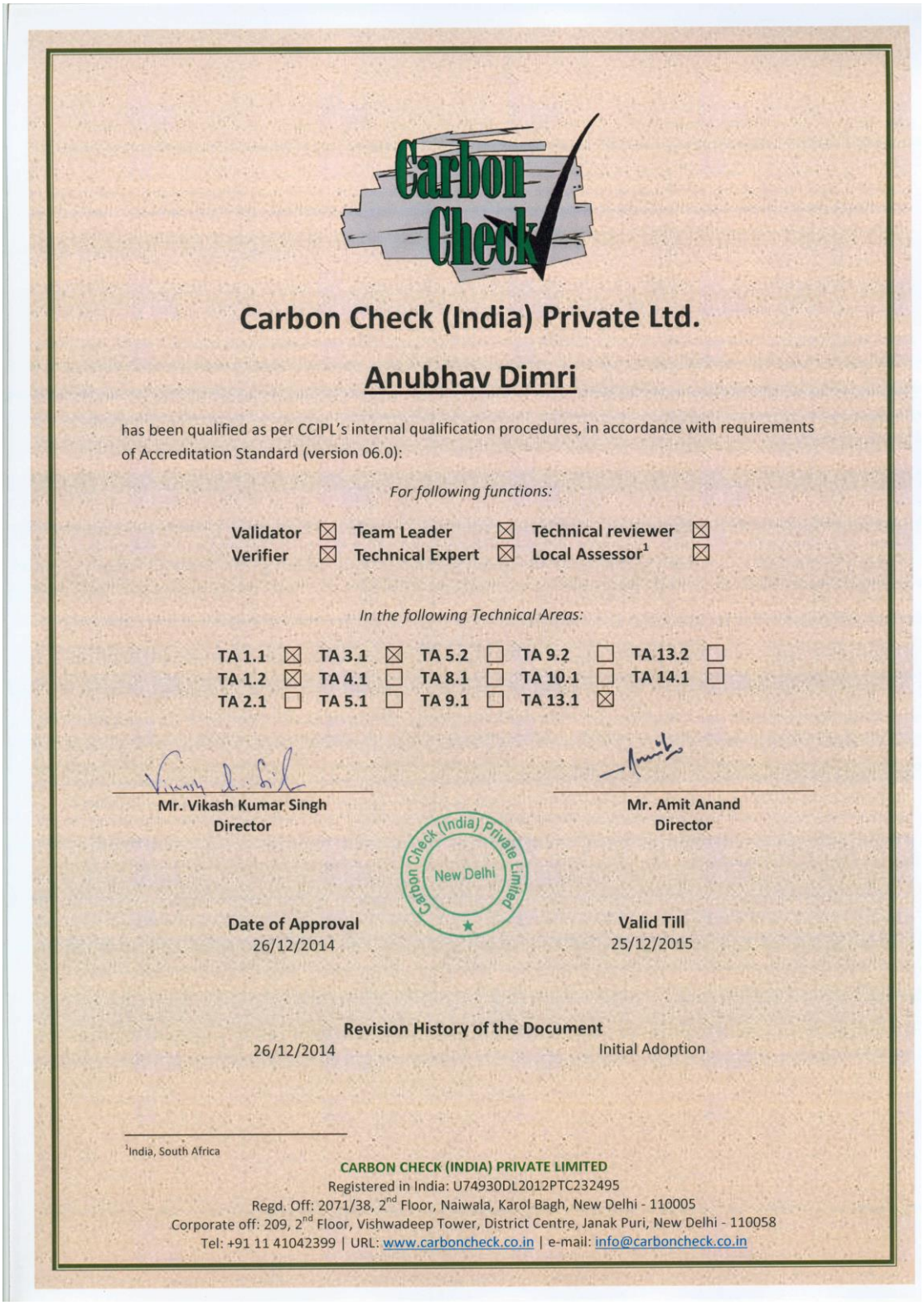
Finding	CL 02
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the next periodic verification ☐ Outstanding finding (not closed) ☒ The finding is closed

Finding	CL 03		
Classification	☐ CAR	☒ CL	☐ FAR
Description of finding *(DOE)*	The statement "In the project activity no electricity or heat is generated, and natural gas use is not applicable" in section B.6.1 of the PDD is not corresponding/matching to(in context of possible use of the captured LFG) description in the section A.1 of the PDD. PP is requested to clarify, while doing so please also refer to original registered PDD.		
Corrective Action or clarification #1 *(PP shall write a detailed and clear corrective action or further information for clarification as per finding)*	In order to secure consistency throughout the Project Design Document, in terms of the utilisation of the captured LFG, Section A.1. of the revised PDD has been updated by explicitly mentioning that utilisation of the captured LFG other than flaring is not included in the project boundary: *"For the purpose of requesting renewal of the crediting period, this updated PDD does not include options for utilisation of the captured LFG other than flaring*." The reason why potential uses of the captured LFG, other than flaring, is mentioned is purely informative to be transparent about the fact that the project design may be changed in the future. However being outside the scope of this PDD and in case these changes take effect, the PDD shall be updated accordingly, in line with the requirements stipulated in the CDM Project Standard.		
DOE Assessment #1 *The assessment shall encompass all open issues in the finding. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	PP has revised and updated the section A.1 and B.6.1 of the PDD, stating that utilisation of the captured LFG other than flaring is not included in the project boundary and found appropriate to the validation team.		
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the next periodic verification ☐ Outstanding finding (not closed) ☒ The finding is closed		

Finding	CL 04		
Classification	☐ CAR	☒ CL	☐ FAR
Description of finding *(DOE)*	Annual average emission reduction of the project is substantially decreased from the original registered PDD (61,745 tCO_2e in the revised PDD Vs 188,320 tCO_2e in the original registered PDD), PP is requested to clarify the reason. While doing so please refer to paragraph 289 and 290 of Project standard version 07.		
Corrective Action or clarification #1 *(PP shall write a detailed and clear corrective action or further information for clarification as per finding)*	The estimated emissions reductions for the second crediting period are less than the ex-ante calculated emissions reductions for the first crediting period. The reason is that the methodology applied in the original PDD was withdrawn after the registration of the project activity and replaced by a consolidated methodology and therefore different methodologies have been applied for the emissions reductions calculations: the ex-ante calculations for the first crediting period are based on methodology AM0011 (Version 02) and the ex-ante calculations for the request for renewal of the crediting period are in accordance with methodology ACM0001 (Version 15.0). AM0011 (Version 02) is based on direct measurement of the amount of landfill gas, whereas the ex-ante calculations of ACM0001 (Version 15.0) are based on the quantities of waste disposed into the landfill. The latter is a very conservative approach when compared to AM0011. The difference is not related to the validity of the original baseline or to the implementation of national and/or sectoral policies and circumstances which would require GHG emissions reductions measures.		
DOE Assessment #1 *The assessment shall encompass all open issues in the finding. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	The PP has provided the proper clarification regarding annual average emission reduction of the project same has been crosscheck with ER calculations sheet and also interviewed during OSV. Hence CL is closed.		
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the next periodic verification ☐ Outstanding finding (not closed) ☒ The finding is closed		

APPENDIX B

Certificates of Competence



Carbon Check (India) Private Ltd.

Anubhav Dimri

has been qualified as per CCIPL's internal qualification procedures, in accordance with requirements of Accreditation Standard (version 06.0):

For following functions:

Validator	☒	Team Leader	☒	Technical reviewer	☒
Verifier	☒	Technical Expert	☒	Local Assessor[1]	☒

In the following Technical Areas:

TA 1.1	☒	TA 3.1	☒	TA 5.2	☐	TA 9.2	☐	TA 13.2	☐
TA 1.2	☒	TA 4.1	☐	TA 8.1	☐	TA 10.1	☐	TA 14.1	☐
TA 2.1	☐	TA 5.1	☐	TA 9.1	☐	TA 13.1	☒		

Mr. Vikash Kumar Singh
Director

Mr. Amit Anand
Director

Carbon Check (India) Private Limited — New Delhi

Date of Approval
26/12/2014

Valid Till
25/12/2015

Revision History of the Document

26/12/2014	Initial Adoption

[1] India, South Africa

CARBON CHECK (INDIA) PRIVATE LIMITED
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Carbon Check (India) Private Ltd.

Amit Anand

has been qualified as per CCIPL's internal qualification procedures, in accordance with requirements of Accreditation Standard (version 06.0):

For following functions:

Validator	☒	Team Leader	☒	Technical reviewer	☒
Verifier	☒	Technical Expert	☒	Local Assessor[1]	☒

In the following Technical Areas:

TA 1.1	☐	TA 3.1	☒	TA 5.2	☐	TA 9.2	☐	TA 13.2	☐
TA 1.2	☒	TA 4.1	☐	TA 8.1	☒	TA 10.1	☐	TA 14.1	☒
TA 2.1	☐	TA 5.1	☐	TA 9.1	☐	TA 13.1	☒		

Mr. Vikash Kumar Singh
Director

Mr. AnubhavDimri
Director

Carbon Check (India) Private Limited New Delhi

Date of Approval
26/12/2014

Valid Till
25/12/2015

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26/12/2014	Initial Adoption

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Carbon Check (India) Private Ltd.

Barun Kumar

is hereby certified as a qualified

Assessor
Technical Expert

In the following Technical Areas
1.2; 3.1; 13.1

with Carbon Check (India) Private Ltd., under the regulations of the UNFCCC and Carbon Check's qualification criteria .

Approval date: 29 November 2014

Technical
Executive/Director
Mr. Amit Anand

Compliance officer
Mr. Anubhav Dimri

The above competence is valid for one year from the date of approval and is subject to review as per changes in CCIPL and UNFCCC requirements and procedures.