

Verification and Certification Report

3rd periodic verification

Report for:

Xentolar Holdings Limited

Verification of CDM project for
Bangkok Kamphaeng Saen East: Landfill Gas to
Electricity Project
(Ref 3462)

Monitoring Period:
01 November 2011 to 31 March 2012

LRQA Reference	: BGK 0404293 Version 07
Date	: 29 October 2012
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Contents

1	<i>Executive Summary</i>	3
2	<i>Introduction</i>	6
2.1	Objective	6
2.2	Scope	6
2.3	GHG Project Description.....	7
3	<i>Methodology</i>	7
3.1	Verification approach.....	7
3.2	Desk review	8
3.3	On-site assessment.....	8
3.4	Quality of evidence.....	10
3.5	Resolution of clarification and corrective action requests.....	11
3.6	Internal quality control	11
4	<i>Verification protocol and conclusions</i>	11
4.1	Compliance of the project implementation with the registered project design document	12
4.2	Compliance of the monitoring plan with the monitoring methodology, including applicable tool(s).....	13
4.3	Compliance of monitoring activities with the registered monitoring plan	13
4.4	Compliance with the calibration frequency requirements for measuring instruments.....	14
4.5	Assessment of data and calculation of emission reductions	14
5	<i>Making the monitoring report publicly available</i>	15
6	<i>Certification report</i>	16
7	<i>Appendices</i>	17
7.1	Appendix A: List of documents reviewed	17
7.2	Appendix B: Certificate of Appointment.....	23
7.3	Appendix C: Verification Protocol and Findings	24

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1 Executive Summary

Lloyd's Register Quality Assurance Limited has been contracted by Xentolar Holdings Limited, representing the project participants (PP), to undertake the third periodic verification of the registered project activity "Bangkok Kamphaeng Saen East: Landfill Gas to Electricity Project" project reference number 3462 covering the monitoring period from 1 November 2011 to 31 March 2012. The verification has been performed by document review based on the Monitoring Report Version 2 dated 15/04/2012 as made publicly available, on-site assessment and interviews with the stakeholders, resolution of outstanding issues and issuance of the verification report.

The project intends to reduce greenhouse gas (GHG) emissions by the extraction, capturing and utilisation of landfill gas (LFG) for electricity generation and export to the national electricity grid system of Thailand. The scenario existing prior to the start of the implementation of the project activity is atmospheric release of the LFG and existing and/or new grid connected power plants for power generation. The current installed capacity with 8 generators is 8.51 MW while the PP expects that up to 15 generators can be installed if the expected increase in gas is confirmed, with a maximum capacity of 16 MW as per the registered PDD. The project activity involves installation of a full integrated LFG collection system, gas pre-treatment system, LFG generator sets, flaring system, and associated control systems, gas pipe-works, and electricity connection system.

The fulfilment of the requirements as set forth in the Article 12 of the Kyoto Protocol of the United Nations Framework Convention on Climate Change (UNFCCC), the modalities and procedures for a CDM and relevant decisions of the Conference of the Parties serving as meeting of the Parties to the Kyoto Protocol (COP/MOP) and the Executive Board of the CDM (CDM-EB) has been evaluated and the conformance to the verification requirements were confirmed based on the given information. A risk based approach was taken to conduct the verification, and corrective action requests (CARs), clarifications (CLs) and forward action requests (FARs) were issued for relevant actions by the PP.

The verification team identified, through the verification process, 11 CARs and 3 CLs. The PP has taken actions and submitted to LRQA the revised monitoring report and supporting evidence. The verification team, through the verification process, confirmed that the emission reductions achieved by the project activity during the monitoring period are correctly calculated in the monitoring report Version 7 dated 03/09/2012 based on the approved monitoring methodology and the monitoring plan of the registered PDD. LRQA certifies the emission reductions amounting to 133,695 tCO₂e and requests the CDM-EB to issue the CERs.

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Abbreviations

BE	Baseline emission
°C	Degree Celsius
CAR	Corrective action request
CDM	Clean Development Mechanism
CDM-EB	Executive Board of Clean Development Mechanism
CDM M&P	Modalities and procedures for a clean development mechanism
CER	Certified Emission Reduction
Cf	Flow Coefficient value of V-cone flow meter
CL	Clarification
CMP	Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol
COD	Commercial operation date
COP/MOP	Conference of the Parties serving as meeting of the Parties to the Kyoto Protocol
DEDE	Department of Alternative Energy Development and Efficiency Ministry of Energy
DOE	Designated operational entity
EIA	Environmental Impact Assessment
ERs	Emission reductions
FAR	Forward action request
GE	GE Jenbacher GmbH & Co OHG
GHG	Greenhouse gas
GWP	Global warming potential
IEE	Initial Environmental Examination
IPCC	Intergovernmental panel on climate change
IT	Information technology
KP	Kyoto Protocol of the United Nations Framework Convention on Climate Change
kPa	kilopascal
kVA	kilovolt-amperes
kW	kilowatt
LE	Leakage emission
LFG	Landfill gas
LR	Lloyd's Register
LRQA	Lloyd's Register Quality Assurance Limited
MMC	Marske Machine Hire and Calibration Centre
MOI	Ministry of Industries
MP	Monitoring Plan
MR	Monitoring Report
MW	Megawatt
MWe	Megawatt of electricity
Nm ³	Normalised cubic meter
NTP	Normal temperature and pressure
ODA	Official Development Assistance
ONEP	Office of Natural Resources and Environmental Policy and Planning
Pa	Pascal
PDD	Project design document
PE	Project emission
PEA	Provincial Electricity Authority
P&ID	Piping and instrumentation diagram



PLC	Programmable Logic Controller
PP	Project participant
PPA	Power purchase agreement
QA/QC	Quality Assurance/Quality Control
SCADA	Supervisory Control and Data Acquisition
SCC	Sindicatum Carbon Capital Ltd.
S/N	Serial number
tCO ₂ e	Tonne of carbon dioxide equivalent
Itl	Absolute temperature
TLAS	Thai Laboratory Accreditation Scheme; Thai Industrial Standard Institute
UNFCCC	United Nations Framework Convention on Climate Change
UK	United Kingdom
VSPP	Very small power producer
VVS	Validation and verification standard



2 Introduction

The project participant (PP) represented by Xentolar Holdings Limited has contracted with Lloyd's Register Quality Assurance Limited (LRQA) to undertake the third periodic verification of the proposed project activity "Bangkok Kamphaeng Saen East: Landfill Gas to Electricity project" covering the monitoring period from 1 November 2011 to 31 March 2012. This report summarises the findings through the verification process that has been conducted on the verification requirements of the CDM.

The verification has been undertaken by the team formed of the qualified personnel of LRQA as follows:

Paveena Hengsritawat	LRQA Thailand	Team Leader, CDM Verifier,
Dr. Komsilp Wangyao	External Expert	Sector Expert
Prabodha C Acharya	LRQA India	Technical Reviewer,
Atthavute Ruenruengjai	External Expert	Sector Expert to Technical Reviewer
Javier Vallejo Drehs	LRQA Ltd.	Decision Maker

Personnel being engaged in a CDM project verification are qualified based on the established procedures of LRQA to assure the resource requirements that satisfy all the requirements of competence criteria of the CDM accreditation standard for operational entities. LRQA is designated as an operational entity and holds the full responsibility on decision-making regarding the verification in accordance with the accreditation requirements of the CDM-EB. The certificate of appointment of the team personnel is attached to this report.

2.1 Objective

Through the verification activities, the verification team was to confirm that:

- 1) the project activity has been implemented and operated as described in the validated and registered PDD and that all physical features of the project activity are in place
- 2) the monitoring report (MR) and other supporting documents provided are complete and verifiable, and in accordance with applicable CDM requirements
- 3) actual monitoring systems and procedures comply with the monitoring systems and procedures described in the monitoring plan (MP) and the approved methodology; and
- 4) the data is recorded and stored as per the monitoring methodology.

The verification followed the requirements of the current version of the CDM Validation and Verification Standard (CDM VVS) to ensure the quality and consistency of the verification work and the report.

2.2 Scope

The scope of verification was an independent and objective review of the monitored emission reductions (ERs) against the verification requirements of the CDM M&P. LRQA followed a risk-based approach in the verification, focusing on the identification of significant risks for implementation of the registered monitoring plan and the resultant emission reductions. The verification statement shall become final after final review by the decision maker of LRQA Ltd.



2.3 GHG Project Description

Project title	Bangkok Kamphaeng Saen East: Landfill Gas to Electricity Project
CDM reference	3462
Date of registration	21/01/2011
Applied methodology	ACM0001 "Consolidated baseline and monitoring methodology for landfill gas project activities" Version 11
Crediting period	21/01/2011 – 20/01/2018 (7 years renewable)
Project location	Bangkok Kamphaeng Saen East Landfill Site, T. Sasimhum, A. Kamphaeng Saen, Nakhon Pathom, 73140. (City of Kamphaeng Saen, Province of Nakhon Pathom, District of Kamphaeng Saen, The Kingdom of Thailand) Its geographic coordinates are 14° 3'50.62"N latitude and 99°56'50.96"E longitude
Project participants	Host Country: Bangkok Greenpower Co., Ltd. ¹ Annex I Country: Xentolar Holdings Limited, Sindicatum Carbon Capital Ltd.
Monitoring period	01/11/2011 – 31/03/2012

3 Methodology

3.1 Verification approach

LRQA's verification of the project documentation provided by the project participant was based on both quantitative and qualitative information on emission reductions. Quantitative information comprises the reported numbers in the monitoring report submitted to LRQA. Qualitative information is made up of the information on internal management controls, calculation procedures, procedures for transfer of data, frequency of emission reports, and review and internal audit of calculations.

As well as the monitoring documentation provided by the project participants, LRQA also reviewed:

- the registered PDD and the monitoring plan, including any approved revised monitoring plan and/or changes from the registered PDD, and the corresponding validation report
- previous verification reports, if any
- the applied monitoring methodology
- relevant decisions, clarifications and guidance from the CMP and the CDM Executive Board
- any other information and references relevant to the project's resulting emissions reductions.

LRQA also confirmed that the Monitoring Report is as per the standardised format.

¹ The PP PS Natural Energy Co., Ltd. has been withdrawn as PP w.e.f. 14/09/2011. Please refer to the project page <http://cdm.unfccc.int/Projects/DB/SGS-UKL1267631662.24/view> for details.



3.2 Desk review

The verification was performed primarily based on the review of the monitoring report and the supporting documentation. This process included:

- 1) a review of data and information presented to verify their completeness
- 2) a review of the MP and monitoring methodology, paying particular attention to the frequency of measurements, the quality of metering equipment including calibration requirements, and the QA/QC procedures, and
- 3) an evaluation of data management and the QA/QC system in the context of their influence on the generation and reporting of ERs.

The monitoring report Version 1 dated 12/04/2012 was initially reviewed for its completeness. Subsequently the monitoring report Version 2 dated 15/04/2012 was made publicly available. This last version was reviewed and LRQA requested the PP to present the supporting information and documents and such additional information and documents were also reviewed by LRQA.

Through the process of the verification, the revised monitoring report and the supporting documents were evaluated to confirm the actions taken by the PP to the CARs and CLs issued by LRQA. The documents reviewed by LRQA are listed in Appendix A. LRQA reviewed the final version of the monitoring report Version 7 dated 03/09/2012 to confirm that all changes agreed had been incorporated.

3.3 On-site assessment

An on-site assessment was conducted as a part of verification activity and involved:

- 1) an assessment of the implementation and operation of the CDM project activity as per the registered PDD
- 2) a review of information flows for generating, aggregating and reporting of the monitoring parameters
- 3) interviews with relevant personnel to confirm that the operational and data collection procedures are implemented in accordance with the MP
- 4) a cross-check between information provided in the MR and data from other sources
- 5) a check of the monitoring equipment including calibration performance, and observations of monitoring practices against the requirements of the PDD and the applied methodology
- 6) A review of calculations and assumptions made in determining the GHG data and ERs, and
- 7) An identification of QA/QC procedures in place to prevent, or identify and correct, any errors or omissions in the reported monitoring parameters.

The detail of the on-site assessment is as follows:



Date	Location	Team Members on site	Subjects covered	Persons interviewed
14/05/2012	Project Site	Paveena Hengsitawat and Dr. Komsilp Wangyao	- Organizational arrangements and project implementation - Site layout and Project boundary - Project operation, confirmation of technical specification, maintenance, provision of project equipment including measuring devices - Performance of project activity, Monitoring / measuring systems, Data management and reporting, QA/QC systems - Data management and reporting, QA/QC systems - Record keeping - Metering guidelines , Meter specifications – Accuracy, make - Calibration requirement – procedure, frequency/schedule, records - Measurement, Data collection and Processing systems for the following parameters - Measurement of LFG_{total,y} - Measurement of LFG_{flare, y} (or FV_{RG, h}) - Measurement of LFG_{electricity, y}	Sindicatum Carbon Capital Ltd. (the Annex I country participant of the project activity) - Mr. Jay Mariyappan, Managing Director of Climate Change - Mr. Teerasit Tantasuralerk, CDM & Commercial Manager (Thailand) - Mr. Pongsthon Sangchai (CDM Monitoring team) - Ms. Kapusadee Saenvaede (CDM Monitoring Team) - Mr. Jarawat Saelee (Pre-treatment system supervisor)
15/05/2012	Project Site	Paveena Hengsitawat and Dr. Komsilp Wangyao	- Measurement, Data collection and Processing systems for the following parameters - Measurement of LFG composition and methane fraction in LFG, $\omega_{CH_4,y}$ (or $f_{v,CH_4, RG,h}$) - Measurement Temperature of LFG, T - Measurement Pressure of LFG, P - Measurement of Temperature of the exhaust gas of the flare, T_{Flare} - Determination of Flare efficiency - Calculation of PE flare,y - Measurement of EL_{LFG} (Net quantity of electricity produced /exported using LFG) - Measurement of EL_{import} (or EC_{Pj,j,y}), Net amount of electricity imported from the grid for auxiliary use	Sindicatum Carbon Capital Ltd. (the Annex I country participant of the project activity) - Mr. Jay Mariyappan, Managing Director of Climate Change - Mr. Teerasit Tantasuralerk, CDM & Commercial Manager (Thailand) - Mr. Pongsthon Sangchai (CDM Monitoring team) - Ms. Kapusadee Saenvaede (CDM Monitoring Team) - Mr. Marcus Xia, CDM Manager (Note: Call in for



Date	Location	Team Members on site	Subjects covered	Persons interviewed
			○ Measurement of operating hours of energy plants, ○ Monitoring of Average technical transmission and distribution losses for providing electricity to Sources j, TDL j,y ○ Process to determine Regulatory requirement relating to landfill gas project (It may effect the value of AF or MD reg,y) ○ Determination of Power engine efficiency ● Emergency procedures – Change / failure in meters / equipment ● Baseline emission ● Project emission ● ER calculation ● Provisions for internal audits ● Staff Competency and training ● Compliance to regulatory requirements ● Environmental report (Compliance to environmental regulations) ● Contribution to sustainable development ● Issue with stakeholders	interview on Mass balance of LFG flow only)

For details of all the findings of the desk review and site visit, please refer to the Verification Protocol and Findings in Appendix C.

3.4 Quality of evidence

When verifying the reported emission reduction, LRQA ensured that there was a clear audit trail that contained the evidence and records that validate the stated figures. All source documents that form the basis for assumptions and other information underlying the GHG data are shown in Appendix A.

When assessing the audit trails, LRQA also examined:

1. whether sufficient evidence was available, both in terms of frequency and in covering the full monitoring period
2. the source and nature of the evidence
3. if comparable information was available from sources other than that used in the monitoring report, LRQA cross-checked the monitoring report against the other sources to confirm that the stated figures were correct. The sources and the data referenced are shown in Appendix A.

LRQA also assessed that the data collection system met the requirements of the monitoring plan as per the applied methodology.



3.5 Resolution of clarification and corrective action requests

LRQA, during this verification, identified issues related to the monitoring, implementation or operation of the proposed CDM project activity that could impair the capacity of the proposed CDM project to achieve emission reductions or influence the reporting of emission reductions. LRQA has identified, discussed and concluded these issues within the Verification Protocol and Findings – Appendix C.

LRQA has raised a Corrective Action Request (CAR) if one of the following occurred:

1. A non-compliance with the monitoring plan or methodology is found in the monitoring and reporting that has not been sufficiently documented by the project participants, or the evidence provided to prove conformity is insufficient
2. Modifications to the implementation, operation and monitoring of the registered project activity has not been sufficiently documented by the project participants
3. Mistakes have been made in applying assumptions, data or calculations in relation to emission reductions that will impact upon the quantity of emission reductions
4. Issues identified in a FAR during validation or previous verification(s) to be verified during verification have not been resolved by the project participants.

LRQA has raised a Clarification Request (CL) if information was insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

All CARs and CLs raised by LRQA during this verification have been resolved. The ERs can be certified and recommended for issuance to the CDM Executive Board.

3.6 Internal quality control

The technical review by a qualified person independent from the verification team, and a review by an authorised decision maker are to be completed before the submission of the verification report to the PP and before requesting the issuance of the verified ERs.

4 Verification protocol and conclusions

LRQA has undertaken this verification in accordance with the verification protocol (which is based on the Clean Development Mechanism Validation and Verification Standard Version 02.0). This section provides an overview of the verification activities and general conclusions. Further details in relation to each element of the protocol and to each finding are shown in Verification Protocol and Findings – Appendix C.

The protocol is structured based on the main verification requirements as follows:

- compliance of the project implementation with the registered project design document
- compliance of the monitoring plan with the monitoring methodology, including applicable tool(s)
- compliance of monitoring activities with the registered monitoring plan
- compliance with the calibration frequency requirements for measuring instruments
- assessment of data and calculation of emission reductions.



4.1 Compliance of the project implementation with the registered project design document

LRQA has determined during the verification process that:

- the implementation and operation of the project activity has been conducted in accordance with the description contained in the registered PDD, except the temporary use of diesel generator during testing for COD of new engines as described in CAR 03. The PP has revised the PDD to include the use of this diesel generator and has submitted the revised PDD along with the MR for the acceptance of the post registration changes by the Board in accordance with Paragraph 134 of the PCP version 2. The verification team reviewed this revised PDD and confirms that the changes are included in Appendix 1 of the PS version 01 and do not require prior approval by the Board. The verification team confirms also the revised PDD to be appropriately reflecting the actual design and implementation of the project. Please refer to CDM post registration change validation opinion which provides detail of change and the verification team opinion.

LRQA has, by means of a desk review and an on-site visit, assessed that:

- all physical features of the proposed CDM project activity proposed in the registered PDD are in place and that
- the project participants have operated the proposed CDM project activity as per the registered PDD except the temporary use of diesel generator during testing for COD of new engines as mentioned above.

In the PDD, it was mentioned that the number of generator sets installed will vary during the life of the project depending on the quantity of gas available. The volume of gas is expected to increase during the first years of the project activity while waste tipping continues and it is expected that up to 15 generators can be installed if the expected increase in gas is confirmed, with a maximum capacity of 16MW feasible that can be exported with two grid connections. After waste tipping ceases, the quantity of gas available is expected to reduce, and generator sets may be decommissioned and sold.

LRQA confirmed that the project implementation is in line with the registered PDD and corresponds to the description in the MR; the three flares were installed between October 2009 and January 2010. Landfill gas has been extracted and combusted by flares since February 2010, and the 3 Flares were completely commissioning on 25/06/2010. The physical installation of the first 4 x1063kW engines and construction of the grid connection was completed by late March 2010. Following commissioning of the grid connection the project started to export power to the Thai Grid on 8th April 2010. The additional 2 x 1063kW engines (Nos. 5 & 6) were installed during April 2011 and the last 2 additional 2x 1063kW engines (Nos. 7 & 8) were installed during December 2011. The dates of commissioning completion for the engines were confirmed as below:

Engine	Commissioning Handover Date	Engine	Commissioning Handover Date
1	18/05/2010	5	20/04/2011
2	17/06/2010	6	20/05/2011
3	18/05/2010	7	27/01/2012
4	18/05/2010	8	27/01/2012



Addition of further engines will depend on the gas availability and installation is expected during the subsequent monitoring periods. A separate grid connection will be required for the additional engines that are in line with the registered PDD.

For details of the implementation status of the project, the actual operation of the proposed CDM project activity, any information provided in the monitoring report that is different from that stated in the registered PDD², and any approvals of the necessary request of notification or request for approval of changes, please refer to the Verification Protocol in Appendix C.

4.2 Compliance of the monitoring plan with the monitoring methodology, including applicable tool(s)

LRQA has determined that the project implementation is in accordance with the provisions of the registered PDD except the temporary use of diesel generator as aforementioned. The verification team considered this change as a type of change indicated in paragraph 6 of Appendix 1 of Clean Development Mechanism Project Standard Version 01.0 which does not require prior approval by the board. The PP has revised the registered PDD to include the monitoring plan of project emission from fossil fuel consumption, in order to request acceptance of post registration change along with the request for issuance of CER. The verification team reviewed this revised monitoring plan and confirm that it is conformance with the applicable methodology ACM0001 Version 11 and the Tool to calculate project or leakage or CO₂ emissions from fossil fuel combustion (Version 02)". Please refer to CDM post registration change validation opinion which provides detail of change and the verification team opinion.

The verification team has also verified that the validated monitoring plan is in accordance with the approved methodology applied by the proposed CDM project activity and the mentioned revised monitoring plan.

For details relating to this section, please refer to the Verification Protocol in Appendix C.

LRQA confirms that the monitoring plan is in accordance with the approved methodology applied by the proposed CDM project activity.

4.3 Compliance of monitoring activities with the registered monitoring plan

LRQA has confirmed that:

1. the registered monitoring plan, the applied methodology and the requested revised monitoring plan have been properly implemented and followed by the project participants.
2. all parameters stated in the monitoring plan, the applied methodology and relevant CDM Executive Board decisions, have been sufficiently monitored and updated as applicable, including:
 - a. project emission parameters
 - b. baseline emission parameters

² And has caused an increase in estimates of the emission reductions in the current monitoring period or is highly likely to increase the estimates of emission reductions in future monitoring periods



- c. leakage parameters
 - d. management and operational system
- 3. the accuracy of equipment used for monitoring is in accordance with the relevant guidance provided by the CDM Executive Board and is controlled and calibrated in accordance with the monitoring plan
 - a. monitoring results are consistently recorded as per approved frequency
 - b. quality assurance and quality control procedures have been applied in accordance with the monitoring plan.

For details relating to this section, please refer to the Verification Protocol in Appendix C.

LRQA confirms that monitoring has been carried out in accordance with the monitoring plan contained in the registered PDD and the revised monitoring plan which submitted for request approval along with this request to issuance of CERs.

The list in the Verification Protocol – Appendix C shows each parameter required by the monitoring plan, and clearly states how LRQA has verified the information flow (from data generation, aggregation, to recording, calculation and reporting) for these parameters, including the values in the monitoring report.

4.4 Compliance with the calibration frequency requirements for measuring instruments

LRQA has determined that the calibration of measuring equipment has been conducted at the frequency specified in the applied monitoring methodology and in the registered monitoring plan.

For details relating to the frequency of calibration and any cases identified of delayed calibration, please refer to the Verification Protocol in Appendix C.

4.5 Assessment of data and calculation of emission reductions

LRQA has determined whether:

- 1. a complete set of data for the specified monitoring period is available
- 2. information provided in the monitoring report has been cross-checked with other sources such as plant log books, inventories, purchase records, laboratory analysis
- 3. calculations of baseline emissions, proposed CDM project activity emissions and leakage, as appropriate, have been carried out in accordance with the formulae and methods described in the monitoring plan and the applied methodology document
- 4. any assumptions used in emission calculations have been justified
- 5. appropriate emission factors, IPCC default values and other reference values have been correctly applied.

For details of whether data was not available because activity levels or non-activity parameters were not monitored in accordance with the registered monitoring plan, a description of LRQA cross-checked reported data, please refer to the Verification Protocol in Appendix C.

LRQA confirms that appropriate methods and formulae for calculating baseline emissions, projects emissions and leakage have been followed.



LRQA is of the opinion that all assumptions, emissions factors and default values that were applied in calculations have been justified.

5 Making the monitoring report publicly available

In accordance with the "Procedures for making the monitoring report available to the public in accordance with paragraph 62 of the modalities and procedures for the CDM", the monitoring report Version 02 dated 15/04/2012 was made publicly available on the CDM website on 16/04/2012 at:

<http://cdm.unfccc.int/Projects/DB/SGS-UKL1267631662.24/iProcess/LRQA%20Ltd1334587525.16/view>



6 Certification report

LRQA has undertaken the third periodic verification of the proposed project activity “Bangkok Kamphaeng Saen East: Landfill Gas to Electricity Project” covering the monitoring period from 01/11/2011 to 31/03/2012 based on the requirements of CDM as set out in Article 12 of the Kyoto Protocol, the CDM M&P, the present annex, subsequent decisions made by the COP/MOP and CDM-EB, and the other rules applicable to the proposed project activity including the host country’s legislation and its specific requirements for sustainable development.

Through the verification process, the verification team identified 11 CARs, and 3 CLs. The PP has taken actions to address the CARs and CLs and submitted to LRQA the revised monitoring report Version 7 dated 03/09/2012 and the other supporting evidence. All CARs and CLs have been appropriately closed before the issuance of the verification report.

The verification team is of the opinion that the proposed project activity has been implemented in accordance with the revised PDD including the MP. The MP complies with the approved monitoring Methodology and the monitoring complies with the MP. The revised PDD is submitted for acceptance of the Board along with the request of issuance of CERs. The monitored data and calculation of ERs are assessed and confirmed as correct. Therefore LRQA hereby certifies, and requests the issuance of, the reported ERs of “Bangkok Kamphaeng Saen East: Landfill Gas to Electricity Project” during the monitoring period of 01/11/2011 to 31/03/2012 (inclusive both the days) amounting to 133,695 tCO₂e to the CDM Executive Board.

Decision Maker

Date: 05/11/2012

Javier Vallejo Drehs

CDM Quality Manager



7 Appendices

7.1 Appendix A: List of documents reviewed

Category A documents (documents from the PP)

1.	The revised PDD dated 27/06/2012
2.	The revised PDD Version 9 dated 02/07/2012 (for acceptance of post registration change)
3.	(Revised)_50018_BKK_E_Revised_Gas_Model_for_FAM_V11_230712, which was revised to provide ex-ante estimation calculation of Project emission from fossil fuel consumption from the use of diesel generator
4.	Monitoring report Version 1 dated 12/04/2012
5.	Monitoring report Version 2 dated 15/04/2012
6.	Monitoring report Version 3 dated 28/05/2012
7.	Monitoring report Version 4 dated 02/07/2012
8.	Monitoring report Version 5 dated 31/007/2012
9.	Monitoring report Version 6 dated 10/08/2012
10.	Monitoring report Version 7 dated 03/09/2012
11.	Emission Reduction Spreadsheet of the 3 rd Monitoring period Version 1
12.	Emission Reduction Spreadsheet of the 3 rd Monitoring period Version 2 dated 28/05/2012
13.	Emission Reduction Spreadsheet of the 3 rd Monitoring period Version 3 dated 27/06/2012
14.	Emission Reduction Spreadsheet of the 3 rd Monitoring period Version 4 dated 31/07/2012
15.	Emission Reduction Spreadsheet of the 3 rd Monitoring period Version 5 dated 10/08/2012
16.	Emission Reduction Spreadsheet of the 3 rd Monitoring period Version 6 dated 03/09/2012
17.	Emission Reduction Spreadsheet of the 2 nd Monitoring period Version 4 dated 24/07/2012 (for correction of error of power equation of V cone flow meter of Engine 6 as per detail described in CAR 04.)
18.	The spreadsheet of minute monitoring data during this monitoring period revision 1
19.	The spreadsheet of minute monitoring data during this monitoring period revision 2
20.	The spreadsheet of minute monitoring data during this monitoring period revision 3
21.	The spreadsheet of minute monitoring data during this monitoring period revision 4
22.	The spreadsheet of minute monitoring data during the 2nd monitoring period revision 4(for correction of error of power equation of V cone flow meter of Engine 6 as per detail described in CAR 04.)
23.	Permit for construction of office building and equipment foundations at the project site issued by the director of Sasimhum sub district administration organisation, valid between 23/11/2009 and 24/11/2010.
24.	The Factory License no.02-108/2553 of Bangkok Green Power Co., Ltd. for generation of 8.52 MW electricity from landfill gas which was approved by The Energy Regulatory Commission of Thailand on 02/03/2010 (Under recommendation by MOI) valid until 31/12/2015



25.	The Electrical Production License no. Ko Ko Po 01-1 (1)/53-081 issued by The Energy Regulatory Commission of Thailand for production of electricity from landfill gas. This license is valid from 04/03/2010 to 03/03/2020.
26.	The Controlled Energy Generating License reference no. So Ko Po 5501/074 issued by The Energy Regulatory Commission of Thailand, valid between 04/03/2010 and 03/03/2014 (valid through 3 March 2014) for four generator sets (Generator no. 1 to Generator no.4 @ capacity = 1,550 kVA)
27.	The Controlled Energy Generating License reference no. So Ko Po 5501/0177 issued by the Energy Regulatory Commission of Thailand, valid between 24/05/2011 and 23/05/2015 for the additional of two new generator sets (@ capacity = 1,445 kVA)
28.	The Controlled Energy Generating License reference no. So Ko Po 5501/0028.7 issued by the Energy Regulatory Commission of Thailand, valid between 02/02/2012 and 01/02/2016 for the extension of generating capacity by additional of two new generator sets (@ capacity = 1,445 kVA)
29.	Power Purchase Agreement no.VSPP-PEA-252/2552 between Bangkok Green Power Co., Ltd and PEA (Provincial Electricity Authority) for supply of electricity up to 8 MW at 22 KV planned commercial operation date (COD) within 1 December 2009
30.	PEA meter reading report for COD of 0.8 MW on 8/04/2010
31.	PEA meter reading report for COD of 3.0 MW on 3/06/2010
32.	PEA meter reading report for COD of 4.0 MW on 6/10/2010
33.	PEA meter reading report for COD of 6.0 MW on 26/05/2011
34.	PEA meter reading report for COD of 6.3 MW on 12/07/2011
35.	GE commissioning report for engine 1 on 18/05/2010
36.	GE commissioning report for engine 2 on 17/06/2010
37.	GE commissioning report for engine 3 on 18/05/2010
38.	GE commissioning report for engine 4 on 18/05/2010
39.	GE commissioning report for engine 5 on 20/04/2010
40.	GE commissioning report for engine 6 on 20/05/2010
41.	GE commissioning report for engine 7 on 27/01/2012
42.	GE commissioning report for engine 8 on 27/01/2012
43.	F-CDM-MOC Form for voluntary withdrawal of PS Natural Energy Co., Ltd from the PP.
44.	Manual of Pre-treatment System and Flares date April 2010 from manufacturer "Nanjing Carbon Recycle Biomass Technology Co., Ltd."
45.	Root blower Manual
46.	Enclosed LFG Flare specification-3x 2,000 m ³ /hr date February 2010 from manufacturer "Nanjing Carbon Recycle Biomass Technology Co., Ltd."
47.	Flare Efficiency certificate from manufacturer "Nanjing Carbon Recycle Biomass Technology Co., Ltd."
48.	Technical specification of LFG engine- JF760-F763
49.	Technical specification of LFG engine GE Energy Jenbacher Type 3
50.	Technical data of GE Generator model "JGC 320 GS-L.L"
51.	Manual of EDM1 Mk6 Genius Energy Meter Revision D1
52.	Monitoring Spreadsheet of Engines operating hours at the end of this monitoring period
53.	Maintenance and special event records during this monitoring period
54.	CDM monitoring and quality control manual (LFTH/518/MQCM01) Version 6 date 16 November 2011 and Version 8 dated 8/03/2012
55.	Operation log sheets for manual monitoring of pre-treatment operation, flare operation, and engine operation during this monitoring period



56.	Data sheet and technical specification of energy meter EDME Mk6 Genius
57.	PEA Memo dated 01/10/2009 relate to electricity meter calibration for VSPP
58.	Confirmation letter from manufacturer "GE Jenbacher GmbH & Co OHG" that the operation hour's counter need not to be calibrated based on the fact that the operating hour counter is a GEJ internal software counter
59.	Guardian Plus Infra-red Gas Monitor Operating Manual and technical specification
60.	Product data sheet, reference manual and specification of Rosemount 3051 digital pressure transmitter
61.	Operator manual Honeywell STT 830-173 Thermocouple
62.	Technical Specification of Honeywell Thermocouple, Spec of accuracy of Honeywell Temperature Transmitter
63.	Honeywell STT 171 Temperature transmitter Operator Manual
64.	Specification of Uniflare Type N Thermocouple and transmitter 32-N-LTS-176-6.0-2I-TXLIN/EXI
65.	Technical Specification Kingways Keyon V-Cone Flow meters
66.	Lamway V cone Flow meter manual
67.	Technical Specification Shanghai Kent KVCF V cone Flow meter
68.	LFTH-518-Engine Equipment installation log-CER3
69.	LFTH-518-Flare Equipment installation log-CER3
70.	Piping and Instrument diagrams (P&ID) for the CDM instrumentations drawing numbers .LFTH-518-CP-006 R11_Master, LFTH-518-CP-007 R6_Master, LFTH- 518-CP-008 R7_Master, LFTH-518-CP-009 R7_Master
71.	LFTH518 Engine Calibration Record log sheet -MR3
72.	LFTH518 Flare Calibration Record log sheet -MR3
73.	Calibration certificates for V-cone flow meters • S/N 9061213 dated 01/12/2011 • S/N 9061212 dated 29/07/2011 • S/N 10071503 dated 23/08/2010 All were calibrated by Shanghai Inspection and Testing Institute of Instruments and Automatic Systems
74.	Calibration certificates for V-cone flow meter • S/N 9061210 dated 14/09/2011 • S/N 9062916 dated 21/06/2011 • S/N 9061205 dated 18/06/2011 • S/N 9062903, S/N 9062907, S/N 9062913 and S/N 9062901 dated 13/06/2011 • S/N 1104-0160 dated 14/06/2011 • S/N 1104-0159 dated 20/07/2011 • S/N 9062914 dated 13/09/2011 All were calibrated by Miracle International Technology Co., Ltd.
75.	Calibration certificate for Edinburg Gas Analyser S/N 31426 dated 03/06/2011 by Miracle International Technology Co., Ltd.
76.	Calibration certificate for Electric meter (Export)EDMI Mk6 Genius • Main meter S/N 201005194 - PEA 15850695 dated 12/07/2011 • Back-up meter S/N 201007272 - PEA 15852773 dated 13/07/2011 Both were calibrated by PEA
77.	Calibration certificate for Electric meter (Import) EDM Mk6 Genius • Main meter S/N 201006718 - PEA 15852219 dated 12/07/2011 • Back-up meter S/N 201005191 – PEA 15850692 dated 13/07/2011 Both were calibrated by PEA



78.	Calibration certificate for Pressure transmitter - S/N 54660080, S/N 54660089, S/N 5466010, S/N 5466007, S/N 5466015, S/N 02443480, and S/N 02443481 dated 14/06/2011 - S/N 02166915, S/N 02300672, S/N02300673, and S/N 02300674 dated 16/11/2010 - S/N 02150751, S/N 02150753, S/N 02166915, S/N 02300672, S/N 02300673, and S/N 02300674 dated 10/11/2011 All were calibrated by Miracle International Technology Co., Ltd.
79.	Calibration certificate for Pressure transmitter for S/N 02150753 and S/N 02150750 dated 20/12/2010 Both were calibrated by Marske Machine Hire & Calibration Centre
80.	Certificate of calibration for temperature transmitter - S/N080625355, S/N 100208523, S/N 080625400, and S/N 090536657 dated 08/08/2011 - S/N 100208515, S/N 100208537, S/N 100208540, S/N 100208541, and S/N 080625360 dated 09/08/2011 - S/N 090536658, S/N 090543121, S/N 090536683, and S/N 090543120 dated 17/03/2011 - S/N 100211940 and S/N 100098212 dated 29/03/2011 - S/N 090536658, S/N 090536683, S/N 090543120, and S/N 090543121 dated 01/03/2012 All were calibrated by Thermology Co., Ltd.
81.	Certificate of calibration for thermocouple for - S/N 090329527 dated 08/08/2011 - S/N 080614305, S/N 080614306, and S/N 080614379 dated 07/09/2011 - S/N 080614323, S/N 080614321, and S/N 080614320 dated 09/08/2011 - S/N 22641C/1, and S/N 22641C/3 dated 07/02/2012 All were calibrated by Thermology Co., Ltd.
82.	Certificate of calibration for thermocouple for S/N 22641C/1A, S/N22641C/2A and S/N22641C/3A dated 05/01/2011. All were calibrated by TC Ltd.
83.	Laboratory accreditation certificate for Shanghai Inspection and Testing Institute of Instruments and Automatic Systems
84.	Certification of laboratory Accreditation and scope of accreditation for Miracle International Technology Co., Ltd.
85.	Certification of laboratory Accreditation and scope of accreditation Marske Machine Hire and Calibration Centre (MMC) Thailand
86.	Certification of laboratory Accreditation and scope of accreditation for Thermology Co., Ltd.
87.	Plant and equipment Preventive maintenance schedule and record during the monitoring period
88.	Gas analyser monthly gas span and calibration record during the monitoring period
89.	Certificate of composition of 59.94 % methane standard gas cylinder no. 580878 expired 13/09/2014
90.	Certificate of Analysis of 99.99% Nitrogen standard gas cylinder no. 018090 expired 08/09/2013
91.	Daily check record for Flare equipment
92.	CDM Non-compliance data error log during this monitoring period
93.	Flow meter Sizing application document for each V-cone flow meters
94.	Summary sizing V cone flow meter calculation equation – MR3



95.	Spreadsheet of minute monitored data of all monitored parameters for the monitoring period dated 10/04/2012
96.	Spreadsheet of hourly averaged data of all monitored parameters for the monitoring period dated 10/04/2012
97.	Spreadsheet for determining relation between power generation VS LFG flow for each engine (called as non-essential data record spreadsheet for the monitoring period)
98.	Internal audit report No.1 Version : V1 for audit date 14-15/11/ 2011
99.	Minute of management review meeting date 29/11/2011
100.	The most update published Annual report of Department of Alternative Energy Development and Efficiency (DEDE) for the electric power in Thailand year 2010 and Thailand Energy statistic year 2011
101.	Calculation spreadsheet for transmission and distribution loss of Thai grid for last five years and for the latest published version of year 2011
102.	Monthly electrical statements for import and export electricity issued by PEA during the monitoring period
103.	Monthly records of import and export electricity meter witness reading by both the PP and PEA during the monitoring period
104.	Monthly electricity invoices during the monitoring period
105.	Final Initial Environmental Examination (IEE) report
106.	Ambient air quality monitoring report during June 27-4/07/2011
107.	Environmental quality monitoring report during June 20-24/02/2012
108.	Staff training matrix and records which include course relate to introduction to CDM, CDM reporting requirements, CDM monitoring manual, Emission reduction and CDM monitoring, calibration and maintenance for specific equipment/instrument.
109.	Accident investigation procedure (SCC-QCD-HSP1.2 Issue 1)
110.	The installation and commissioning checklist for electric parts of pre-treatment system and flares dated 25/06/2010
111.	The installation and commissioning checklist for mechanical parts of pre-treatment system and flares dated 25/06/2010
112.	Material withdraw request and approval record for withdrawal of diesel fuel for diesel generator on 09/03/2012
113.	Excel calculation sheet for project emission from diesel generator provided on dated 29/05/2012
114.	The specification of the diesel generator (CAT model C32 Prime 800ekW 1000kVA CMCP4)
115.	The revised summary sizing V cone flow meter calculation equation – for EFT 9006 (according to new CF dated 27/07/2011) and for EFT 9007 (according to new CF dated 26/12/2011)
116.	Macro which revised for correction of power equation of V-cone flow meter of engine 6 and V-cone flow meter of engine 7 according to their new CF dated 27/07/2011 and 26/12/2011 respectively.
117.	Confirmation letter dated 28/05/2012 from Miracle International Technology Co., Ltd, an accredited lab that calibrated V-cone flow meters, that the interpretation and judgement method of their calibration results is in accordance with the V-cone manufacture's manual.
118.	The spreadsheet of minute monitoring data during this monitoring period - dated 28/05/2012
119.	Confirmation letter dated 23/05/2012 from Miracle International Technology Co., Ltd, that calibrated the gas analyser follow the manufacturer's specification



Category B documents (other documents referenced)

1.	Registered PDD (Version 08 dated 13/08/2010)
2.	Validation report (VAL2782 IN02 dated 18/01/2011)
3.	ACM0001 "Consolidated baseline and monitoring methodology for landfill gas project activities" Version 11
4.	Tool to determine project emissions from flaring gases containing methane.
5.	Tool to calculate the emission factor for an electricity system Version 02
6.	Tool to calculate baseline, project and/or leakage emissions from electricity Consumption Version 1.
7.	CDM Validation and Verification Standard Version 02.0
8.	CDM Project Standard Version 01.0
9.	CDM Project Cycle Procedure Version 02.0
10.	Guidelines for Completing Monitoring Report Form Version 02.0
11.	Notification of Ministry of Natural Resources and Environment issued in Royal Thai Gazette on 31 August 2552 B.E. (Year 2009) relate to type of project which required EIA
12.	Notification of Ministry of Industry issued in Royal Thai Gazette on 7 October 2547 B.E. relate to allowable limit of concentration of air emission from stack of power plant
13.	Summary report of Thailand Greenhouse Gas Management Organization (TGO), which is Thai's Designated National Authority (DNA) relate to "The study of emission factor for electricity generation of Thailand in year 2010"
14.	2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 2



7.2 Appendix B: Certificate of Appointment

Verification of “Bangkok Kamphaeng Saen East: Landfill Gas to Electricity Project”

We hereby certify that the following personnel have engaged in the verification process that has fully satisfied the competence requirements of the verification of the CDM project activity.

Name of Person

Paveena Hengsritawat
Dr. Komsilp Wangyao
Prabodha C Acharya
Atthavute Ruenruengjai
Javier Vallejo Drehs

Assigned Roles

Team Leader
Sector Expert
Technical Reviewer
Sector Expert to Technical Reviewer
Decision Maker

Decision Maker

Date: 05/11/2012

Javier Vallejo Drehs

CDM Quality Manager

7.3 Appendix C: Verification Protocol and Findings

This document has been produced by the LRQA Verification Team after the desk review and the site visit have been completed. It outlines the verified situation in relation to a number of criteria, including those defined in the Validation and Verification Standard (VVS) and the Project Standard (PS) produced by the CDM Executive Board.

Where LRQA has identified issues requiring corrective action or clarification, a reference is made in the 'Conclusion' column, and details are stated in the section marked 'Findings'.

	Verified situation	Conclusion
SECTION 1. Project implementation in accordance with the registered PDD		
General description of the project		
1.1. Does the MR provide general information of the project and is it as registered by CDM-EB?	Yes The general description of the project activity in the monitoring report (MR) section A and B.1 is identical as it is in the registered PDD. One of the PP, PS Natural Energy Co., Ltd., has been voluntarily withdrawn from the project activity. The approved withdrawal of the PP is updated on the UNFCCC site with the revised MOC. ³	OK
1.2. Is the Monitoring report as per the standardised format? (EB54 Annex 34)	The current standardised format of the F-CDM-MR Version 02.0 of VVS track, which is available in CDM web site, ⁴ is being used. However, there are several observations noted from the MR Version 3 that it is not in conformance with the "Guidelines for completing the monitoring report form" as per Annex20 to EB66, therefore CAR11 is raised. The PP has responded to this finding by revising the monitoring report to address the issues. The verification team reviewed the revised Monitoring report and confirms that it is in conformance with the "Guidelines for completing the monitoring report form". Therefore this finding has been closed	~~CAR 11~~ OK
1.3. Is there any open issue in the validation / previous	No FAR was issued by the previous verification. Two FARs were issued during the validation i.e FAR#05 and point b) of FAR15, which were addressed by the PP	~~CAR 01~~

³ <https://cdm.unfccc.int/ModalitiesOfCommunication/forms/KS09LKIZ9LT2OA2UNJDI8TKTUZEOGCOX/pdf>

⁴ http://cdm.unfccc.int/Reference/PDDs_Forms/Issuance/iss_form07.doc

	Verified situation	Conclusion
verification including FARs? (CDM VVS para. 213)	during the 1st periodic verification. Three issues from the incompleteness check results by UNFCCC secretariat from the 1st and 2nd periodical verifications were also checked during this 3rd periodic verification. Two of them were reoccurred then CAR 01 and CAR 02 were raised as details described in the finding log. (One related to The monitoring report does not contain information on actual implementation (i.e. installed dates, commissioning date and operation started date) for the flare component of the project activity was raised as detailed in CAR 01. The other related to the spreadsheet of calculation of emission reduction does not contain explanation with regard to application of formulae for determination of flare efficiency in the spreadsheet, CAR 02 was issued. The PP has effectively responded to CAR 01 by revising section A.1 and B.1. of the monitoring report to include information relate to installation and commissioning date of all key project components, i.e. engines, flares, gas collection system, pre-treatment system. Hence this CAR has been closed. The PP has also effectively responded to CAR 02 by revising section D.2 of the monitoring report and revising the ER spreadsheet to include explanation with regard to the application of formulae for the determination of the flare efficiency in the spreadsheet and to indicate how the compliance with the manufacturer's specifications of the flare has been monitored to adopt the default value of flare efficiency during certain hours. This also provides the explanation on how three thermocouples of each particular flare has being used to determine the flare efficiency. Therefore CAR 02 has been closed. Please refer to details and resolution of the CAR in the finding log.	~~CAR 02~~ OK
Implementation status of the project activity		
1.4. Is the project location indicated as the same as the registered PDD? Confirm geographical coordinates	Geographical coordinates of the project locations which are indicated in Section A.2. of the MR are the same as indicated in Section A.4.1.4. of the registered PDD. This also reflects the actual location of the project as confirmed from Google Maps.	OK
1.5. Is the project boundary described in the same way as the registered PDD? Please confirm each component based on the applied methodology.	The description in the monitoring report is consistent with the project boundary described in the registered PDD Section B.3. This is almost in accordance with the applied methodology, ACM0001 Version 11 and the actual project implementation except one issue related to utilization of diesel generator for back up during COD of new engines within this monitoring period. This issue was raised as CAR 03 because the project emission for using of diesel generator was not included in the	~~CAR 03~~ OK

	Verified situation	Conclusion
	project boundary and was not monitored, reported, calculated and taken into account for calculation of emission reduction during this 3rd monitoring period. The PP has responded to this finding by revising the PDD to include the project description that mentions the use of fossil fuel when necessary. This revised PDD also include the monitoring plan and equation for monitoring of Project emission from fossil fuel consumption. The verification team has reviewed and validated this revised PDD for determine post registration change and confirm that it is compliance with the ACM0001 Version 11 and the “Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion Version 02. This revised PDD is being submitted along with the request for issuance of CERs for this 3rd monitoring period for acceptance of the Board of the post registration changes. ER calculation spreadsheet of this 3rd monitoring period also includes monitoring and calculation of PE from combustion of fossil fuel consumption. The verification team reviewed the source of data, monitoring and calculation method and confirmed that it is correct and comply with the ACM0001 Version 11 and the “Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion Version 02. Therefore this finding has been closed. Please refer to detail of this finding which is described in the finding log.	
1.6. Has on-site fossil fuel consumption, if any, been monitored? Is any emission source missed? Check the site lay-out and confirm through site tour.	The applied methodology and the registered monitoring plan do not required monitoring of any on-site fossil fuel consumption. In addition, the registered PDD described that “No other fossil fuel will be consumed on site by this project activity and $PE_{FC,j,y}$ does not need to be accounted for as there will be no thermal generation by the proposed project activity”. However, it was observed during this 3 rd periodic verification that “The Annex F of the MR provided that there was some special events relate to “Shutdown power plant for connect diesel generator for COD” during 6:54 – 9:26 of 09/03/2012 and 10:07-10:37 of 10/03/2012”. Interviews with the PP during the site visit revealed that the project activity has not used diesel or other fossil fuel oil for any purpose except for this special event. The diesel generator was used for back up during testing for COD of new engines. This was raised as a finding as described in CAR 03 as previously referred to in section 1.5	~~CAR-03~~ OK
1.7. Confirm contractors for equipment and installation works	Confirmed via physical observation during site visit that the project activity use SCC LFG Gas collection system. Site inspection and review of the equipment manual	OK

	Verified situation	Conclusion
	also confirmed that the manufacturer of pre-treatment system and enclosed LFG flares is the Nanjing Carbon Recycle Biomass Technology Co., Ltd. The manufacturer of generator sets is GE Jenbacher GmbH & Co OHG.	
1.8. Confirm conformance with baseline and monitoring methodology - Applicability conditions. Please refer to the complete description of the applicability conditions and confirm that the project activity meets all the requirements.	Through the site visit and the review of equipment specifications, it was confirmed that: • The project activity flares captured land fill gas through three closed flares. • The captured gas is used to produce electrical energy. Therefore the project activity meets applicability conditions of the applied methodology ACM0001 Version 11. Through the site visit and the review of grid permissions, it was confirmed that the electricity generated from the project is supplied to the Thailand electrical grid (Thai grid) and therefore meets the applicability condition of the applied tool i.e “Tool to calculate the emission factor for an electricity system” Version 02. Through the site visit and the review of documents, it was confirmed that: • The residual gas stream being flared contains no combustible gases other than methane, and • The residual gas streams being flared are obtained from decomposition of organic material within landfills. Therefore the project activity meets the applicability conditions of the applied tool i.e. “Tool to determine project emissions from flaring gases containing methane” The verification team also confirmed through site visit and review of the grid connection that no captive power plant is installed at the project site. The project has purchased electricity from the grid only. Therefore, the project activity meets applicability conditions of the applied tool to calculate baseline, project and/or leakage emissions from electricity consumption Version 01.	OK
1.9. Confirm use or not use of public funding and determine if there is no diversion of ODA to the project activity.	The verification team confirmed through interview with the project participants during the site visit that no public funding from Annex-1 countries was involved in the project activity. There have been no changes in relation to the source of project investment from which was validated by the DOE during the validation stage.	OK

	Verified situation	Conclusion
1.10. Check data in the MR and in the PDD. Describe data and variables that are different from that stated in the registered PDD and caused an increase in emission reductions estimations.	Data and variable that are stated in Section B.6.2. and section B.7.1. of the registered PDD and in Section D.1. and Section D.2. of the MR are consistent, however the value of grid emission factor of electricity ($CEF_{elec,BL,y}$ or $EF_{EL,y}$) applied for calculation in the ER calculation sheet Version 1 and indicated in Table 5 and Table 6 of section E.4. of the MR version 2 as 0.5113 tCO₂/MWh is different from the fixed ex-ante value indicated in the registered PDD and section D.1 of the MR version 2 (0.57420 tCO₂/MWh). Though this discrepancy does not cause an increase in emission reductions estimations, the selected fixed ex-ante value of this parameter as indicated in the registered PDD need to be applied. Hence CAR 09 was raised. The PP has responded to this finding by correction of the value of grid emission factor in the revised ER calculation sheet and table 5 and table 6 of the revised MR to be the same as the fixed ex-ante value indicated in the registered PDD, therefore this CAR has been closed.	~~CAR-09~~ ~~Closed~~ OK
1.11. By means of an on-site visit: Is the general information of the project provided in the Monitoring report and is it as registered by CDM-EB? List each technical component and equipment and check design parameters and actual status of installation and / or operation. Please check to ensure that all physical features of the proposed CDM project activity in the registered PDD are in place and the PP has operated the proposed CDM project activity as per the registered PDD. It may include but not limited to: • the actual capacity and output • plant load factor • type of feedstock • operation of other components / units within the	The project activity involves extraction, capturing and utilization of landfill gas (LFG) from Bangkok Kamphaeng Saen Landfill East Site to generate electricity. The LFG has been extracted and captured using Sindicatum Carbon Capital proprietary LFG collection system and the electricity generated has been exported to the Thai grid. The scenario existing prior to the start of the implementation of the project activity was the atmospheric release of the landfill gas and existing and/or new grid connected power plants for the power generation. Under project activity, a full integrated LFG collection system has been installed and put into operation. The extracted gas has been utilized to generate electricity. When the yield of gas is insufficient to supply to the generators, or surplus LFG due to engine maintenance or other site factors, LFG has been sent to an enclosed ground flare where the gas has been flared thus minimising methane emissions and maximising carbon abatement. During the on-site verification, through the observation of equipment, interviews with the relevant staff and checking of technical specification of main components, it was confirmed that the project activity has been implemented as described in the	~~CAR-01~~ OK

⁵ The sampling shall be in line with the "Standard for sampling and surveys for CDM project activities and programme of activities"

	Verified situation	Conclusion
project boundary which could affect functioning of the project plant. In cases where there are a large number of components and equipment items and the check of all of them is not an available option, then a random sampling check shall be performed. Justify here the sample chosen and describe the results⁵.	registered PDD. - Spark ignition Power Generator units: Currently, there are totally eight engines (no.1 to 8), each with a capacity of 1063kW. Engines no.1 to no. 6 have been in place since the 1st monitoring period. The first four engines (no.1 to 4) were installed by late March 2010. The electricity produced by the first group of these four generators started to export to the national electricity grid system of Thailand on the 8th April 2010 at a capacity of 0.8 MW, this was subsequently increased to 3MW on the 3rd June 2010 and further increased to 4MW on the 6th October 2010 after permissions to export to the grid were granted by PEA. Then an additional two engines (No. 5 & 6), with a capacity of 1063 kW each, were installed during April 2011. The commissioning hand over date of Engines no.5 and 6 was 20/04/2011 and 20/05/2011, respectively. Correspondingly, PEA export approval for 6MW was achieved on 26 May 2011 and subsequently increased to 6.3MW on 12 July 2011. Two more additional engines (no.7 and 8), with a capacity of 1063 kW each were installed during December 2011. The commissioning hand over date of both Engine no.7 and no.8 was 27 January 2012. The ER from Methane destruction from each new engine has been calculated since date of commissioning hand over. However, the PEA has yet to grant approval for the increase from 6.3MW to 8MW export. So the project has limited its electricity generation to be not more than 6.3MW which is the PPA limit, while the surplus landfill gas has been fed to flares. - Landfill gas collection system consisting of HDPE horizontal collection pipes connected with LFG extraction plant and LFG pre-treatment plant are in place. The recovered LFG has passed through the pre-treatment plant where moisture and particulates have been removed prior to the power generating engine. The Gas analyser was equipped for monitoring of methane concentration of this treated LFG. - Three enclosed flares equipped with a monitoring system to measure flow, pressure, and temperature. Review of the technical specification of the enclosed flares provided by the manufacturer and site observation confirmed the description of the flares as matching that in the registered PDD. (Flare capacity 3 x 2,000 Nm³/h, flare temperature 500-1200°C, methane combustion efficiency >98%) These three flares were physically installed by October 2009 and completed by January 2010. Landfill gas has been extracted and combusted by flares since February 2010. The three flares were completely commissioning on	

	Verified situation	Conclusion
	25/06/2010. Section A.1. and Section B.1. of the Monitoring report Version 2.0 date 15/04/2012 did not contain information on relevant dates for the flare component of the project activity (e.g. construction, commissioning, continued operation periods, etc.) hence CAR 01 was raised. The PP revised the MR to contain information related to installation and commissioning date of all key project components, i.e. engines, flares, gas collection system, pre-treatment system. Therefore this CAR 01 has been closed.	
1.12. Have responsibilities for monitoring been described and specified?	Section C of the MR states that a specific CDM department has been established and a CDM Manager has been appointed to oversee that those activities are carried out according to the monitoring plan. A CDM Monitoring team is established having a day to day responsibilities for checking instrumentation, record keeping, data handling and data processing, filing, reporting, organisation repair and maintenance of monitoring equipment. The CDM Monitoring team reports to the CDM Manager and has responsibility to ensure that the monitoring plan is implemented as described in the registered monitoring plan. The responsibilities of the monitoring team have also been described in the CDM Manual, which were confirmed as being implemented.	OK
1.13. Are the responsibilities and authorities for monitoring and reporting in line with those stated in the registered monitoring plan?	Yes. The organisation chart was reviewed during the on-site visit. Through interviews of the relevant personnel it was confirmed that responsibilities and authorities for monitoring and reporting are in accordance with the registered monitoring plan and the MR.	OK
1.14. Check QA/QC, management systems. Are procedures described and specified in the MR? Are they consistently applied as described in the MP? a. documented instructions, management manual b. documentation c. data archiving d. monitoring report e. cross-checking f. energy balance analysis (as relevant)	Yes. A CDM Monitoring and Quality Control Manual for the project activity has been established following the quality management system of Sindicatum Carbon Capital Ltd (SCC) to provide the detailed procedures for monitoring, reporting and QA/QC activities to ensure implementation of monitoring in compliance with the registered monitoring plan. The main monitoring functions are undertaken by an assigned CDM Manager and CDM Monitoring team of SCC. Daily monitoring activities are undertaken by the CDM Monitoring team. The CDM Monitoring team reports the monitoring results and	OK

	Verified situation	Conclusion																			
g. internal audits / verification and management review	calculation to the CDM Manager for checking. SCC Climate Change Officers conduct internal reviews of the monitoring report before submission for verification and internal audits on a regular basis. The operational data is accessible on-line through the internet and it enables close monitoring by the CDM Monitoring team. Following the established QA/QC procedures, a number of internal checks have been implemented on the monitoring and reporting of the ERs. The measured raw data is recorded in the dedicated CDM spreadsheet while the back up system has been implemented for data security. Calculation is conducted on the spreadsheet on hourly, daily and weekly basis for internal QA/QC purposes. Calculation and reporting of ERs is conducted on a monthly basis and compiled for monitoring report of the monitoring period specified for verification. Internal technical review is conducted by qualified personnel of SCC before the monitoring report is completed and presented to the DOE for verification. The internal audit is conducted at least once a year by qualified SCC climate change team. The last internal audit was conducted on 14-15 November 2011.																				
1.15. Have the procedures for emergency and abnormal situations been established?	The procedure for detection, action and mitigation of non-compliance has been established and described in CDM Monitoring and Quality control manual. The SCC CDM monitoring team remotely records all monitored data everyday. If abnormal data are identified, the CDM engineers will ask the on-site operator to check the related instrument. If the problem persists, SCC will contact the installation company to replace the faulty instrument with an approved calibrated instrument. Some measuring devices, which are listed in the table below, were replaced during this monitoring period. <table> <tr> <th>Equipment</th><th>TAG No.</th><th>The installed location</th></tr> <tr> <td rowspan="6">Temperature Transmitter</td><td>ETT 9001</td><td>at the inlet of gas engine generator no.1</td></tr> <tr> <td>ETT 9002</td><td>at the inlet of gas engine generator no. 2</td></tr> <tr> <td>ETT 9003</td><td>at the inlet of gas engine generator no. 3</td></tr> <tr> <td>ETT 9004</td><td>at the inlet of gas engine generator no. 4</td></tr> <tr> <td>ETT 9005</td><td>at the inlet of gas engine generator no. 5</td></tr> <tr> <td>ETT 9006</td><td>at the inlet of gas engine generator no. 6</td></tr> <tr> <td>Pressure</td><td>EPT 9001</td><td>at the inlet of gas engine generator no.1</td></tr> </table>	Equipment	TAG No.	The installed location	Temperature Transmitter	ETT 9001	at the inlet of gas engine generator no.1	ETT 9002	at the inlet of gas engine generator no. 2	ETT 9003	at the inlet of gas engine generator no. 3	ETT 9004	at the inlet of gas engine generator no. 4	ETT 9005	at the inlet of gas engine generator no. 5	ETT 9006	at the inlet of gas engine generator no. 6	Pressure	EPT 9001	at the inlet of gas engine generator no.1	~~CAR-08~~ OK
Equipment	TAG No.	The installed location																			
Temperature Transmitter	ETT 9001	at the inlet of gas engine generator no.1																			
	ETT 9002	at the inlet of gas engine generator no. 2																			
	ETT 9003	at the inlet of gas engine generator no. 3																			
	ETT 9004	at the inlet of gas engine generator no. 4																			
	ETT 9005	at the inlet of gas engine generator no. 5																			
	ETT 9006	at the inlet of gas engine generator no. 6																			
Pressure	EPT 9001	at the inlet of gas engine generator no.1																			

	Verified situation			Conclusion	
	Transmitter	EPT 9002	at the inlet of gas engine generator no. 2		
		EPT 9003	at the inlet of gas engine generator no. 3		
		EPT 9004	at the inlet of gas engine generator no. 4		
		EPT 9005	at the inlet of gas engine generator no. 5		
		EPT 9006	at the inlet of gas engine generator no. 6		
	Thermocouple	TTC 9393A	at 80% of stack height of Flare no.1		
		TTC 9393B	at 50% of stack height of Flare no.1		
		TTC 9493A	at 80% of stack height of Flare no.2		
	This was confirmed by reviews of the CDM monitoring equipment installation log - Engines, CDM monitoring equipment installation log - Flares & Pre-Treatment plant (which describes installation date, equipment type, serial number, and certificate reference), P&ID diagrams which provide historical information on plant CDM instrument installation, and the CDM non-compliance log which indicates time of equipment replacement. The minute monitoring spreadsheet was also reviewed and it was confirmed that there were no monitored results from the respective monitoring equipment during the period when it was being replaced. The measuring devices were changed during the monitoring period to replace the devices that were due for calibration with the calibrated one, Details are provided in the Annex E of the MR. Relevant records were checked by the verification team. Where data in the on-line system is corrupted or missing whilst the plant is operating, the corrupt or missing data can be corrected and justified either by using installed back-up metering devices or by taking the conservative value of the parameter one hour before the error and one hour after the system restart or by using the average value of the parameter from the previous 24 hours if there is evidence that neither of the other values is representative. If all data is missing due to the internet connection failure between the local control system and the central computer, this data will be set as zero in the CDM spreadsheet. Through checking the CDM spreadsheet during the verification, it was observed that method implemented for treatment of data for missing or corrupted data for %CH₄, Temperature and Pressure does not comply with process for “Treatment of missing or corrupted data” as indicated in the registered PDD and mentioned in the above paragraph. Therefore CAR 08 was raised. The PP has responded to this finding by correctly applying the method for treatment to missing/error of data in line with the				

	Verified situation	Conclusion
	registered PDD. Therefore this finding has been closed.	
1.16. Has the system for qualification and training been established as relevant for the monitoring and management activities?	Competency requirements for the position of CDM manager and for the monitoring staff has been fulfilled as defined in the MR. This was confirmed through review of the CDM manual, the training program and training records.	OK
1.17. Check the environmental report, license, permit and compliance to the local environmental legislation (if relevant).	Based on the Thai regulation, the Office of Natural Resources and Environmental Policy and Planning (ONEP), an Environmental Impact Assessment (EIA) is not required for thermal power plants that have a capacity of less than 10MWe. Currently, the project has total installed capacity of 8.504 MW (considered from 8 x 1063 kW) having grid connection maximum capacity at 8.0 MWe dispatch, hence EIA is not required. As per the registered PDD, the project is designed to have a maximum capacity of 16MWe with two grid connection of 8MWe each to be separately installed depending on the gas availability. The current verified installation was installed by Bangkok Green Power Co. Ltd. However, an Initial Environmental Examination (IEE) report was developed in accordance with the Thai DNA. Project activities with a capacity below 10 MW shall provide an IEE. The PP has periodically monitored key environmental parameters during the operation phase as described in the monitoring programme in the IEE report. Though the 2nd monitoring of year 2011 was deferred due to effect from flooding crisis in Central region of Thailand during the 4th Quarter of year 2011, this deferment has been informed and acknowledged by Nakhon Pathom Provincial of Department of Industrial Work as confirmed from their acknowledgement received on 24 November 2011. A review of the following results have confirmed compliance with the host country legal requirement: - analysis of the ambient air quality monitoring during 27/06/2011- 04/07/2011 - analysis of the ambient air quality monitoring of the characteristics of air emission from all eight stacks of engines - noise and sound level measurements during 20-24/02/2012	OK
1.18. Check contribution to sustainable development, comparing those expected in PDD and the actual	By capturing and utilising LFG, which would have been released to the atmospheric in the absence of this project activity, the project contributes to the reduction in GHG emissions, and improvement in local air quality through the reduction of odours,	OK

	Verified situation	Conclusion	
status.	correct management of landfill for optimisation of landfill gas recovery, an improvement in the safety aspects of the landfill by collection of the landfill gas, reduction in the dangers of combustion and explosion of methane pockets, and the transfer of technology as defined in the PDD. Through physical observation, independent research and based on the verification team's country specific knowledge, no negative impact from the project activity was identified.		
1.19. Check issues with local stakeholders, claims, complaints, etc.	It was confirmed by review of operation and maintenance records, internal audit records and on-site interviews that there have been no claims and complaints from local stakeholders prior to the verification visit.	OK	
1.20. If from the above assessment the conclusion is that the implementation or operation of the project activity does not conform with the description contained in the registered PDD and/or corrections have been made to project information or parameters fixed at validation, determine if these changes and/or corrections do not require prior approval by the board: - Any corrections to project information of a registered CDM project activity that do not affect the design of the project activity do not require prior approval by the Board. - A request for approval is required if any of the three issues below is adversely impacted by the identified changes to the project design.			
1.21. The applicability and application of the applied methodology under which the project activity has been registered: Check if the project boundary has changed and if any of the parameters to assess the applicability conditions have changed.	It was noted during this verification that the project boundary as described in the registered PDD was changed. While the registered PDD described that the project boundary does not include project emission from fossil fuel consumption as “ No other fossil fuel will be consumed on site by this project activity and $PE_{FC,j,y} = 0$” It was noted that Diesel oil has been used for back up of electricity during COD test for new engines. Therefore CAR 03 was raised. Please refer to the resolution of this CAR, mentioned in section 1.5 of this protocol, in the finding log. The verification team reviewed and confirmed that this change does not affect the applicability conditions of the approved methodology.	YES	NO
			✓
1.22. The additionality of the project activity: Check if any of the input parameters to the investment analysis have changed. For barrier analysis, check if any information or data used in the barrier analysis has changed.	Through interview with the PP during the on site visit, it was confirmed that no input parameters to the investment analysis have been changed. The change of project design by allowing occasionally use of Diesel Generator as a back up of electricity during COD test for new engines does not change/overcome the investment barrier of the project. Therefore the additionality of the project is not affected by this change of the project design.	YES	NO
			✓

	Verified situation	Conclusion	
		YES	NO
1.23. The scale of the project activity. Check if the project is still small scale or large scale after the implementation of the changes.	It was confirmed that the scale of the project remains unchanged as confirmed from the current PPA which remains unchanged since the start of the crediting period.		✓
If the answer to any of the above items is YES, please conduct an assessment of the potential impacts of these changes following the Procedures for Post Registration Changes.			
1.24. If, from the above assessment, the conclusion is that the changes require prior approval by the EB in accordance with the PS, please check any approvals of the necessary request for approval of changes.	The change of project design was reviewed and confirmed by the verification team that it is a type of change which is listed in paragraph 6 of Appendix 1 of the Project Standard Version 01.0., because this change does not adversely impact any of the following • The applicability and application of the applied methodology under which the project activity has been registered. • The additionality of the project activity • The scale of the project activity Hence it is not required prior approval by the board	OK ~~CAR 03~~ ~~Closed~~	

	Verified Situation	Conclusion
SECTION 2. Compliance of the Monitoring Plan with the Monitoring Methodology including applicable Tool(s)		
2.1. Is the monitoring plan (registered or approved) in accordance with the applied methodology?	Confirmed by review the registered monitoring plan and found to be in accordance with the applied methodology. (ACM0001 version 11 and its applicable tools).	OK
2.2. If the methodology provides different options (for example, use of default values or on-site measurements), has the Monitoring Report specified which option is used?	The Tool to determine project emission from flaring gases containing methane provides two options to determine efficiency of enclosed flares. Option (a) is to use a 90% default value while continuous monitoring of compliance with manufacturer's specification of flare, Option (b) is continuous monitoring of the methane destruction efficiency of the flare. Option (a) of the tool was specified in the monitoring plan and has been implemented accordingly. When calculating grid emission factors, the Tool to calculate the emission factor for an electricity system Version 02 provides two options of ex-ante calculation or ex-post calculation. The registered PDD has selected the ex-ante option; therefore the emission factor remains fixed for the whole crediting period. CAR 09 was initially raised because the value of grid emission factor applied for calculation of emission reduction in the ER calculation sheet and Section E.4. of the MR Version 2 is different from the fixed ex-ante value as provided in the registered PDD. The PP has responded to this finding by correcting the value of grid emission factor to be the same as in the registered PDD, therefore this finding has been closed.	~~CAR-09~~ ~~Closed~~ OK
2.3. Is all data collected and archived according to the tables in the applied Monitoring Methodology and is this included in the Monitoring Plan?	In the context of the project, the baseline emissions and the project emissions can be calculated with this monitored data. All the data is collected, archived and reported in the MR in accordance with the approved methodology and the registered MP. This includes the monitoring of key parameters, e.g. • Total amount of landfill gas captured ($LFG_{total,y}$), • Amount of landfill gas flared ($LFG_{flare,y}$),	~~CAR-09~~ OK

	Verified Situation	Conclusion
	- Amount of landfill gas combusted in power plant ($LFG_{electricity,y}$), - Methane fraction in the landfill gas ($\omega_{CH_4,y}$), - Temperature of the landfill gas (T), - Pressure of the landfill gas (P) - Net quantity of electricity produced / exported using LFG (EL_{LFG}), - Net amount of electricity imported from the grid for auxiliary use ($EL_{import} / EC_{PJ,j,y}$), - Operation hours of the energy plant, - Temperature of the exhaust gas of the flare (T_{flare}). - Data relate to Average technical transmission and distribution losses for providing electricity to Source j ($TDL_{j,y}$), and - Regulatory requirements relating to landfill gas projects, which may effect the value of AF or MDreg,y , have been annually monitored from reliable published data available within the host country. In the context of the project, the baseline emissions, the project emission from electricity consumption and project emission from flare can be calculated with these monitored data. However, during this monitoring period there was a one-off event where the PP used diesel generator for back up of electricity during testing for COD of new engines, but the registered monitoring plan and PDD does not include the monitoring of project emission from fossil fuel consumption. CAR 03 as previously mentioned in item 1.5 was issued for this finding.	
2.4. Check the calculation of emission reductions following the applied methodology: - baseline emissions - project emissions - leakage - emission reductions of the project.	Confirmed by review of MR Section E and ERs calculation spreadsheets that describe and demonstrate correct calculation following the applied methodology and the registered PDD (Please refer to section 5-1 below.), except for the project emissions resulting from the use of the diesel generator. This was not reported in the MR version 2 and ER spreadsheet version 1. Therefore CAR 03 was issued as aforementioned.	~~CAR 03~~ OK

	Verified Situation	Conclusion
2.5. List any monitoring aspect that is not specified in the methodology and check its compliance with the Monitoring Plan, for example: • additional monitoring parameters • monitoring frequency • calibration frequency.	According to the approved methodology and the registered monitoring plan, the following parameters need to be monitored continuously: • total amount of landfill gas captured, • the amount of landfill gas flared, • the amount of landfill gas combusted in power plant, • methane fraction in the landfill gas, • temperature of the landfill gas, • pressure of the landfill gas, • net quantity of electricity produced / exported using LFG, • net amount of electricity imported from the grid for auxiliary use, • temperature in the exhaust gas of the flare. The following parameters need to be monitored hourly: • flare efficiency, • project emission from flaring • flow rate of methane. Through the on-site verification, it was verified that the frequency of monitoring is in compliance with the registered monitoring plan. The calibrations of monitoring instruments were implemented annually or once per 2 years (for V-cone flow meter). The calibration frequency of the monitoring instruments were not specified in the monitoring methodology and the registered monitoring plan, but considered as appropriate according to related technical specifications and calibration records.	OK

	Verified Situation	Conclusion															
SECTION 3. Compliance of Monitoring activities with the registered Monitoring Plan																	
3-1. Is the Monitored Data included in the Monitoring Report as per the Monitoring Plan or any accepted revised MP?	Almost all the data to be monitored included in the current MR (Version 3) are in accordance with the requirements of the MP, except monitoring of project emission from diesel oil combustion which is not included in the registered PDD. This is raised as CAR 03. Please refer to the findings log below and to section 1.5 above.	~~CAR 03~~ OK															
3-2. Has the data been generated at the frequency required by the Monitoring Plan or any accepted revised MP?	Through checking the details of the monitored data, it can be confirmed that the data has been generated at the required frequency. This was confirmed by review of the actual monitored data during this monitoring period in comparison with the monitoring frequency of each monitoring parameter defined in the registered monitoring plan. Please refer to the table below. It can be also confirmed that the monitoring frequency described in the monitoring report is in accordance with the actual monitoring performed. <table> <tr> <th>Parameter</th><th>The monitoring frequency which defined in the registered monitoring plan</th><th>The actual monitoring frequency as confirmed from the actual monitored data during site visit</th></tr> <tr> <td>LFG_{total,y}</td><td>Continuous (Average value in a time interval not greater than an hour shall be used in the calculations of emission reductions)</td><td>Every minute (Average value of minute monitored data within an hour is used in the calculations of emission reductions)</td></tr> <tr> <td>LFG_{flare,y} (or FV_{RG,h})</td><td>Continuous (Average value in a time interval not greater than an hour shall be used in the calculations of emission reductions)</td><td>Every minute (Average value of minute monitored data within an hour is used in the calculations of emission reductions)</td></tr> <tr> <td>LFG_{electricity,y}</td><td>Continuous (Average value in a time interval not greater than an hour shall be used in the calculations of emission reductions)</td><td>Every minute (Average value of minute monitored data within an hour is used in the calculations of emission reductions)</td></tr> <tr> <td>ω_{CH4,y} (or fv_{CH4,RG,h})</td><td>Continuous (Average value in a time interval not greater than an hour shall be used in the calculations of emission reductions)</td><td>Every minute (Average value of minute monitored data within an hour is used in the calculations of emission reductions)</td></tr> </table>	Parameter	The monitoring frequency which defined in the registered monitoring plan	The actual monitoring frequency as confirmed from the actual monitored data during site visit	LFG _{total,y}	Continuous (Average value in a time interval not greater than an hour shall be used in the calculations of emission reductions)	Every minute (Average value of minute monitored data within an hour is used in the calculations of emission reductions)	LFG _{flare,y} (or FV _{RG,h})	Continuous (Average value in a time interval not greater than an hour shall be used in the calculations of emission reductions)	Every minute (Average value of minute monitored data within an hour is used in the calculations of emission reductions)	LFG _{electricity,y}	Continuous (Average value in a time interval not greater than an hour shall be used in the calculations of emission reductions)	Every minute (Average value of minute monitored data within an hour is used in the calculations of emission reductions)	ω _{CH4,y} (or fv _{CH4,RG,h})	Continuous (Average value in a time interval not greater than an hour shall be used in the calculations of emission reductions)	Every minute (Average value of minute monitored data within an hour is used in the calculations of emission reductions)	OK
Parameter	The monitoring frequency which defined in the registered monitoring plan	The actual monitoring frequency as confirmed from the actual monitored data during site visit															
LFG _{total,y}	Continuous (Average value in a time interval not greater than an hour shall be used in the calculations of emission reductions)	Every minute (Average value of minute monitored data within an hour is used in the calculations of emission reductions)															
LFG _{flare,y} (or FV _{RG,h})	Continuous (Average value in a time interval not greater than an hour shall be used in the calculations of emission reductions)	Every minute (Average value of minute monitored data within an hour is used in the calculations of emission reductions)															
LFG _{electricity,y}	Continuous (Average value in a time interval not greater than an hour shall be used in the calculations of emission reductions)	Every minute (Average value of minute monitored data within an hour is used in the calculations of emission reductions)															
ω _{CH4,y} (or fv _{CH4,RG,h})	Continuous (Average value in a time interval not greater than an hour shall be used in the calculations of emission reductions)	Every minute (Average value of minute monitored data within an hour is used in the calculations of emission reductions)															

	Verified Situation			Conclusion
	T	Measured continuously to determine the density of CH ₄ . No separate monitoring of temperature is necessary when using flow meters that automatically measure temperature and pressure, expressing LFG volumes in normalised cubic meters (Nm ³)	V-flow meters that automatically measure temperature and pressure, expressing LFG volumes in term of Nm ³ has been used for monitoring of LFG volume in every minute	
	P	Measured continuously to determine the density of CH ₄ . No separate monitoring of temperature is necessary when using flow meters that automatically measure temperature and pressure, expressing LFG volumes in normalised cubic meters (Nm ³)	V-flow meters that automatically measure temperature and pressure, expressing LFG volumes in term of Nm ³ has been used for monitoring of LFG volume in every minute	
	EL _{LFG}	Continuously measured	Continuously measured. The monthly meter reading values which can be corroborated against invoice of electricity supply to the PEA were used for ER calculation.	
	EL _{import} (or EC PJ, j, y)	Continuously measured	Continuously measured. The monthly meter reading values which can be corroborated against invoice of electricity purchased from the PEA were used for ER calculation.	
	Operation of the energy plant	Annually	Monthly	
	Regulatory requirements relating to landfill gas projects	Annually	Every monitoring period.(more frequently than annually)	
	T _{Flare}	Continuously	Every minute. The monitored data within an hour interval was used for determination of flare efficiency and calculation of PE _{flare} .	
	PE _{Flare}	Calculate as per the tool to determine project emissions from flaring gases,	Calculate from LFG flare and the flare efficiency during each hour	

	Verified Situation	Conclusion
	which tools requires this parameter to be calculated as the sum of emissions from each hour h, based on the methane flow rate in the residual gas and the flare efficiency during each hour TDL j,y The monitoring of published data will be performed annually. Every monitoring period. (more frequent than annually)	
3-3.Has the monitoring been implemented in accordance with the monitoring plan contained in the registered PDD or any accepted revised MP? Confirm that the monitoring and reporting procedures have been implemented as documented and follow by PPs.	The quantity (flow), concentration, pressure and temperature of the landfill gas captured, flared or used for electricity for determining methane mass flow in normal temperature and pressure condition, as well as the flare combustion temperature, is continuously measured and digitally recorded. The sampling and recording frequency for the automatic electronic monitoring systems is at 1 minute intervals. The results are recorded together with the date and time. Electronic Data capture is through the LFG extraction and utilisation plants supervisory control and data acquisition system (SCADA). Raw data is transferred from each monitoring location to an onsite storage unit (Red Lion) and then sent to a data centre where it is processed by FORMAC before being sent to the QA/QC team in the form of monthly excel reports. Calculation is conducted on hourly basis for internal checks and on a monthly basis for calculating the ERs. (Note: FORMAC is a complete remote monitoring and computing platform for Gas used by the project activity. FORMAC is an IT solutions and engineering company based in the UK whose details are available at http://www.formac.net/home/en/), Methane density under standard temperature and pressure condition of 0.0007168 tCH₄/m³CH₄ is used following the applied monitoring methodology. Measuring of methane mass flow consists of gas flow measurement by V-cone flow meter with differential pressure transmitters, gas temperature and pressure transmitters and infra-red gas analyzer for measuring of methane concentration. The V-cones & its differential pressure transmitters and temperature transmitter are mounted in the LFG pipe work between the gas pre-treatment package and the generator sets/flares for measuring the total LFG flow in Nm³. The other V-cones & its differential pressure transmitters and temperature transmitter are installed at gas	~~CAR-07~~ ~~CAR-04~~ ~~CAR-06~~ OK

	Verified Situation	Conclusion
	inlet to each gas engine and flare for measurement of $LFG_{Electricity,y}$ in Nm^3 and $LFG_{Flare,y}$ in Nm^3 respectively. The infra-red gas analyzer is located between the gas pre-treatment package and the generator sets/flare for measuring methane concentration in LFG stream. The gas engines and flare systems are located just after the pre-treatment facilities and are directly connected by a gas pipe. Gas analysis is on the same basis as the flow measurement following the registered monitoring plan. The V-cone flow meters have an accuracy of $\pm 0.5\%$ following the registered monitoring plan. The gas analyzer has an accuracy of $\pm 2.0\%$ full scale deflection. The monitoring equipment has been chosen to meet the good monitoring practices and have been properly installed, maintained and regularly calibrated. The temperature in the exhaust gas of the flare (T_{Flare}) is also directly measured continuously by Type N Thermocouples as described in the MP. The measured data is logged at minute intervals by SCADA and automatically transferred to and recorded in the spreadsheet. Based on the data, the efficiency of the flare is determined for each hour following the "Tool to determine project emissions from flaring gases containing methane". The parameters $FV_{RG,h}$ and $fv_{CH_4, RG,h}$ are covered by $LFG_{Flare,y}$ and methane concentration for determining the mass flow rate of methane in the residual gas. Thus the project emissions from flaring can be calculated. Measurement of flow, methane concentration, temperature and pressure are all made in the same gas conditions and correction of moisture content was not required to determine the volumetric fraction of methane. The project activity uses enclosed flares and the use of a default value of flare efficiency ($\eta_{flare,h}$) has been selected as per the registered PDD. 90% default efficiency is used if the temperature in the exhaust gas of the flare is above $500^{\circ}C$ for more than 40 minutes during the hour h and the manufacture's specification on proper operation of the flare are met continuously during the hour h. 50% default efficiency is used if the temperature in the exhaust gas of the flare is	

	Verified Situation	Conclusion																						
	above 500°C for more than 40 minutes during the hour h, but the manufacture's specification on proper operation of the flare are not met at any point in time during the hour h. 0% default efficiency is used if the temperature in the exhaust gas of the flare is below 500°C for more than 20 minutes during the hour h. CAR 07 was initially raised because flare efficiency determination in some period are not following the above mentioned criteria. The PP has responded to this finding by correcting the algorithm applied to determine flare efficiency. A review of the monitoring sheet confirms that this has been properly solved. Therefore CAR 07 has been closed. During verification, it was observed that the temperatures in the exhausted gas of the flare some times exceed 700°C. According to AM_CLA_0047 Temperature of the exhaust gases at the sampling point inside the flare⁶, the high temperature (above 700°C) may be due to different reasons such as: 1) the flare capacity is not adequate for the gas flow; and 2) air mixing or/and quantity inside the flare is not adequate and combustion may be taking place in the cooling zone or even in the exhaust (staged combustion-using atmospheric at entrained from the top). The verification team checked the flare system specification that describes the flare capacity and air mixing or/and quantity. The specification of the flare system is shown in the following table: <table><tr><th>Parameters</th><th>Manufacturer's requirements</th></tr><tr><td>Minimum flame temperature</td><td>500 degree C</td></tr><tr><td>Maximum flame temperature</td><td>1200 degree C</td></tr><tr><td>Minimum flow rate</td><td>300 Nm³/h</td></tr><tr><td>Maximum flow rate</td><td>2000 Nm³/h</td></tr><tr><td>Minimum CH4 content of LFG</td><td>25%</td></tr><tr><td>Maximum CH4 content of LFG</td><td>65%</td></tr><tr><td>Thickness of ceramic fibre lagging</td><td>325 mm</td></tr><tr><td>Dimension of the flare</td><td>Ø 2,200(mm)x 8,000(mm)</td></tr><tr><td>Temperature of the flare surface</td><td>≤ 70 degree C</td></tr><tr><td>Methane Combustion efficiency</td><td>> 98%</td></tr></table>	Parameters	Manufacturer's requirements	Minimum flame temperature	500 degree C	Maximum flame temperature	1200 degree C	Minimum flow rate	300 Nm ³ /h	Maximum flow rate	2000 Nm ³ /h	Minimum CH4 content of LFG	25%	Maximum CH4 content of LFG	65%	Thickness of ceramic fibre lagging	325 mm	Dimension of the flare	Ø 2,200(mm)x 8,000(mm)	Temperature of the flare surface	≤ 70 degree C	Methane Combustion efficiency	> 98%	
Parameters	Manufacturer's requirements																							
Minimum flame temperature	500 degree C																							
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Temperature of the flare surface	≤ 70 degree C																							
Methane Combustion efficiency	> 98%																							

	Verified Situation	Conclusion
	The verification team compared the operational records of the flare system and found the flow rate during the monitoring period was within the capacity of the flare, temperature of the flare, and CH₄ content of LFG was within the range specified by the manufacturer. In addition, during the on-site assessment no visible flames were observed at the top of the flare. Therefore, it is concluded that the operation during the proposed monitoring period was within the specification. The project activity applied default value of flare efficiency (maximum 90% as against the assured flare efficiency of 98% by the manufacturer) by continuous monitoring of compliance with manufacture's specification of flare according to the selected option (a) of the "Tool to determine project emissions from flaring gases containing methane" but does not apply continuous monitoring of the methane destruction efficiency of the flare as per option (b) of this tool. This implementation is in compliance with the applied tool and the registered monitoring plan. Although the flare is a "low height flare" as per the clarification AM_CLA_0047, the measurement of annual methane composition using traversing measuring procedure at maximum stable flare capacity is not required since this measurement is applicable for option (b) of the tool, which is continuous monitoring of methane destruction efficiency of the flare, but the project activity does not apply this option. This issue was confirmed during the 10th Teleconference (Post EB 68) meeting between DOEs, DOE/AIE Forum and UNFCCC secretariat on 07/08/2012 as shown in its meeting minutes. The parameters as mentioned above (flow rate, temperature of the flare and CH₄ content of LFG) are being monitored and recorded by the PP at every minute. After the raw data has been consolidated, the LFG total flow at pre-treatment, each engine flow and each LFG flare flow are calculated according to each individual set of V-Cone parameters. V-cone differential pressure type flow meter is used to determine volumetric flow of LFG to pre-treatment, each engine flow and each LFG flare. The basis for LFG flow calculation from the measured differential pressure is provided by the flow meter manufacturer in the form of parabolic "power equation for flow" with an "error function equation" for each of the V-cone flow meter. The PLC SCADA	

	Verified Situation	Conclusion
	system calculated the flow rate in m³/hr using these equations. LFG pressure and temperature are also measured to allow the calculation of mass flow. During the verification it was observed that incorrect values have been applied in the algorithm for the “power equation for flow” and also in the “error function equation” for monitoring the amount of landfill gas flow to engine 6 by the V-cone flow meter S/N 1104-0159 since 27/07/2011 till the end of this monitoring period (31/03/2011) and the amount of landfill gas flow to engine 7 by the V-cone flow meter S/N 9062901 since 26/12/2011 till the end of this monitoring period (31/03/2012), which results in an incorrect flow calculation. Therefore, CAR 04 was raised. The PP has corrected the algorithm by applying the corrections of the values to the flow parameters for power equation and error function equation to the Engine 6 and Engine 7. The verification team checked the correction applied to the algorithms and confirms that the algorithms are now corrected. The verification team further reviewed the corrected LFG flow to Engine 6 (from 01/11/2011 till 31/03/2012) and Engine 7 (from 27/01/2011 till 31/03/2012) to check the monitored flow data in every minute and its hourly and monthly aggregation as reported in the Emission Reduction (ER) spreadsheet. The flow from Engine 6 is now changed from 2,146,040.21 m³/hr to 2,175,553.28 m³/hr and that of Engine 7 is changed from 807,800.42 m³/hr to 795,035.95 m³/hr during the 3rd monitoring period. Hourly values of LFG flow to Engine6 and Engine 7 have now been correctly reported and used for ER calculation of the 3rd monitoring period. The correction of power equation and error function for LFG flow calculation of the aforementioned V-cone flow meter was applied not only during this 3rd monitoring period but also partly during the 2nd monitoring period, i.e. flow meter S/N 1104-0159 (Engine6) which was used in the 2nd monitoring period from 27/07/2011 till 31/10/2011. This was confirmed by reviewing the corrected algorithm, corrected minute data sheet and corrected ER calculation sheet of 2nd monitoring period. The ER calculation sheet of the 3rd monitoring period was also corrected by deducting 171 tCO₂e previously claimed during the 2nd monitoring period. CAR 04 is therefore closed.	

	Verified Situation	Conclusion
	The calculated flows are at NTP conditions. Minute data for Gas Pressure, Gas Temperature, CH₄% and V-Cone differential pressure for each individual engine and flare are used to calculate the volumetric flow rate of pure CH₄ delivered to each engine and flare at NTP conditions (m³/min). Once each individual engine flow is calculated, they are aggregated to give the total engine flow in every given minute. Once LFG_{total}, LFG_{electricity} and three flare flows of LFG_{flare} have been calculated, a mass balance check for flow rates in each minute is conducted. The values provided in the ER sheet are the hourly average values and not directly used for ER calculation. LRQA has reviewed the actual monitored data (minute data) and corresponding hourly data as presented in the ER Spreadsheet for the monitoring period and noted that process which has been implemented for mass balancing of LFG_{total} and LFG_{electricity} is not in compliance with the mass balance method described in the registered monitoring plan. Therefore CAR 06 was raised. The PP responded to this CAR by revising the algorithms used for mass balancing of LFG flow to be in compliance with the registered monitoring plan. The verification team confirmed it by reviewing the revised Minute monitored data sheet and its corrected mass balance results of LFG flow. Therefore CAR 06 has been closed. With the following monitored parameters: MD_{flare,y}, MD_{electricity,y}, MD_{project, y}, BE_y, PE_{EC,y}, PE_y; Emission Reductions - ER_y - can be calculated based on the formulas described in the registered PDD Project Emissions are calculated based on the Distribution Losses which are reported by Thai Authorities. The electricity exported and electricity imported are measured continuously by the electricity meter installed at PEA's distribution line connecting system to the grid, but reported by the PEA statements monthly at the beginning of the following month. The PP also records the reading of these Import and Export power meters on daily basis in the operation log sheet. The data can be corroborated against the financial data like invoice for the export and import of electricity to the grid and also the monthly joint meter reading report between PEA and the PP.	

	Verified Situation	Conclusion
	Though the quantity of electricity generation used for ER calculation in some months as listed below are slightly higher than the quantity indicated in the invoice, this value applied for ER calculation was confirmed as correct and consistent with the quantity presented in the monthly report of joint meter reading between PEA and the PP. The different quantities of electricity generation between the invoice and the monthly report of joint meter reading between PEA and the PP in some months were caused by the PEA's rule in the PPA: PEA shall not pay for the amount of electricity which the power plant supplied to the grid in exceed of the maximum supply limit indicated in the PPA. 1. The value of total amount of electricity exported to the grid during January 2012 used for ER calculation in Annex A of the Monitoring Report is 4,232.4 MWh, which is equal to the quantity of exported electricity from the PEA report of monthly joint meter reading between PEA and the PP. This is slightly higher than the quantity presented in the invoice and receipt for selling of electricity to PEA for this month which indicated 4,232.149MWh 2. The value of total amount of electricity exported to the grid during February 2012 used for ER calculation in Annex A of the Monitoring Report is 4,079.76 MWh, which is equal to the quantity of exported electricity from the PEA report of monthly joint meter reading between PEA and the PP. This is slightly higher than the quantity presented in the invoice and receipt for selling of electricity to PEA for this month which indicated 4,079.625MWh Both the electricity meters for electricity imported and exported have two sets. One main meter and one back-up meter. Both the main and back meters are provided and installed by the PEA. The power meters have an accuracy of 0.5 s class that meets the Thailand standards for fiscal calibration. All the meters were installed, approved and have been annually calibrated by PEA.	
3-4. Have types of measurement instrumentation used been described and specified?	Yes, the verification team confirmed that the information of the monitoring instruments was consistent with the descriptions in the Annex D and E of monitoring report through the physical observation and the document review of technical specifications and calibration certificates. CL 03 was raised because there is some error provision of information in Annex E and Annex D of the MR Version 2 as details described in the finding log.	~~CL 03~~ OK

	Verified Situation	Conclusion
	The PP has responded to this CL by revising Annex D and Annex E of the MR to provide the correct information and the finding was closed.	

	Verified Situation	Conclusion
3-5. Is the accuracy of equipment used for monitoring sufficient and regularly controlled and calibrated in line with the registered monitoring plan or any accepted revised MP? Check relevance of maintenance and calibration included in the monitoring plan. Check relevance of laboratory analysis if included in the monitoring plan.	The verification team confirmed through the on-site assessment that the installation of all the measuring devices has been completed and the equipment has been operated and maintained in the normal operating condition; however some of the monitoring devices have had to be replaced (please refer to the section of Monitoring Parameters and Calibration Checklist in this protocol). The technical specification from the manufacturers was reviewed and the verification team confirmed that the monitoring system of the project activity meets the good monitoring practice of the industrial sector in the host country. The verification team checked all the calibration records listed in Annex E of the monitoring report that cover all of the measuring devices used during the monitoring period and confirmed the calibration results and the calibration frequencies as satisfactory. CAR 05 was initially raised because calibration reports of several V-cone flow meters used for measurement of LFG flow to several engines and to some flares showing %error within the test range during calibration were out of the acceptable limits. The PP has responded to this finding providing the confirmation letter from the accredited calibration laboratory that carried out this calibration that the calibration was done following relevant standards and the calibration were confirmed within the acceptable range in accordance with the respective equipment manufacture's manual. Therefore this finding has been closed. The accreditation certificate of each institute that conducted the calibrations was also checked and confirmed as valid. But the laboratory that calibrated Gas Analyser S/N 31426 on 03/06/2011, the accreditation scope from TLAS does not specify that the scope includes the calibration of the gas analyzer, hence CAR 10 was raised. The PP has responded to this finding by provision of confirmation from the laboratory that the method that they applied for calibration of this gas analyzer is as per manufacturer recommendation in its manual that is as per the registered monitoring plan. Therefore this CAR 10 has been closed.	~~CAR 05~~ ~~CAR 10~~ OK
LRQA Reference: BGK0404293	Date: 10/10/2012	Page 49 of 107
MSBSF43808	page 49 of 107	Revision 6.4, 14 May 2012

	Verified Situation	Conclusion																
	Annex E of the monitoring report presents the records of removal and installation of the CDM monitoring instruments. The team confirmed that the removal and installation of some monitoring instruments did not affect the effective implementation of the monitoring plan. (Please refer to the section of Monitoring Parameters and Calibration Checklist below in this protocol). All measuring devices were regularly calibrated as per the manufacturer's recommendation following the registered monitoring plan and satisfy the host country regulations, and have been used to cover the whole of this monitoring period except few Thermocouples of Flare 1 and Flare 2 and a spare V-cone flow meter for measurement Total LFG flow at the pretreatment plant as details listed below. <table><tr><th>TAG no.</th><th>Equipment</th><th>Equipment start date and end date during this monitoring period</th><th>Remark</th></tr><tr><td>FT 9261A</td><td>V-Cone flow meter S/N 9061213 for measurement of LFG total at pre-treatment plant</td><td>27/01/2012 to 31/03/2012</td><td>V-cone flow meter TAG no. FT 9261A has been removed since previous monitoring period and has not been replaced until 27/01/2012. Though the equipment was not available during the mentioned period, unavailability of this equipment does not effect to the ER monitoring and calculation because this equipment is only provided as spare for V-cone Flow meter TAG no. 9261 B only and it confirmed that V-cone flow meter TAG no.9261B has being operated well during this monitoring period.</td></tr><tr><td>TTC 9393A (Thermocouple which located at 80% height of stack of flare 1)</td><td>Thermocouple S/N 22641C/2 for measurement temperature of Flare 1</td><td>01/11/2011 to 05/01/2012</td><td>This thermocouple was removed one day after invalid date of its calibration certificate. (Its calibration certificate no.18706-2A was valid until 04/01/2012 while the equipment was being available at Flare 1 until 05/01/2012) Anyway, this causes no effect to the monitoring result or calculation result of ER because the flare 1 was not being operated during that date.</td></tr><tr><td></td><td>Thermocouple S/N 22641C/1</td><td>10/03/2012 to 31/03/2012</td><td>This thermocouple was installed on 10/03/2012 to replace Thermocouple of S/N</td></tr></table>	TAG no.	Equipment	Equipment start date and end date during this monitoring period	Remark	FT 9261A	V-Cone flow meter S/N 9061213 for measurement of LFG total at pre-treatment plant	27/01/2012 to 31/03/2012	V-cone flow meter TAG no. FT 9261A has been removed since previous monitoring period and has not been replaced until 27/01/2012. Though the equipment was not available during the mentioned period, unavailability of this equipment does not effect to the ER monitoring and calculation because this equipment is only provided as spare for V-cone Flow meter TAG no. 9261 B only and it confirmed that V-cone flow meter TAG no.9261B has being operated well during this monitoring period.	TTC 9393A (Thermocouple which located at 80% height of stack of flare 1)	Thermocouple S/N 22641C/2 for measurement temperature of Flare 1	01/11/2011 to 05/01/2012	This thermocouple was removed one day after invalid date of its calibration certificate. (Its calibration certificate no.18706-2A was valid until 04/01/2012 while the equipment was being available at Flare 1 until 05/01/2012) Anyway, this causes no effect to the monitoring result or calculation result of ER because the flare 1 was not being operated during that date.		Thermocouple S/N 22641C/1	10/03/2012 to 31/03/2012	This thermocouple was installed on 10/03/2012 to replace Thermocouple of S/N	
TAG no.	Equipment	Equipment start date and end date during this monitoring period	Remark															
FT 9261A	V-Cone flow meter S/N 9061213 for measurement of LFG total at pre-treatment plant	27/01/2012 to 31/03/2012	V-cone flow meter TAG no. FT 9261A has been removed since previous monitoring period and has not been replaced until 27/01/2012. Though the equipment was not available during the mentioned period, unavailability of this equipment does not effect to the ER monitoring and calculation because this equipment is only provided as spare for V-cone Flow meter TAG no. 9261 B only and it confirmed that V-cone flow meter TAG no.9261B has being operated well during this monitoring period.															
TTC 9393A (Thermocouple which located at 80% height of stack of flare 1)	Thermocouple S/N 22641C/2 for measurement temperature of Flare 1	01/11/2011 to 05/01/2012	This thermocouple was removed one day after invalid date of its calibration certificate. (Its calibration certificate no.18706-2A was valid until 04/01/2012 while the equipment was being available at Flare 1 until 05/01/2012) Anyway, this causes no effect to the monitoring result or calculation result of ER because the flare 1 was not being operated during that date.															
	Thermocouple S/N 22641C/1	10/03/2012 to 31/03/2012	This thermocouple was installed on 10/03/2012 to replace Thermocouple of S/N															

Verified Situation				Conclusion
	for measurement temperature of Flare 1 22641C/2A which has been removed since 05/01/2012. This means the thermocouples TAG no. TTC 9393A is not available for monitoring Temperature of Flare 1 during 05/01/2012 until 10/03/2012. However, this causes no effect to the monitoring result or calculation result of ER because the flare 1 was not being operated during that mentioned period as confirmed from operational records during the site visit.			
	TTC 9393B (Thermocouple which located at 50% height of stack of flare 1)	Thermocouple S/N 22641C/3 for measurement temperature of Flare 1	01/11/2011 to 05/01/2012	
		Thermocouple S/N 22641C/3 for measurement temperature of Flare 1	10/03/2012 to 31/03/2012	
	TTC 9493A (Thermocouple which located at 80% height of stack of flare 2)	Thermocouple S/N 22641C/1 for measurement temperature of Flare 2	01/11/2011 to 05/01/2012	

	Verified Situation	Conclusion
3-6. Check that responsibilities and authorities for monitoring and reporting are in line with the monitoring plan. Are the monitoring results consistently recorded, reviewed and approved as stated in the PDD or any accepted revised MP?	Yes, confirmed by review of CDM monitoring and quality control manual, reports of monitored data, records of internal audits, and on-site interview with the CDM manager, CDM monitoring team and site staff concerned.	OK
3-7. Reporting period: Defined? If a monitoring period of a parameter more / less than a year is applied, check if the monitoring is in a complete and consistent manner?	The registered MP did not define the reporting period. The MR defines the current monitoring period as 01/11/2011-31/03/2012 (both date inclusive) This monitoring period covers 152 days. All data to calculate emission reductions were available for this verification. The monitoring is in a complete and consistent manner.	OK
3-8. If the monitoring plan includes the determination of environmental and / or social indicators, have the sustainable development indicators been monitored in accordance with the registered monitoring plan?	Not applicable	N/A
3-9. Check monitoring of Environmental and Social indicators (if relevant) • implementation of measures • monitoring equipment • quality assurance procedures • external data.	Not applicable	N/A

		Verified Situation	Conclusion
SECTION 2 and 3: Post Registration Changes			
3-10. If, from the above assessment in SECTIONS 2 and 3, the conclusion is that there are temporary deviations or permanent changes from the registered Monitoring Plan or Monitoring Methodology, determine if these deviations or changes require prior approval by the EB by answering the questions below. All the answers to the applicable questions below shall be explained and the reasons for each conclusion given in the "Verified situation" column.			
Temporary deviations from the registered monitoring plan or applied methodology: Prior approval by the EB is <u>not</u> required if the answer to the applicable questions below is YES.			
3-11. Have the PPs reported as zero any parameter related to baseline GHG emissions that they have temporarily failed to monitor or for which they are unable to produce evidence related to such monitoring?	N/A	YES	NO
		-	-
3-12. Have the PPs estimated (assuming that the source of the GHG emissions operated at maximum capacity for the full period of the missing data) any parameter that they have temporarily failed to monitor or for which they are unable to produce evidence related to such monitoring? For project GHG emissions related to the consumption of electricity, the estimate shall include an addition of 10% to account for transmission and distribution losses.	N/A	YES	NO
		-	-
Permanent changes from the registered monitoring plan or applied methodology			
If the monitoring equipment actually installed has a lower accuracy level than the accuracy stipulated in the applied methodology and/or in the registered monitoring plan, and the monitoring equipment is under the control of the project participants, prior approval by the EB is <u>not</u> required if the answer to the applicable questions below is YES:			
3-13. Have the PPs deducted from the measured value, for any parameter used for calculating baseline GHG	N/A	YES	NO

	Verified Situation	Conclusion	
emissions, the difference between the accuracy level of the installed monitoring equipment and the accuracy prescribed by the applied methodology and/or the registered monitoring plan?		-	-
3-14. Have the PPs added to the measured value, for any parameter used for calculating project GHG emissions, the difference between the accuracy level of the installed monitoring equipment and the accuracy prescribed by the applied methodology and/or the registered monitoring plan?	N/A	YES	NO
		-	-
Changes to the monitoring of the registered CDM project activity of a type listed below do not require approval by the EB. Confirm in the conclusion column that the change is of the type in the table below and explain the reasons.			
3-15. Change of calibration frequency or practice for monitoring equipment not within the control of project participants	N/A	-	
3-16. Change of accuracy / type / model of meter(s) as per a power purchase agreement (PPA)	N/A	-	
3-17. Change of location of meter(s) as per a power purchase agreement (PPA)	N/A	-	
If the answer to any of the above items has been that approval from the EB is required, please conduct an assessment of the potential impacts of these changes following the Procedures for Post Registration Changes.			
3-18. If, from the above assessment, the conclusion is that the temporary deviations or permanent changes require prior approval by the EB in accordance with the PS, please check any approvals of the necessary request for approval of changes.	N/A	-	

3.19 Monitoring Parameters and Calibration Checklist:

Complete the following table for each parameter:

Data / Parameter (as in the MP)		LFG _{total,y} Total amount of landfill gas captured at Normal Temperature and Pressure	
Value	Ex ante	The ex-ante estimation of LFG _{total,y} during year 2011 and year 2012 indicated in the registered PDD = 18,603,462 Nm ³ and 19,440,072 Nm ³ respectively.	
	Ex-post	16,967,992 Nm ³	
Measuring frequency		Continuous measuring/recorded every minute	
Reporting frequency		Monthly and Annually	
Is the measuring and reporting frequency in line with the MP and the Monitoring Methodology?		Yes	
Recording (Manually / electronically / ...)		Electronically	
QA/QC How are values verified? (Cross-checked, double-checked,...)		CAR 06 was raised because mass balance method implemented for this parameter is not fully compliant with the mass balance process indicated in the registered monitoring plan. The PP has responded to this finding by revising the mass balance method to be in line with the registered monitoring plan. Therefore this CAR 06 has been closed. The consistency of flow measurements has been checked by examining the hourly flow balance. The conservative value among (LFG_{flare, h} + LFG_{electricity, h}) vis-à-vis LFG_{total, h} has been used for ER calculation. To monitor this parameter, gas flow, and gas temperature and pressure for transfer to normal condition has been measured. All meters were calibrated periodically. Internal review was conducted periodically	
Type of Monitoring Equipment and Identification number or Reference in the PDD		Flow meter	
Is accuracy of the monitoring equipment as stated in the PDD? If not stated in the PDD, does it represent good monitoring practices?		V-Cone flow meter associated with differential pressure transmitter accuracy $\pm 0.5\%$ These were presented in the technical specifications and confirmed in the calibration records.	
Period of operating time		27/01/2012 – 31/03/2012	01/11/2011 – 31/03/2012
Instrument type		V-Cone Flow meter with Differential Pressure transmitter	V-Cone Flow meter with Differential Pressure transmitter

Data / Parameter (as in the MP)	LFG _{total,y} Total amount of landfill gas captured at Normal Temperature and Pressure	
Manufacturer, model and serial number	Kingways, KVS14I1KD23FSN : V-Cone Flow meter with Rosemount 3051 CD Differential Pressure Transmitter, range 750-7,500 m ³ /Hr, S/N 9061213 CL 03 was raised due to incorrect indication of model of this V-cone flow meter. The PP responded to resolve this CAR, therefore it has been closed	Kingways, KVS14I1KD23FSN : V-Cone Flow meter with Rosemount 3051 CD Differential Pressure Transmitter, range 750-7,500 m ³ /Hr, S/N 9061212 CL 03 was raised due to incorrect indication of model of this V-cone flow meter. The PP responded to resolve this CAR, therefore it has been closed
Specific location	Mounted at LFG pipe work between the gas treatment package and the generator sets/ Flare (Tag No. FT9261A)	Mounted at LFG pipe work between the gas treatment package and the generator sets/ Flare (Tag No. FT9261B)
Calibration dates	01/12/2011 valid till 30/11/2013	29/07/2011 valid till 28/07/2013
Company performing the calibration	Shanghai Inspection and Testing Institute of Instruments and Automatic Systems	Shanghai Inspection and Testing Institute of Instruments and Automatic Systems
Required calibration frequency: Is it in line with the MP? Or represent good monitoring practices?	V-cone was calibrated every 2 years, which was recommended in the calibration records. The manufacturer's recommendation of the v-cone flow meter does not require any further calibration since installation. However, the PP has decided to conduct a two yearly calibration for v-cone since the validity of the calibration certificates is for two years. Calibration frequency of the flow meters as maintained by the PP considered a good monitoring practice.	
Is calibration valid for the whole reporting period?	The calibration for this instrument is valid from 01/12/2011 till 30/11/2013, which covers the used period. (Remark: Two sets of V-cone flow meters were installed for measurement of LFG _{total,y} , one has tag no. FT 9261A, the other has tag no. FT 9261B. Each of these V-cone flow meters has use range cover total quantity of LFG enter to all flares and all engines; hence it can be used only one set while the other set is being spare.)	Yes, the calibration for this instrument covers the period the equipment was in use.
Maintenance	This V-cone was removed since the previous monitoring period and was reinstalled on 27/01/2012. Though this equipment was not available in this 3 rd monitoring period during 01/11/2011 to 27/01/2012, monitoring of LFG total during this period had been done by using V-cone flow meter tag no. FT9261B. The verification team has reviewed and confirmed that the range of V-cone flow meter tag no. FT9261B is 750-7,500 m ³ /Hr which cover the range of total LFG flow enter to the project power plant. So the unavailability of V-cone flow meter tag no. FT9261A during the mentioned period has not adversely affected the monitoring of the project.	In good condition.
Does the data management (from monitoring equipment to emission reductions calculation) ensure correct transfer of data and reporting of emission reductions?	Yes. Please refer to item 1-14	Yes. Please refer to item 1-14
Key reporting risks	Low risk. As stated above, QA/QC procedures have been effectively implemented and the CAR 06 is addressed.	Low risk As stated above, QA/QC procedures have been effectively implemented and the CAR 06 is addressed.

Data / Parameter (as in the MP)		LFG _{flare, y} (or FV _{RG, h}) Amount of landfill gas flared at Normal Temperature and Pressure		
Value	Ex ante	The ex-ante estimation of LFG _{Flare, y} during year 2011 and year 2012 indicated in the registered PDD = 1,381,685 Nm ³ and 2,203,272 Nm ³ respectively.		
	Ex-post	2,675,053 Nm ³		
Measuring frequency		Continuous measuring/recorded every minute		
Reporting frequency		Monthly and Annually		
Is the measuring and reporting frequency in line with the MP and the Monitoring Methodology?		Yes		
Recording (Manually / electronically / ...)		Electronically		
QA/QC How are values verified? (Cross-checked, double-checked,...)		The consistency of flow measurements has been checked by examining the hourly flow balance. The conservative value among (LFG _{flare, h} + LFG _{electricity, h}) vis-à-vis LFG _{total, h} are used for ER calculation. To monitor this parameter, gas flow, and gas temperature and pressure for transfer to normal condition has been measured. All meters were calibrated periodically. Internal review was conducted periodically.		
Type of Monitoring Equipment and Identification number or Reference in the PDD		Flow meter		
Is accuracy of the monitoring equipment as stated in the PDD? If not stated in the PDD, does it represent good monitoring practices?		V-Cone flow meter associated with differential pressure transmitter accuracy $\pm 0.5\%$ (Please refer CAR 05) .		
Period of operating time		01/11/2011 – 31/03/2012	01/11/2011 – 31/03/2012	01/11/2011 – 31/03/2012
Instrument type		V-Cone flow meter with Differential Pressure transmitter	V-Cone flow meter with Differential Pressure transmitter	V-Cone flow meter with Differential Pressure transmitter
Manufacturer, model and serial number		Kingways, KVS08IIC23FSN : V-cone Flow meter with Rosemount 3051 CD Differential Pressure Transmitter, range 250 – 2,500 m ³ /Hr, S/N 9061210	Kingways, KVS08IIC23FSN : V-cone Flow meter with Rosemount 3051 CD Differential Pressure Transmitter, range 250 – 2,500 m ³ /Hr, S/N 9062916	Kingways, KVS08IIC23FSN : V-cone Flow meter with Rosemount 3051 CD Differential Pressure Transmitter, range 250 – 2,500 m ³ /Hr, S/N 9061205
Specific location		On the inlet to Flare 1 (Tag no. FT9391)	On the inlet to Flare 2 (Tag no.FT9491)	On the inlet to Flare 3 (Tag no.FT9591)
Calibration dates		14/09/2011 valid till 13/09/2013	21/06/2011 valid till 20/06/2013	18/06/2011 valid till 17/06/2013
Company performing the calibration		Miracle International Technology Co., Ltd.	Miracle International Technology Co., Ltd.	Miracle International Technology Co., Ltd.

Data / Parameter (as in the MP)	LFG _{flare, y} (or FV _{RG, h}) Amount of landfill gas flared at Normal Temperature and Pressure		
Required calibration frequency: Is it in line with the MP? Or represent good monitoring practices?	All V-cone flow meters calibrated every 2 years, which was recommended in the calibration records. The manufacturer's recommendation of the v-cone flow meter does not require any further calibration since installation. However, the PP has decided to conduct a two yearly calibration for v-cone as recommended by the calibration lab. Calibration frequency of the flow meters as maintained by the PP considered a good monitoring practice.		
Is calibration valid for the whole reporting period?	Yes, the calibration for this instrument covers this monitoring period.	Yes, the calibration for this instrument covers this monitoring period.	Yes, the calibration for this instrument covers this monitoring period.
Maintenance	In good condition.	In good condition.	In good condition.
Does the data management (from monitoring equipment to emission reductions calculation) ensure correct transfer of data and reporting of emission reductions?	Yes. Please refer to item 1-14	Yes. Please refer to item 1-14	Yes. Please refer to item 1-14
Key reporting risks	Low risk As stated above, QA/QC procedures have been effectively implemented.	Low risk As stated above, QA/QC procedures have been effectively implemented.	Low risk As stated above, QA/QC procedures have been effectively implemented.

Data / Parameter (as in the MP)		LFG _{electricity, y} Amount of landfill gas combusted in power plant at Normal Temperature and Pressure	
Value	Ex ante	The ex-ante estimation of LFG _{electricity, y} during year 2011 and year 2012 indicated in the registered PDD = 17,221,776 Nm ³ and 17,236,800 Nm ³ respectively.	
	Ex-post	13,940,686 Nm ³	
Measuring frequency		Continuous measuring/recorded every minute	
Reporting frequency		Monthly and Annually	
Is the measuring and reporting frequency in line with the MP and the Monitoring Methodology?		Yes	
Recording (Manually / electronically / ...)		Electronically	
QA/QC How are values verified? (Cross-checked, double-checked,...)		CAR 06 was raised because mass balance method implemented for this parameter is not fully compliant with the mass balance process indicated in the registered monitoring plan. (The PP has responded to this finding by revising the mass balance method to be in line with the registered monitoring plan. Therefore this CAR 06 has been closed. The consistency of flow measurements has been checked by examining the hourly flow balance. The conservative value among (LFG_{flare, h} + LFG_{electricity, h}) vis-à-vis LFG_{total, h} has been used for ER calculation. To monitor this parameter, gas flow, and gas temperature and pressure for transfer to normal condition has been measured. All meters were calibrated periodically. Internal review was conducted periodically	

Data / Parameter (as in the MP)	LFG ^{electricity, y} Amount of landfill gas combusted in power plant at Normal Temperature and Pressure			
Type of Monitoring Equipment and Identification number or Reference in the PDD	The registered PDD described that "Flow meter for LFG monitoring work will work on the differential pressure measurement principle with associated different pressure gauge having an accuracy $\pm 0.5\%$ "			
Is accuracy of the monitoring equipment as stated in the PDD? If not stated in the PDD, does it represent good monitoring practices?	V-Cone flow meter associated with differential pressure transmitter accuracy $\pm 0.5\%$ (Please refer CAR 05)			
Period of operating time	01/11/2011 to 31/03/2012	01/11/2011 to 31/03/2012	01/11/2011 to 31/03/2012	01/11/2011 to 31/03/2012
Instrument type	V-Cone flow meter with Differential Pressure transmitter	V-Cone flow meter with Differential Pressure transmitter	V-Cone flow meter with Differential Pressure transmitter	V-Cone flow meter with Differential Pressure transmitter
Manufacturer, model and serial number	Kingways, KVS06IIC23FSN: V-cone flow meter with Rosemount 3051 CD Differential Pressure Transmitter, range 100 - 1,000 m ³ /Hr, S/N 9062903	KVS Lamway, RVM-VS06IIF63N2: V-cone flow meter with Rosemount 3051 CD Differential Pressure Transmitter, range 100 - 1,000 m ³ /Hr, S/N 10071503	Kingways, KVS06IIC23FSN: V-cone flow meter with Rosemount 3051 CD Differential Pressure Transmitter, range 100 - 1,000 m ³ /Hr, S/N 9062907	Kingways, KVS06IIC23FSN: V-cone flow meter with Rosemount 3051 CD Differential Pressure Transmitter, range 100 - 1,000 m ³ /Hr, S/N 9062913
Specific location	On the inlet of generator no.1 (Tag No. EFT9001)	On the inlet of generator no.2 (Tag No. EFT9002)	On the inlet of generator no.3 (Tag No. EFT9003)	On the inlet of generator no.4 (Tag No. EFT9004)
Calibration dates	13/06/2011 valid till 12/06/2013	23/08/2010 valid till 22/08/2012	13/06/2011 valid till 12/06/2013	13/06/2011 valid till 12/06/2013
Company performing the calibration	Miracle International Technology Co., Ltd.	Shanghai Inspection and Testing Institute of Instruments and Automatic Systems	Miracle International Technology Co., Ltd.	Miracle International Technology Co., Ltd.
Required calibration frequency: Is it in line with the MP? Or represent good monitoring practices?	All V-cone flow meters calibrated every 2 years, which was recommended in the calibration records. The manufacturer's recommendation of the v-cone flow meter does not require any further calibration since installation. However, the PP has decided to conduct a two yearly calibration for v-cone as recommended by the calibration lab. Calibration frequency of the flow meters as maintained by the PP considered a good monitoring practice.			
Is calibration valid for the whole reporting period?	Yes, the calibration for this instrument covers this monitoring period.	Yes, the calibration for this instrument covers this monitoring period.	Yes, the calibration for this instrument covers this monitoring period.	Yes, the calibration for this instrument covers this monitoring period.
Maintenance	In good condition.	In good condition.	In good condition.	In good condition.
Does the data management (from monitoring equipment to emission reductions calculation) ensure correct transfer of data and reporting of emission reductions?	Yes. Please refer to item 1-14	Yes. Please refer to item 1-14	Yes. Please refer to item 1-14	Yes. Please refer to item 1-14

Data / Parameter (as in the MP)	LFG_{electricity, y} Amount of landfill gas combusted in power plant at Normal Temperature and Pressure			
Key reporting risks	Low risk. As stated above, QA/QC procedures have been effectively implemented and the CAR 06 is addressed	Low risk. As stated above, QA/QC procedures have been effectively implemented and the CAR 06 is addressed	Low risk. As stated above, QA/QC procedures have been effectively implemented and the CAR 06 is addressed	Low risk. As stated above, QA/QC procedures have been effectively implemented and the CAR 06 is addressed

Data / Parameter (as in the MP)		LFG _{electricity, y} Continued Table Amount of landfill gas combusted in power plant at Normal Temperature and Pressure			
Value	Ex ante	See table LFG _{electricity, y} above			
	Ex-post	See table LFG _{electricity, y} above			
Measuring frequency		See table LFG _{electricity, y} above			
Reporting frequency		See table LFG _{electricity, y} above			
Is the measuring and reporting frequency in line with the MP and the Monitoring Methodology?		See table LFG _{electricity, y} above			
Recording (Manually / electronically / ...)		See table LFG _{electricity, y} above			
QA/QC How are values verified? (Cross-checked, double-checked,...)		See table LFG _{electricity, y} above			
Type of Monitoring Equipment and Identification number or Reference in the PDD		See table LFG _{electricity, y} above			
Is accuracy of the monitoring equipment as stated in the PDD? If not stated in the PDD, does it represent good monitoring practices?		See table LFG _{electricity, y} above			
Period of operating time		01/11/2011 to 31/03/2012	01/11/2011 to 31/03/2012	26/12/2011 to 31/03/2012	26/12/2011 to 31/03/2012
Instrument type		V-Cone flow meter with Differential Pressure transmitter	V-Cone flow meter with Differential Pressure transmitter	V-Cone flow meter with Differential Pressure transmitter	V-Cone flow meter with Differential Pressure transmitter
Manufacturer, model and serial number		Shanghai Kent, KVCFF150CD1N/6: V-cone flow meter with Rosemount 3051 CD Differential Pressure Transmitter , range 100 - 1,000 m ³ /Hr, S/N 1104-0160	Shanghai Kent, KVCFF150CD1N/6: V-cone flow meter with Rosemount 3051 CD Differential Pressure Transmitter , range 100 - 1,000 m ³ /Hr, S/N 1104-0159	Kingways, KVS06I1KC23FSN: V-cone flow meter with Rosemount 3051 CD Differential Pressure Transmitter , range 200 - 2,000 m ³ /Hr, S/N 9062901	Kingways, KVS06I1KC23FSN: V-cone flow meter with Rosemount 3051 CD Differential Pressure Transmitter , range 100 - 1,000 m ³ /Hr, S/N 9062914
Specific location		On the inlet of generator no.5 (Tag No. EFT9005)	On the inlet of generator no.6 (Tag No. EFT9006)	On the inlet of generator no.7 (Tag No. EFT9007)	On the inlet of generator no.8 (Tag No. EFT9008)
Calibration dates		14/07/2011 valid till 13/07/2013	20/07/2011 valid till 19/07/2013	13/06/2011 valid till 12/06/2013	13/09/2011 valid till 12/09/2013
Company performing the calibration		Miracle International Technology Co., Ltd.	Miracle International Technology Co., Ltd.	Miracle International Technology Co., Ltd.	Miracle International Technology Co., Ltd.

Data / Parameter (as in the MP)	LFG ^{electricity, y} Continued Table Amount of landfill gas combusted in power plant at Normal Temperature and Pressure			
Required calibration frequency: Is it in line with the MP? Or represent good monitoring practices?	All V-cone flow meters calibrated every 2 years, which was recommended in the calibration records. The manufacturer's recommendation of the v-cone flow meter does not require any further calibration since installation. However, the PP has decided to conduct a two yearly calibration for v-cone as recommended by the calibration lab. Calibration frequency of the flow meters as maintained by the PP considered a good monitoring practice.			
Is calibration valid for the whole reporting period?	Yes, the calibration for this instrument covers this monitoring period.	Yes, the calibration for this instrument covers this monitoring period.	The calibration is valid for the whole used period of this instrument. (Remark: This instrument was newly installed on 26/12/2011 for new generator no.7, which started COD since 27/01/2012)	The calibration is valid for the whole used period of this instrument. (Remark: This instrument was newly installed on 26/12/2011 for new generator no.8, which started COD and have taken into account for ER since 27/01/2012)
Maintenance	In good condition.	In good condition.	In good condition	In good condition
Does the data management (from monitoring equipment to emission reductions calculation) ensure correct transfer of data and reporting of emission reductions?	Yes. Please refer to item 1-14	Yes. Please refer to item 1-14	Yes. Please refer to item 1-14	Yes. Please refer to item 1-14
Key reporting risks	Low risk. As stated above, QA/QC procedures have been effectively implemented and the CAR06 is addressed	Low risk. As stated above, QA/QC procedures have been effectively implemented and the CAR06 is addressed	Low risk. As stated above, QA/QC procedures have been effectively implemented and the CAR06 is addressed	Low risk. As stated above, QA/QC procedures have been effectively implemented and the CAR 06 is addressed

Data / Parameter (as in the MP)		PE _{flare, y} Project emission from flaring of the residual gas stream in year y
Value	Ex ante	The ex-ante estimation of PE _{flare, y} during year 2011 and year 2012 indicated in the registered PDD = 2,080 tCO ₂ e and 3,317 tCO ₂ e respectively. (or 1,172 tCO ₂ e during this monitoring period)
	Ex-post	2,650 tCO ₂ e
Measuring frequency		Calculated every hour interval
Reporting frequency		Monthly and Annually
Is the measuring and reporting frequency in line with the MP and the Monitoring Methodology?		Yes
Recording (Manually / electronically / ...)		Electronically
QA/QC How are values verified? (Cross-checked, double-checked,...)		The enclosed flare has been operated and maintained as per the specification prescribed by the manufacturer. Monitoring of T Flare as well as other key parameters essential for determining flare efficiency as prescribed in flare manufacturer's specification, i.e. Flow rate of LFG enter to Flare, Methane content of LFG, and temperature for confirmation the appropriate application of default value during each operation hour using for PE flare calculation has been done during this monitoring period.
Type of Monitoring Equipment and Identification number or Reference in the PDD		N/A (This parameter has not been monitored but calculated)
Is accuracy of the monitoring equipment as stated in the PDD? If not stated in the PDD, does it represent good monitoring practices?		ditto
Period of operating time		ditto
Instrument type		ditto
Manufacturer, model and serial number		ditto
Specific location		ditto
Calibration dates		ditto
Company performing the calibration		ditto
Required calibration frequency: Is it in line with the MP? Or represent good monitoring practices?		ditto
Is calibration valid for the whole reporting period?		ditto
Maintenance		ditto
Does the data management (from monitoring equipment to emission reductions calculation) ensure correct transfer of data and reporting of emission reductions?		Yes. Please refer to item 1-14

Data / Parameter (as in the MP)	PE _{flare, y} Project emission from flaring of the residual gas stream in year y
Key reporting risks	Low risk As stated above, QA/QC procedures have been effectively implemented.

Data / Parameter (as in the MP)	$\omega_{CH_4, y}$ (or $f_{v_{CH_4, RG, h}}$) Methane fraction in the landfill gas
Value	Ex ante 0.5
	Ex-post 0.496 (The hourly average methane concentration was in the range of 39.8 % to 62.2%, with average value of 49.6% during the monitoring period)
Measuring frequency	measured continuously (reading every minute and average value in a time interval of an hour are used in the calculations of emission reductions)
Reporting frequency	Monthly and Annually
Is the measuring and reporting frequency in line with the MP and the Monitoring Methodology?	Yes
Recording (Manually / electronically / ...)	Electronically
QA/QC How are values verified? (Cross-checked, double-checked,...)	Gas analyser maintained and calibrated. (Please refer CAR 10 and CL 01 which have been closed.)
Type of Monitoring Equipment and Identification number or Reference in the PDD	Gas quality analyser
Is accuracy of the monitoring equipment as stated in the PDD? If not stated in the PDD, does it represent good monitoring practices?	The PDD does not state the accuracy level of this instrument. However, the Infrared Gas Analyser with + 2% full scale deflection has been used which represented good monitoring practice. This was presented in the technical specifications and confirmed in the calibration records.
Period of operating time	01/11/2011 to 31/03/2012
Instrument type	Infra Red Gas Analyser (Certified CE marked)
Manufacturer, model and serial number	Edinburgh Instruments Limited , Model Guardian Plus Infra-Red Gas monitor, range 0-100% , S/N 31426
Specific location	Mounted at LFG pipe work between the LFG treatment package and the generator sets/ Flare (Tag No. CH4 9261A)
Calibration dates	03/06/2011 valid till 02/06/2012
Company performing the calibration	Miracle International Technology Co., Ltd.
Required calibration frequency: Is it in line with the MP? Or represent good monitoring practices?	The MP does not describe the calibration frequency. However, the PP planned to calibrate this instrument annually as described in the MR which represents good monitoring practice.
Is calibration valid for the whole reporting period?	Yes, the calibration for this instrument covers this monitoring period.

Data / Parameter (as in the MP)	$\omega_{CH_4,y}$ (or $f_{v_{CH_4, RG,h}}$) Methane fraction in the landfill gas
Maintenance	In good condition
Does the data management (from monitoring equipment to emission reductions calculation) ensure correct transfer of data and reporting of emission reductions?	Yes. Please refer to item 1-14. CAR 08 relate to treatment of missing data of this parameter was initialled raised. The PP has corrected the method to treatment of this data to be comply with the registered monitoring plan. Therefore this CAR 08 has been closed.
Key reporting risks	Low risk. As stated above, QA/QC procedures have been effectively implemented and the CAR 08 is addressed.

Data / Parameter (as in the MP)		T Temperature of the landfill gas
Value	Ex ante	0°C
	Ex-post	Various
Measuring frequency		Continuous measuring
Reporting frequency		Recorded every minute
Is the measuring and reporting frequency in line with the MP and the Monitoring Methodology?		Yes
Recording (Manually / electronically / ...)		Electronically
QA/QC How are values verified? (Cross-checked, double-checked,...)		Temperature probe maintained and calibrated as per manufactures recommendations
Type of Monitoring Equipment and Identification number or Reference in the PDD		Temperature probe
Is accuracy of the monitoring equipment as stated in the PDD? If not stated in the PDD, does it represent good monitoring practices?		The PDD does not state the accuracy of this instrument. However, the temperature transmitter with accuracy $\pm 0.3 + 0.005 \text{ t}^\circ\text{C}$ has been used which represented good monitoring practice. This was presented in the technical specifications and confirmed in the calibration records.

Data / Parameter (as in the MP)	T Temperature of the landfill gas		
Period of operating time	01/11/2011 to 31/03/2012 for S/N 080625355 (Tag No. TT9261A) and S/N 080625360 (Tag No. TT9261B)	01/11/2011 to 31/03/2012 for all S/N 100208523 (inlet to Flare 1), S/N 080625400 (inlet to Flare 2), and S/N 090536657 (inlet to Flare 3)	01/11/2011 to 01/03/2012 for S/N 090536658 (inlet to Engine 1), S/N 090543121 (inlet to Engine 2), S/N 090536683 (inlet to Engine 3), S/N 090543120 (inlet to Engine 4), S/N 100211940 (inlet to Engine 5), and S/N 100098212 (inlet to Engine 6), 01/03/2012 to 31/03/2012 for S/N 100208540 (inlet to Engine 1), S/N 100208515 (inlet to Engine 2), S/N 090536658 (inlet to Engine 3), S/N 090543121 (inlet to Engine 4), S/N 090536683 (inlet to Engine 5), and S/N 090543120 (inlet to Engine 6) 26/12/2011 to 31/03/2012 for S/N 100208541 (inlet to Engine 7) and S/N 100208537 (inlet to Engine 8)
Instrument type	Temperature transmitter	Temperature transmitter	Temperature transmitter
Manufacturer, model and serial number	Honeywell, STT830-171 temperature transmitter, range -58 – 500°C	Honeywell, STT830-171 temperature transmitter, range -58 – 500°C	Honeywell, STT830-171 temperature transmitter, range -58 – 500°C
Specific location	In LFG pipe work between the gas treatment package and the generator sets/ Flare (Tag nos. TT9261A & TT9261B)	At the inlet of Flare 1, inlet of Flare 2 and inlet of Flare 3 (Tag Nos. TT9391, TT9491 & TT9591)	At the inlet of each engine (Tag Nos. ETT9001, ETT9002, ETT9003, ETT9004, ETT9005, ETT9006, ETT9007 and ETT 9008 for Engine 1 to Engine 8 respectively)

Data / Parameter (as in the MP)	T Temperature of the landfill gas		
Calibration dates	08/08/2011 for S/N 080625355 valid till 07/08/2012 09/08/2011 for S/N 080625360 valid till 08/08/2012	08/08/2011 for all S/N 100208523 (inlet to Flare 1), S/N 080625400 (inlet to Flare 2), and S/N 090536657 (inlet to Flare 3) all valid till 07/08/2012	17/03/2011 for S/N 090536658 (inlet to Engine 1), S/N 090543121 (inlet to Engine 2), S/N 090536683 (inlet to Engine 3), and S/N 090543120 (inlet to Engine 4) all valid till 16/03/2012 29/03/2011 for S/N 100211940 (inlet to Engine 5) and S/N 100098212 (inlet to Engine 6) both valid till 28/03/2012 09/08/2011 for S/N 100208540 (inlet to Engine 1), S/N 100208515 (inlet to Engine 2), S/N 100208541 (inlet to Engine 7), and S/N 100208537 (inlet to Engine 8) all valid till 08/08/2012 01/03/2012 for S/N 090536658 (inlet to Engine 3), S/N 090543121 (inlet to Engine 4), S/N 090536683 (inlet to Engine 5), and S/N 090543120 (inlet to Engine 6) all valid till 28/02/2013
Company performing the calibration	Thermology Co., Ltd.	Thermology Co., Ltd.	Thermology Co., Ltd.
Required calibration frequency: Is it in line with the MP? Or represent good monitoring practices?	The MP does not describe the calibration frequency. However, the PP planned to calibrate this instrument annually as described in the MR which represents good monitoring practice.		
Is calibration valid for the whole reporting period?	Yes	Yes	Yes, the calibrations for temperature transmitter tag no. ETT 9001 to ETT 9006 cover this monitoring period. While the calibration for temperature transmitter tag no. ETT 9007 (for Engine 7) and ETT 9008 (for engine 8) are valid for the whole used period of this instrument. (Remark: ETT 9007 and ETT 9008 were newly installed on 26/12/2011 for new generator no.7 and no.8 respectively, which started COD and have taken into account for ER since 27/01/2012)
Maintenance	In good condition	In good condition	In good condition
Does the data management (from monitoring equipment to emission reductions calculation) ensure correct transfer of data and reporting of emission reductions?	Yes. Please refer to item 1-14. CAR 08 relate to treatment of missing data of this parameter was initialled raised. The PP has corrected the method to treatment of this data to be in line with the registered monitoring plan. Therefore this CAR 08 has been closed.		

Data / Parameter (as in the MP)	T Temperature of the landfill gas
Key reporting risks	Low risk. As stated above, QA/QC procedures have been effectively implemented and the CAR 08 is addressed

Data / Parameter (as in the MP)		P Pressure of the landfill gas	
Value	Ex ante	101,300 Pa	
	Ex-post	Various	
Measuring frequency		Continuous measuring	
Reporting frequency		Recorded every minute	
Is the measuring and reporting frequency in line with the MP and the Monitoring Methodology?		Yes	
Recording (Manually / electronically / ...)		Electronically	
QA/QC How are values verified? (Cross-checked, double-checked,...)		Pressure transmitter maintained and calibrated as per manufactures recommendations	
Type of Monitoring Equipment and Identification number or Reference in the PDD		Pressure transmitter	
Is accuracy of the monitoring equipment as stated in the PDD? If not stated in the PDD, does it represent good monitoring practices?		The PDD does not state the accuracy of this instrument. However, the pressure transmitter with accuracy $\pm 0.075\%$ span has been used which represented good monitoring practice. This was presented in the technical specifications and confirmed in the calibration records.	
Period of operating time		01/11/2011 to 31/03/2012 for S/N 5466080 and S/N 5466089 (mounted at LFG pipe work after pre-treatment unit)	01/11/2011 to 31/03/2012 for S/N 5466010, S/N 5466007, and S/N 5466015 (at inlet to Flare 1 – 3 respectively) 01/11/2011 to 10/11/2011 for S/N 02166915, S/N 02300672, S/N 02300673, S/N 02300674, S/N 02150753 and S/N 02150750 (at inlet to Engine 1- 6 respectively) 10/11/2011 to 31/03/2012 for S/N 02443480, S/N 02443481, S/N 02166915, S/N 02300672, S/N 0210751, and S/N 02300674 (at inlet to Engine 1- 6 respectively) 26/12/2011 to 31/03/2012 for S/N 02150753 and S/N 02300673 (at inlet to Engine 7- 8 respectively)

Data / Parameter (as in the MP)	P		
	Pressure of the landfill gas		
Instrument type	Absolute Pressure Transmitter	Absolute Pressure Transmitter	Absolute Pressure Transmitter
Manufacturer, model and serial number	Rosemount, Model 3051TA, Pressure transmitter, range 0-207 kPa	Rosemount, Model 3051TA, Pressure transmitter, range 0-207 kPa	Rosemount, Model 3051TA, Pressure transmitter, range 0-207 kPa
Specific location	LFG pipe work between the gas treatment package and the generator sets/ Flare. (Tag Nos. PT9261A & PT9261B)	LFG pipe work at inlet of each flare (Tag Nos. PT9391, PT9491, and PT9591)	LFG pipe work at inlet of each engine (Tag Nos. EPT9001, EPT9002, EPT9003, EPT9004, EPT9005, EPT9006, EPT9007, and EPT9008)
Calibration dates	14/06/2011 for S/N 5466080 and S/N 5466089 both valid till 13/06/2012	14/06/2011 for S/N 5466010, S/N 5466007, and S/N 5466015 all valid till 13/06/2012	16/11/2010 for S/N 02166915, S/N 02300672, S/N 02300673, and S/N 02300674 (at inlet to Engine 1 to Engine 4 respectively) all valid till 15/11/2011 20/12/2010 for S/N 02150753, and S/N 02150750 (at inlet to Engine 5 to Engine 6 respectively) both valid till 19/12/2011 14/06/2011 for S/N 02443480 and S/N 02443481 (at inlet to Engine 1 to Engine 2 respectively) both valid till 13/06/2012 10/11/2011 for S/N 02166915, S/N 02300672, S/N 02150751, S/N 02300674, S/N 02150753, and S/N 02300673 (at inlet to Engine 3 to Engine 8 respectively) all valid till 09/11/2012
Company performing the calibration	Miracle International Technology Co., Ltd.	Miracle International Technology Co., Ltd.	Marske Machine Hire and Calibration Centre (MMC) Thailand for S/N 02150753 and S/N 02150750 which calibrated on 20/12/2010 Miracle International Technology Co., Ltd. for calibration of S/N 02150753 on 10/11/2011 and for calibration of S/N 02166915, S/N 02443480, S/N 02300672, S/N 02443481, S/N 02300673, S/N 02300674, and S/N 02150751
Required calibration frequency: Is it in line with the MP? Or represent good monitoring practices?	The MP does not describe the calibration frequency. However, the PP calibrates the instrument annually as described in the MR which represents good monitoring practice.		

Data / Parameter (as in the MP)	P		
Is calibration valid for the whole reporting period?	Pressure of the landfill gas Yes	Yes	Yes, the calibrations for pressure transmitter tag no. EPT 9001 to EPT 9006 cover this monitoring period. While the calibration for pressure transmitter tag no. EPT 9007 (for Engine 7) and EPT 9008 (for engine 8) are valid for the whole used period of this instrument. (Remark: EPT 9007 and EPT 9008 were newly installed on 26/12/2011 for new generator no.7 and no.8 respectively, which started COD and have taken into account for ER since 27/01/2012)
Maintenance	In good condition	In good condition	In good condition
Does the data management (from monitoring equipment to emission reductions calculation) ensure correct transfer of data and reporting of emission reductions?	Yes. Please refer to item 1-14. CAR 08 relate to treatment of missing data of this parameter was initialled raised. The PP has corrected the method to treatment of this data to be in line with the registered monitoring plan. Therefore this CAR 08 has been closed.		
Key reporting risks	Low risk. As stated above, QA/QC procedures have been effectively implemented and the CAR 08 is addressed.		

Data / Parameter (as in the MP)		EL _{LFG} Net quantity of electricity produced /exported using LFG
Value	Ex ante	The ex-ante estimation of EL _{LFG} during year 2011 and year 2012 indicated in the registered PDD = 68,882 MWh/year for both years
	Ex-post	20,950.80 MWh
Measuring frequency	Continuously measured	
Reporting frequency	Daily and Monthly	
Is the measuring and reporting frequency in line with the MP and the Monitoring Methodology?	Yes	
Recording (Manually / electronically / ...)	Electronically	
QA/QC How are values verified? (Cross-checked, double-checked,...)	The electricity meters meet the relevant Thailand standards for fiscal calibration purposes. These meters have been installed, approved, maintained and calibrated by PEA. The values were corroborated against the financial data (invoices) from the export of the power to the grid.	
Type of Monitoring Equipment and Identification number or Reference in the PDD	The electricity meters will meet the relevant Thailand standards for fiscal Calibration purposes. They will be maintained and calibrated according to manufacturer's instructions or the relevant regulations	

Data / Parameter (as in the MP)		EL _{LFG} Net quantity of electricity produced /exported using LFG
Is accuracy of the monitoring equipment as stated in the PDD? If not stated in the PDD, does it represent good monitoring practices?		The PDD does not state the accuracy of this instrument. However, the installed electricity meter are Class 0.5 S according to PEA requirement.
Period of operating time		01/11/2011 to 31/03/2012 (Main meter) 01/11/2011 to 31/03/2012 (Back up meter)
Instrument type		Electricity meter
Manufacturer, model and serial number		EDMI model EDMl-Mk6 (Genius), class 0.5S Main meter : S/N 201005194 – PEA15850695 EDMl model EDMl-Mk6 (Genius), class 0.5S Back up meter : S/N 201007272 – PEA 15852773
Specific location		PEA's distribution line which connected to PEA's substation that connecting system to the grid. PEA's distribution line which connected to PEA's substation that connecting system to the grid.
Calibration dates		12/07/2011 valid till 11/07/2012 13/07/2011 valid till 12/07/2012
Company performing the calibration		PEA
Required calibration frequency: Is it in line with the MP? Or represent good monitoring practices?		The approved PDD defined Fiscal calibration. (Meet the relevant Thailand standards for fiscal calibration purposes.)
Is calibration valid for the whole reporting period?		Yes
Maintenance		In good condition
Does the data management (from monitoring equipment to emission reductions calculation) ensure correct transfer of data and reporting of emission reductions?		Yes. Please refer to item 1-14
Key reporting risks		Low risk As stated above, QA/QC procedures have been effectively implemented.

Data / Parameter (as in the MP)		EL _{import} (or EC _{Pj, y}) Net amount of electricity imported from the grid for auxiliary use
Value	Ex ante	The ex-ante estimation of EL import (or EC Pj j, y) during year 2011 and 2012 indicated in the registered PDD = 113 MWh/year for both years
	Ex-post	3.36 MWh
Measuring frequency		Continuously measured
Reporting frequency		Daily and Monthly
Is the measuring and reporting frequency in line with the MP and the Monitoring Methodology?		Yes
Recording (Manually / electronically / ...)		Electronically

Data / Parameter (as in the MP)		EL _{import} (or EC _{PJ,y}) Net amount of electricity imported from the grid for auxiliary use	
QA/QC How are values verified? (Cross-checked, double-checked,...)		The electricity meters meet the relevant Thailand standards for fiscal calibration purposes. These meters have been installed, approved maintained and calibrated by PEA. The values were corroborated against the financial data (invoices) from the import of the power from the grid.	
Type of Monitoring Equipment and Identification number or Reference in the PDD		The PDD described that The electricity meters will meet the relevant Thailand standards for fiscal Calibration purposes. They will be maintained and calibrated according to manufacturer's instructions or the relevant regulations.	
Is accuracy of the monitoring equipment as stated in the PDD? If not stated in the PDD, does it represent good monitoring practices?		The PDD does not state the accuracy of this instrument. However, the installed electricity meter are Class 0.5 S according to PEA requirement.	
Period of operating time		01/11/2011 to 31/03/2012 (Main meter)	01/11/2011 to 31/03/2012 (Back up meter)
Instrument type		Electricity meter	
Manufacturer, model and serial number		EDMI model EDMl-Mk6 (Genius), class 0.5S Main meter : S/N 201006718 – PEA 15852219	EDMI model EDMl-Mk6 (Genius), class 0.5S Back up meter : S/N 201005191 – PEA 15850692
Specific location		PEA's distribution line which connected to PEA's substation that connecting system to the grid.	PEA's distribution line which connected to PEA's substation that connecting system to the grid.
Calibration dates		12/07/2011 valid till 11/07/2012	13/07/2011 valid till 12/07/2012
Company performing the calibration		PEA	
Required calibration frequency: Is it in line with the MP? Or represent good monitoring practices?		The approved PDD defined Fiscal calibration. (Meets the relevant Thailand standards for fiscal calibration purposes.)	
Is calibration valid for the whole reporting period?		Yes	
Maintenance		In good condition	
Does the data management (from monitoring equipment to emission reductions calculation) ensure correct transfer of data and reporting of emission reductions?		Yes. Please refer to item 1-14	
Key reporting risks		Low risk As stated above, QA/QC procedures have been effectively implemented.	

Data / Parameter (as in the MP)		Hours Operation hour of the energy plant	Regulatory requirement relating to landfill gas project (It may effect the value of AF or MD _{reg,y})
Value	Ex ante	7200 hour/year/generator set	
	Ex-post	Engine #1: 2,932 hours, Engine #2 : 3,161 hours, Engine #3: 3,194 hours, Engine #4 : 2,706 hours, Engine #5 : 3,302 hours, Engine #6: 3,298 hours, Engine #7 : 1,276 hours, Engine #8: 1,453 hours (Please refer CL 02)	-

Data / Parameter (as in the MP)	Hours Operation hour of the energy plant	Regulatory requirement relating to landfill gas project (It may effect the value of AF or MD_{reg,y})
Measuring frequency	Continuously measured	Determine annually from National legislation and mandatory regulation
Reporting frequency	Monitored annually	Annually
Is the measuring and reporting frequency in line with the MP and the Monitoring Methodology?	Yes	Yes
Recording (Manually / electronically / ...)	Electronically	Electronically
QA/QC How are values verified? (Cross-checked, double-checked,...)	The equipment is subjected to regularly maintenance along with the engine. It was confirmed from the letter from manufacturer "GE Jenbacher GmbH & Co OHG" that the operation hours counter need not to be calibrated based on the fact that the operating hour counter is a GEJ internal software counter.	N/A
Type of Monitoring Equipment and Identification number or Reference in the PDD	Run meter	N/A
Is accuracy of the monitoring equipment as stated in the PDD? If not stated in the PDD, does it represent good monitoring practices?	PDD does not specify the accuracy of the monitoring equipment used. The operating hour is based on the internal software counter provided by the manufacturer GE Jenbacher GmbH & Co OHG that carried out the required quality test and therefore considered acceptable.	N/A
Period of operating time	01/11/2011 to 31/03/2012	N/A
Instrument type	Run meter	N/A
Manufacturer, model and serial number	GE Jenbacher DIA.NE XT (Dialog Network new generation) motor management system, System elements visualisation with central engine and module control system.	N/A
Specific location	Software based, run meters on each generator set, reading taken from SCADA system.	N/A
Calibration dates	None	N/A
Company performing the calibration	None	N/A
Required calibration frequency: Is it in line with the MP? Or represent good monitoring practices?	Confirmation letter from manufacturer "GE Jenbacher GmbH & Co OHG" that the operation hour's counter need not to be calibrated based on the fact that the operating hour counter is a GEJ internal software counter	N/A
Is calibration valid for the whole reporting period?	-	N/A
Maintenance	In good condition	N/A

Data / Parameter (as in the MP)	Hours Operation hour of the energy plant	Regulatory requirement relating to landfill gas project (It may effect the value of AF or MD _{reg,y})
Does the data management (from monitoring equipment to emission reductions calculation) ensure correct transfer of data and reporting of emission reductions?	Yes the data transfers are through SCADA and therefore eliminate data transposition error. Daily reading is also taking by the qualified operator and maintained in daily engine log sheets. This data is not used for emission reduction calculation.	The PP has update the local legal requirement relates to emission of LFG. The verification team confirmed that no local legal requirement relate to control release of LFG has been used/ enforced at the time of this verification.
Key reporting risks	Low risk.	Low risk.

Data / Parameter (as in the MP)		TDL j,y Average technical transmission and distribution losses for providing electricity to Sources j	Other flare operation parameters (According to manufacture's specification)
Value	Ex ante	10.36%	Note: The PDD described that there is not other data and parameters (other than those already monitored) that are required to monitor whether the flare operates within the range of operating condition according to the manufacturer's specification. As an enclosed flare is used, no flame detector is included.
	Ex-post	8.55%	-
Measuring frequency		Annually monitoring of published data of Electricity Annual report by DEDE department of Ministry of Energy of Thailand. Most recent, accurate, and reliable published data available within the host country is applied.	-
Reporting frequency		Annually	-
Is the measuring and reporting frequency in line with the MP and the Monitoring Methodology?		Yes	-
Recording (Manually / electronically / ...)		N/A	-
QA/QC How are values verified? (Cross-checked, double-checked,...)		N/A	-
Type of Monitoring Equipment and Identification number or Reference in the PDD		N/A	-
Is accuracy of the monitoring equipment as stated in the PDD? If not stated in the PDD, does it represent good monitoring practices?		N/A	-
Period of operating time		N/A	-
Instrument type		N/A	-
Manufacturer, model and serial number		N/A	-

Data / Parameter (as in the MP)	TDL j,y Average technical transmission and distribution losses for providing electricity to Sources j	Other flare operation parameters (According to manufacture's specification)
Specific location	N/A	-
Calibration dates	N/A	-
Company performing the calibration	N/A	-
Required calibration frequency: Is it in line with the MP? Or represent good monitoring practices?	N/A	-
Is calibration valid for the whole reporting period?	N/A	-
Maintenance	N/A	-
Does the data management (from monitoring equipment to emission reductions calculation) ensure correct transfer of data and reporting of emission reductions?	The PP has updated published information for this information form DEDE annually.	-
Key reporting risks	Low risk as source of information for TDL calculation is the most update published report from government organization.	-

Data / Parameter (as in the MP)		T _{Flare} Temperature of the exhaust gas of the flare
Value	Ex ante	>500°C
	Ex-post	Various
Measuring frequency	Continuous measurement (read every minute and used for determination of Flare efficiency every hour)	
Reporting frequency	Hourly	
Is the measuring and reporting frequency in line with the MP and the Monitoring Methodology?	Yes	
Recording (Manually / electronically / ...)	Electronically	
QA/QC How are values verified? (Cross-checked, double-checked,...)	Type N thermocouples have been calibrated according to the manufacturer's specifications	
Type of Monitoring Equipment and Identification number or Reference in the PDD	Type N thermocouple	
Is accuracy of the monitoring equipment as stated in the PDD? If not stated in the PDD, does it represent good monitoring practices?	The PDD does not state the accuracy of this instrument. However, type N thermocouple with accuracy class II (Allowable deviation $\pm$ (0.0075ItI)) has been used which represented good monitoring practice. This was presented in the technical specifications and confirmed in the calibration records. The purpose of the temperature is to justify if the flare meets the manufacturer's specification then further justify the efficiency of the flare.	

Data / Parameter (as in the MP)	T _{Flare} Temperature of the exhaust gas of the flare		
Period of operating time	01/11/2011 to 05/01/2012 and 10/03/2012 to 31/03/2012 for Tag nos.TTC9393A and TTC9393B 01/11/2011 to 31/03/2012 for Tag no.TTC9393C	01/11/2011 to 05/01/2012 for Tag no. TTC9493A S/N 22641C/1A 05/01/2012 to 31/03/2012 for Tag no. TTC9493A S/N 080614379 01/11/2011 to 31/03/2012 for Tag nos. TTC9493B and TTC9493C	01/11/2011 to 31/03/2012 for Tag no.TTC9593A, TTC9593B and TTC9593C
Instrument type	Type N Thermocouple	Type N Thermocouple	Type N Thermocouple
Manufacturer, model and serial number	Uniflare model 32-N-LTS-176-6.0-2I- TXLIN/EXI, range 0 to 1300 °C, Accuracy Class II (allowable deviation ±(0.0075ItI)) Tag no. TTC9393A • S/N 22641C/2A -Operating period was from 01/11/2011 to 05/01/2012 • S/N 22641C/1A -Operating period was from 10/03/2012 to 31/03/2012 Tag no TTC9393B • S/N 22641C/3A - Operating period was from 01/11/2011 to 05/01/2012 • S/N 22641C/3A - Operating period was from 10/03/2012 to 31/03/2012 Honeywell model STT830-173, range 0 to 1,200 °C , Accuracy class II (Allowable deviation ± (0.0075ItI) Tag no. TTC9393C • S/N 090329527 - Operating period was from 01/11/2011 to 31/03/2012	Uniflare model 32-N-LTS-176-6.0-2I- TXLIN/EXI, range 0 to 1300 °C, Accuracy Class II (allowable deviation ±(0.0075ItI)) Tag no. TTC9493A • S/N 22641C/1A -Operating period was from 01/11/2011 to 05/01/2012 Honeywell model STT830-173, range 0 to 1,200 °C , Accuracy class II (Allowable deviation ± (0.0075ItI) Tag no. TTC9493A • S/N 080614379 -Operating period was from 05/01/2012 to 31/03/2012 Tag no. TTC9493B • S/N 080614305 -Operating period was from 01/11/2011 to 31/03/2012 Tag no. TTC9493C • S/N 080614306 -Operating period was from 01/11/2011 to 31/03/2012	Honeywell model STT830-173, range 0 to 1,200 °C , Accuracy class II (Allowable deviation ± (0.0075ItI) Tag no. TTC9593A • S/N 080614323 -Operating period was from 01/11/2011 to 31/03/2012 Tag no. TTC9593B • S/N 080614321 -Operating period was from 01/11/2011 to 31/03/2012 Tag no. TTC9593C • S/N 080614320 -Operating period was from 01/11/2011 to 31/03/2012
Specific location	Mounted at stack of Flare 1	Mounted at stack of Flare 2	Mounted at stack of Flare 3

Data / Parameter (as in the MP)	T _{Flare} Temperature of the exhaust gas of the flare		
Calibration dates	05/01/2011 valid till 04/01/2012 for S/N 22641C/2A and S/N 22641C/3A for the operation period from 01/11/2011 to 05/01/2012 07/02/2012 valid till 06/02/2013 for S/N 22641C/1A and S/N 22641C/3A for the operation period from 10/03/2012 to 31/03/2012 08/08/2011 valid till 07/08/2012 for S/N 090329527	05/01/2011 valid till 04/01/2012 for S/N 22641C/1A 07/09/2011 valid till 06/09/2012 for S/N 080614379, S/N 080614305 and S/N 080614306	09/08/2011 valid till 08/08/2012 for S/N 080614323, S/N 080614321 and S/N 080614320
Company performing the calibration	TC Ltd. for S/N 22641C/2A and S/N22641C/3A which calibrated on 05/01/2011 Thermology Co., Ltd. for S/N22641C/1A, and S/N22641C/3A which calibrated on 07/02/2012 and for S/N090329527 which calibrated on 08/08/2011	TC Ltd. for S/N 22641C/1A which calibrated on 05/01/2011 Thermology Co., Ltd. for S/N 080614379, S/N 080614305 and S/N 080614306 which calibrated on 07/09/2011	Thermology Co., Ltd. for all.
Required calibration frequency: Is it in line with the MP? Or represent good monitoring practices?	The MP does not described calibration frequency. However, the PP calibrates the instrument annually as described in the MR which represents good monitoring practice.	The MP does not described calibration frequency. However, the PP calibrates the instrument annually as described in the MR which represents good monitoring practice.	The MP does not described calibration frequency. However, the PP calibrates the instrument annually as described in the MR which represents good monitoring practice.

Data / Parameter (as in the MP)	T _{Flare} Temperature of the exhaust gas of the flare		
Is calibration valid for the whole reporting period?	No. The calibration report of Thermocouple attached Tag no. TTC9393C is valid for the whole reporting period, while the calibration reports for other thermocouples are not valid for the whole reporting period as described below. Thermocouple attached Tag no. TTC9393A S/N22641C/2A and TTC9393B S/N22641C/3A were being used one day after due for calibration (remains being used on 05/01/2012, while the due date for calibration of these instrument was 04/01/2012) In addition, Thermocouple attached Tag no. TTC9393A and TTC 9393B had been removed since 05/01/2012 and were not reinstalled until 10/03/2012. Anyway, this does not effect to the monitoring results of flare 1 temperature during this period because Flare 1 was not operated during the period these instruments were overdue for calibration. This was confirmed by reviewing the LFG flow enter to Flare 1 which shown as zero during the mentioned period.	No. The calibration reports of Thermocouple attached Tag no. TTC9493B and TTC9493C are valid for the whole reporting period, while the calibration reports for thermocouple attached Tag no. 9493A are not valid for the whole reporting period as described below. Thermocouple attached Tag no. TTC 9493A S/N22641C/1A was being used one day after due for calibration (remains being used on 05/01/2012, while the due date for calibration of this instrument was 04/01/2012) Anyway, this does not effect to the monitoring results of flare 2 temperature during this period because Flare 2 was not operated during the period these instruments were overdue for calibration. This was confirmed by reviewing the LFG flow enter to Flare 2 which shown as zero during the mentioned period.	

Data / Parameter (as in the MP)	T_{Flare} Temperature of the exhaust gas of the flare		
Maintenance	Thermocouple attached Tag no.TTC9393C was being in good condition. Thermocouple attached Tag no.TTC 9393A (S/N 22641C/2A) had been removed since 05/01/2012 and has been replaced by S/N 22641C/1A since 10/03/2012 Thermocouple attached Tag no.TTC 9393B (S/N 22641C/3A) had been removed since 05/01/2012 and has been reinstalled on 10/03/2012	Thermocouple attached Tag no.TTC9493B and TTC9493C were being in good condition. Thermocouple attached Tag no.TTC 9493A (S/N 22641C/1A) has been replaced by S/N 080614379 since 05/01/2012	
Does the data management (from monitoring equipment to emission reductions calculation) ensure correct transfer of data and reporting of emission reductions?	Yes please refer to item 1-14	Yes please refer to item 1-14	Yes please refer to item 1-14
Key reporting risks	Low risk	Low risk	Low risk

Data / Parameter (as in the MP)		FC_{i,j,y} Quantity of fuel type i combusted in process j during the year y	NCV_{i,y} Weighted average net calorific value of fuel type i in year y
Value	Ex ante	5,000 litres per day (once in 2012, 2013, and 2014)	0.03642 GJ/litre
	Ex-post	3,950 litres	0.03642 GJ/litre
Measuring frequency		Record of fossil fuel withdrawal and fossil fuel consumption was maintained.	The NCV was by review appropriateness of the national default value annually as per option C of the MP.
Reporting frequency		Every monitoring period	Every monitoring period
Is the measuring and reporting frequency in line with the MP and the Monitoring Methodology?		Yes	Yes
Recording (Manually / electronically / ...)		Electronically	Electronically

Data / Parameter (as in the MP)	FC_{i,j,y} Quantity of fuel type i combusted in process j during the year y	NCV_{i,y} Weighted average net calorific value of fuel type i in year y
QA/QC How are values verified? (Cross-checked, double-checked,...)	The consistency of metered fuel consumption quantities was cross-checked by an annual energy balance that is based on purchased quantities and stock changes. The metered fuel consumption quantities were also cross-checked with the purchase invoices from the financial records.	The national default value was sourced from Summary Report The Study of Emission Factor for an Electricity System in Thailand 2010 which published by TGO (Thailand's DNA). This is the most updated information from the reliable source, thus considered to be appropriate.
Type of Monitoring Equipment and Identification number or Reference in the PDD	N/A	N/A
Is accuracy of the monitoring equipment as stated in the PDD? If not stated in the PDD, does it represent good monitoring practices?	PDD does not specify the accuracy of the monitoring equipment used. The quantity of fossil fuel type I combusted in process j during the year y is calculated based on the fossil fuel withdraw record (stock change) and the invoice of fossil fuel purchased during the monitoring period, therefore considered to be in line with the monitoring plan.	N/A
Period of operating time	01/11/2011-31/03/2012	N/A
Instrument type	Ruler	N/A
Manufacturer, model and serial number	None	N/A
Specific location	Daily tank	N/A
Calibration dates	N/A	N/A
Company performing the calibration	N/A	N/A
Required calibration frequency: Is it in line with the MP? Or represent good monitoring practices?	N/A	N/A
Is calibration valid for the whole reporting period?	N/A	N/A
Maintenance	N/A	N/A
Does the data management (from monitoring equipment to emission reductions calculation) ensure correct transfer of data and reporting of emission reductions?	Yes.	Yes.
Key reporting risks	Low risk.	Low risk.

Data / Parameter (as in the MP)		EF_{CO₂,i,y} Weighted average CO ₂ emission factor of fuel type i in year y
Value	Ex ante	0.07480 tCO ₂ /GJ

Data / Parameter (as in the MP)		EF _{CO₂,i,y} Weighted average CO ₂ emission factor of fuel type i in year y
	Ex-post	0.07480 tCO ₂ /GJ
Measuring frequency		Every monitoring period
Reporting frequency		Every monitoring period
Is the measuring and reporting frequency in line with the MP and the Monitoring Methodology?		Yes
Recording (Manually / electronically / ...)		Electronically
QA/QC How are values verified? (Cross-checked, double-checked,...)		The IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in Table 1.4 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG inventories was used as per the monitoring plan and as per source d) the applicable tool. Therefore this is appropriate.
Type of Monitoring Equipment and Identification number or Reference in the PDD		N/A
Is accuracy of the monitoring equipment as stated in the PDD? If not stated in the PDD, does it represent good monitoring practices?		N/A
Period of operating time		N/A
Instrument type		N/A
Manufacturer, model and serial number		N/A
Specific location		N/A
Calibration dates		N/A
Company performing the calibration		N/A
Required calibration frequency: Is it in line with the MP? Or represent good monitoring practices?		N/A
Is calibration valid for the whole reporting period?		N/A
Maintenance		N/A
Does the data management (from monitoring equipment to emission reductions calculation) ensure correct transfer of data and reporting of emission reductions?		Yes.
Key reporting risks		Low risk.

	Verified situation	Conclusion
SECTION 4. Compliance with the calibration frequency requirements for measuring instruments		
The "Monitoring Parameters and Calibration Checklist" in section 3 above shall be checked to determine if the calibration frequency specified in the applied monitoring methodology and/or monitoring plan is followed in the monitoring report and in the monitoring activities. Where a failure to comply with the required frequency is detected, or no frequency is mentioned in the monitoring report, please follow the checklist below:		
4-1. If the calibration has been delayed and the calibration has been implemented after the monitoring period in consideration (that is, the results of delayed calibration are available), confirm that the following conservative approach has been adopted in the calculation of emission reductions: - If the delayed calibration did not show any errors in the measuring equipment, or the error was smaller than the maximum permissible error, have the PPs applied the maximum permissible error of the instrument to the measured values taken during the period between the scheduled date of calibration and the actual date of calibration? - If the delayed calibration identified an error greater than the maximum permissible error, have the PPs applied the error identified in the delayed calibration test to the measured values taken during the period between the scheduled date of calibration and the actual date of calibration? Confirm that the error has been applied in a conservative manner, such that the adjusted measured values of the delayed calibration shall result in fewer emission reductions being claimed;	Some monitoring equipment were overdue for calibration as following. TTC 9393A(Thermocouple at 80% height of Flare 1) due on 04/01/2012 but used until 05/01/2012 TTC 9393B(Thermocouple at 50% height of Flare 1) due on 04/01/2012 but used until 05/01/2012 TTC9493A(Thermocouple at 80% height of Flare 2) due on 04/01/2012 but used until 05/01/2012 The delayed calibration of all aforementioned Thermocouples shows the error was smaller than the maximum permissible error. In addition, No LFG enter to those relevant flares during the mentioned period when the thermocouple was overdue for calibration, hence the ERs calculation was not effected. (Please also refer to section Monitoring Parameters and Calibration Checklist in item 3.19 above)	OK
4-2. If the results of the delayed calibration are not available, or the calibration has not been conducted at the time of verification: a. Request the PPs to conduct the required	N/A	-

	Verified situation	Conclusion
calibration; b. On receipt of the calibration results, determine whether the PPs have calculated the emission reductions conservatively using the approach mentioned in section 4.1 above.		
4-3. If it is not possible for the PPs to conduct the calibration at a frequency specified by either the applied methodology, guidance provided by the Board, and/or the registered monitoring plan due to reasons beyond the control of the PPs, check if the PPs have prepared a temporary deviation or a 'Permanent changes from the monitoring plan and/or monitoring methodology application'. Follow the requirements for post registration changes in sections 3.10 to 3.19 above.	N/A	-
4-4. If neither the monitoring methodology nor the monitoring plan specify any requirements for calibration frequency for measuring equipment, determine whether the equipment is calibrated either in accordance with the specifications of the local/national standards, or as per the manufacturer's specification. If neither local/national standards nor the manufacturer's specification are available, international standards may be used.	N/A	-

	Verified situation	Conclusion																
SECTION 5. Assessment of data and calculation of emission reductions																		
5-1. Have calculations of baseline emissions, proposed CDM project activity emissions and leakage, as appropriate, been carried out in line with the formulae and methods described in the monitoring plan and the applied methodology document? Check consistency in the ERs spreadsheet.	The correctness of formula applied for calculation of Baseline Emission is confirmed as correct by reviewing the MR and ERs calculation spreadsheets. The baseline emission of the project activity is calculated as: $BE_y = (MD_{project,y} - MD_{BL,y}) * GWP_{CH4} + EL_{LFG,y} * CEF_{elec,BL,y} + ET_{LFG,y} * CEF_{ther,BL,y}$ Where $MD_{project,y} = MD_{flared,y} + MD_{electricity,y}$ $MD_{BL,y} = 0$ $MD_{flared,y} = LFG_{flared,y} \times \omega_{CH4,y} \times D_{CH4} - PE_{flare,y}/GWP_{CH4}$ $PE_{flare,y} = \sum_{h=1}^{8760} TM_{RG,h} \times (1-\eta_{flare,h}) \times GWP_{CH4}/1000$ (Where $TM_{RG,h} = LFG_{flared,y} \times \omega_{CH4,y} \times D_{CH4}$) $MD_{electricity,y} = LFG_{electricity,y} \times \omega_{CH4,y} \times D_{CH4}$ $ET_{LFG,y} = 0$ The PP has followed the tool to determine project emission from flaring gases containing methane and determined parameter $\eta_{flare,h}$ (90%, 50% or 0% depending on operation conditions of the flare) on hourly basis, therefore $PE_{flare,y}$ and $MD_{flared,y}$ can be calculated by $\eta_{flare,h}$ on hourly basis. Following ex ant determined values are also confirmed compliant with the methodology and registered MP, <table><tr><th>Symbol</th><th>Value</th><th>Units</th><th>Description</th></tr><tr><td>GWP_{CH4}</td><td>21</td><td>tCO₂e/tCH₄</td><td>Global Warming Potential of CH₄</td></tr><tr><td>$CEF_{elec,BL,y}$</td><td>0.5742</td><td>tCO₂/MWh</td><td>emission factor of electricity from Thai grid replaced by project</td></tr><tr><td>D_{CH4}</td><td>0.0007168</td><td>Ton CH₄/m3</td><td>Density of Methane at standard temperature and pressure (0° C and 1.013 bar)</td></tr></table>	Symbol	Value	Units	Description	GWP_{CH4}	21	tCO ₂ e/tCH ₄	Global Warming Potential of CH ₄	$CEF_{elec,BL,y}$	0.5742	tCO ₂ /MWh	emission factor of electricity from Thai grid replaced by project	D_{CH4}	0.0007168	Ton CH ₄ /m3	Density of Methane at standard temperature and pressure (0° C and 1.013 bar)	OK ~~CAP-09~~ ~~CAP-03~~
Symbol	Value	Units	Description															
GWP_{CH4}	21	tCO ₂ e/tCH ₄	Global Warming Potential of CH ₄															
$CEF_{elec,BL,y}$	0.5742	tCO ₂ /MWh	emission factor of electricity from Thai grid replaced by project															
D_{CH4}	0.0007168	Ton CH ₄ /m3	Density of Methane at standard temperature and pressure (0° C and 1.013 bar)															

	Verified situation	Conclusion
	CAR 09 was initially raised because the $CEF_{elec,BL,y}$ value applied in calculation of Baseline emission and Project emission in the ER Calculation sheet version 1 and Section E.4 of MR Version 2, is different from the fixed ex-ante value in the registered PDD. The PP has responded to this CAR correcting the CEF value to be consistent with the registered PDD. Therefore this finding has been closed. The project emission is calculated as $PE_y = PE_{EC,y} + PE_{FC,j,y}$ Where $PE_{EC,y} = EC_{P,y} \times EF_{EL,y} \times (1+TDL_y)$ However, while the registered PDD does not provided the monitoring plan for monitoring $PE_{FC,j,y}$ as it described that “No other fossil fuel will be consumed on site by this project activity and $PE_{FC,j,y} = 0$”, it was noted that Diesel oil was being used for back up of electricity during COD test for new engines. Therefore CAR 03 was raised. Please refer to brief resolution method of this CAR which previously mentioned in item 1.5 and its detail provided in the finding log. According to the revised MP $PE_{FC,i,y} = \sum_i FC_{i,j,y} \times COEF_{i,y}$ According to the registered PDD, no leakage needs to be considered, thus $LE_y=0$. Therefore, the emission reductions of the project activity achieved in this monitoring period could be calculated as: $ER_y = BE_y - PE_y - LE_y = BE_y - (PE_{EC,y} + PE_{FC,i,y}) - LE_y$ $= 136,529 - (2,663) - 0$ $= 133,866$ Furthermore the PP has applied another correction for the ER calculation during 2nd monitoring period as already explained in section 3-3. The resultant reduction of ERs, which is verified to be 171 tCO₂e has been further deducted from the emission reduction achieved during this monitoring period. Therefore total ER claimed for this	

	Verified situation	Conclusion
	3rd monitoring period could be calculated as $133,866 - 171 = 133,695$ tCO ₂ e.	
5-2. Has the calculation tool been correctly documented? Check its consistency and formulae. • baseline emissions • project emissions • leakage • emission reductions of the project.	Refer to the 5-1 above. The ER calculation spreadsheets are established to support the MR	OK
5-3. Is a complete set of data available during the specified monitoring period? If only partial data is available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan proceed as follows: - Check if sections 3.11 and/or 3.12 above are applicable and raise a CAR for the PPs to comply with these requirements. - If sections 3.11 and 3.12 are not applicable or the answer to this question remains NO, a request for deviation is necessary. Conduct an assessment of the potential impacts of these changes in accordance to the procedures for Post Registration Changes.	During this monitoring period some special data events happened as detailed in the Annex F of the MR, CAR 08 was raised because the treatment of missing and corrupted data by replacing the value of corrupted/missing data with the average value of this parameter within an hour before the event does not follow the method for treatment of data described in the registered monitoring plan. The PP has addressed this finding by correcting the method for treatment of missing data in accordance with the registered PDD, therefore this CAR 08 has been closed.	~~CAR 08~~ OK
5-4. Has information provided in the monitoring report been cross-checked with other sources such as plant log books, inventories, purchase records, laboratory analysis? Please describe how LRQA has cross-checked reported data.	The verification team has conducted a comparison analysis between the actual power generation per cubic metre of CH ₄ and the theoretical value. According to the monitoring record of each generator, the average power generation per cubic metre of CH ₄ was calculated as 3.03kWh/Nm ³ CH ₄ during the monitoring period. In theory, considering normal energy content of CH ₄ (0.099KWh/m ³ for 1% methane) and the thermal efficiency of engine (40.8% according to technical specification), the power generation per cubic metre CH ₄ is 4.06 kWh/Nm ³ . Therefore the actual value in this monitoring period is within a reasonable fluctuation range. The electricity export and import values were compared with the invoices. Through these approaches, the	OK

	Verified situation	Conclusion
	verification team confirmed that the data for calculation of emission reduction in the monitoring report Version 7 (dated 03/09/2012) and ER calculation sheet Version 6 dated 03/09/2012 were credible.	
5-5. Have any assumptions used in emission calculations been justified?	The calculation was conducted following the applied methodology, tool and the registered PDD, except for the calculation of the project emissions from fossil fuel consumption which was not provided in the registered PDD as aforementioned. Please refer to section 5-1 above, to the resolution method of CAR 03 previously mentioned in section 1.5 and to the finding log below.	~~CAR 03~~ OK
5-6. Have appropriate emission factors, IPCC default values, and other reference values been correctly applied?	Yes Please refer to section 5-1 above. IPCC default values, default values regulated by the applied methodology and grid emission factor determined ex-ante in the registered PDD which are applicable to the project activity have been correctly applied. CAR 09 was initially raised because an incorrect value of the grid emission factor was applied, the PP has responded by correcting the value to be same as fixed ex-ante provided in the registered PDD, therefore this CAR has been closed.	~~CAR 09~~ ~~Closed~~ OK

Findings⁷

1. Grade / Ref:	CAR 01 MR Version 2 Section A.1. and Section B.1.	2. Date:	21/05/2012	3. Status:	Closed
4. Requirement	- Paragraph 225 (b) of CDM VVS (EB 65 Annex 4) Version 02.0 - Paragraph 10 (a) (i) of the Guidelines for Completeness Check of Requests for Issuance Version 01 (EB 48 – Annex 68) - Section A.1. (c) and Section B.1. of the Guidelines for Completing the Monitoring Report Form Version 02.0 (EB 66 - Annex 20) - Paragraph 188 (b) of CDM Project Standard Version 01.0 (EB65 – Annex 5)				
5. Nature of the Issue Raised:	The monitoring report Version 2 does not contain information on relevant dates for the flare component of the project activity (e.g. construction, commissioning, continued operation periods, etc.). It does not contain information on when each one of the 3 flares was installed and started operation.				
6. Nature of responses provided by the project participants:	The 3 Flares were physically installed by October 2009 and completed by January 2010. Landfill gas has been extracted and combusted by flares since February 2010. The 3 Flares were completely commissioning on 25/06/2010. The Pre treatment and three Flares commissioning documentations are in the enclosing files. The pre-treatment system and Flares installation and commissioning information have been added to the Monitoring Report in Section A.1 and Section B.1.				
7. Assessment of such responses:	The monitoring report was revised. Section A.1. & B.1. of the revised Monitoring Report include information relate to installation period of all three flares, while section A.1 also contains the commissioning date of all three flares. The installation and commissioning checklists dated 25/06/2010 for Pre-T15000 (Pre-treatment and Flares system) were provided as evidence for these equipment installation and commissioning. The final monitoring report (Version 7 dated 03/09/2012) contains information relate to installation and commissioning date of all key project components, i.e. engines, flares, gas collection system, pre-treatment system.				

8. References to resulting changes in the monitoring report or supporting annexes:	
Section A.1 and B.1. of the MR.	

1. Grade / Ref:	CAR 02/ Annex A of MR Version 2 (ER calculation sheet_v1)	2. Date:	21/05/2012	3. Status:	Closed
4. Requirement	- Paragraph 233 of CDM VVS (EB 65 Annex 4) Version 02.0 - Paragraph 10 (b) (iii) of the Guidelines for Completeness Check of Requests for Issuance Version 01 (EB 48 – Annex 68)				
5. Nature of the Issue Raised:	The spreadsheet for the calculation of emission reductions Version 1 does not contain explanation with regard to application of formulae for determination of flare efficiency. It does not indicate how the compliance with the manufacturer's specifications of the flare was met in order to adopt the default value of flare efficiency during certain hours (as required by the tool to determine project emissions from flaring gases containing methane (EB28 – Annex 13), the parameter "Other flare operational parameters" must be monitored when adopting the default value of flare efficiency).				
6. Nature of responses provided by the project participants:	An explanation of the determination of flare efficiency has been added to the ER calculation revised. The "other flare operation parameters" has been added to Section D.2 in the revised Monitoring Report.				
7. Assessment of such responses:	The spreadsheet of calculation of emission reduction and the monitoring report were revised. The revised ER calculation spreadsheet contains explanation how the temperatures read from all of three thermocouples of each flare have being used to determine the flare efficiency. It also contains explanation of the measurement of the manufacturer's specifications of the flare and how these monitored values of flare specifications have being used to determine the flare efficiency. Clear criteria for selection the default value of flare efficiency was also described in this ER calculation spreadsheet. Section D.2. of the revised monitoring report also includes the additional monitoring table for other flare operation parameter for clarity.				
8. References to resulting changes in the monitoring report or supporting annexes:	Section D.2. of the MR ER calculation spreadsheet				

1. Grade / Ref:	CAR 03/ Annex F of MR Version 2	2. Date:	21/05/2012	3. Status:	Closed
4. Requirement	Paragraph 226 and 233 of CDM VVS (EB 65 Annex 4) Version 02.0				
5. Nature of the Issue Raised:	A Diesel generator was used in the project activity while preparation for COD (commissioning for extension the capacity of electricity supply to the grid from 6.3 to be 8.0 MW) during 09/03/2012 and 10/03/2012. This is not in accordance with the description contained in the registered PDD that “no other fossil fuel will be consumed on site by this project activity” and “no $PE_{FC,i,y}$ (Project emission from consumption of heat due to the project activity)”. Project emission caused by using of diesel generator was also not monitored and reported.				
6. Nature of responses provided by the project participants:	A diesel generator was used for a short period (less than 1 day) during the preparation for the COD of the new engines. This is a temporary use, the fossil fuel consumption was monitored and the specifications of the diesel genset obtained. Using the “Tool to calculate project or leakage CO2 emissions from fossil fuel combustion” the project emissions have been calculated and attached in a spreadsheet and deduct from the ER of this monitoring period. The detailed calculation description has also been added to the monitoring report in Section E.2 and E.4. The PDD was revised to include the use of this diesel generator and project emission from this fossil fuel consumption. The monitoring plan was also revised to include monitoring of project emission from this fossil fuel consumption and submitted to DOE for validation prior to request approval for post registration change which will be submitted along with the request for issuance of CERs during this 3rd monitoring period.				
7. Assessment of such responses:	Project CO₂ emission from fossil fuel combustion from using of diesel generator during 09/03/2012 and 10/03/2012 was calculated according to the “Tool to calculate project or leakage CO2 emissions from fossil fuel combustion Version 02”. Option B of this tool was selected for calculation of $COEF_{i,y}$ while the value of $NCV_{i,y}$ and $EF_{CO2,i,y}$ used in the calculation are sourced from published report of Thai's DNA (The study of emission factor for electricity generation of Thailand in year 2010 by Thailand Greenhouse Gas Management Organization). The amount of diesel consumption used for this calculation, which sourced from Material Withdrawal Request record, is 3950 Litres. Base on the specification of the diesel generator (CAT model C32 Prime 800ekW 1000kVA CMCP4), this amount of diesel consumption equals to running this diesel generator at full load for 19.1 Hours or at 75% load for 25.4 hours which is reasonable. The result of this project emission from diesel oil consumption is taken into account and the emission reduction is calculated by subtracting this emission from baseline emission in the revised ER calculation spreadsheet Section E.2. of the MR was also revised to demonstrate the calculation method and formula applied for calculation of this project emission from combustion of diesel oil applying the relevant tool i.e “Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion” (Version 02). Section E.4. of the MR was				

also revised to indicate ER calculation will take project emissions from this diesel oil combustion into account.

The registered PDD was also revised to update the project description that now mentions the use of fossil fuel when necessary. This revised PDD also includes the monitoring plan and equation for monitoring of Project emissions from fossil fuel consumption. The verification team has reviewed and validated this revised PDD for determining post registration changes and confirms that it is in compliance with the ACM0001 Version 11 and the “Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion Version 02. This revised PDD will be submitted for the request of approval of post registration changes along with the request for issuance of CERs for this 3rd monitoring period.

ER calculation spreadsheet of this 3rd monitoring period also includes monitoring and calculation of PE from combustion of fossil fuel consumption. The verification team reviewed the source of data, the monitoring and the calculation method to confirm that it is correct and comply with the ACM0001 Version 11 and the “Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion Version 02.

8. References to resulting changes in the monitoring report or supporting annexes:	
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Section E.2 and Section E.4 of the MR ER spreadsheet Section A.2, A.4.4, B.1, B.3. B.6.1, B.6.3, and B.7.1 of the registered PDD.

1. Grade / Ref:	CAR 04/ MR Version 2 Section E.4 and ER calculation sheet_v1	2. Date:	21/05/2012	3. Status:	Closed
4. Requirement	Paragraph 244 of CDM VVS (EB 65 Annex 4) Version 02.0				
5. Nature of the Issue Raised:	During the site visit, it was observed that incorrect values have been applied in the algorithm for the “power equation for flow” and also in the “error function equation” for monitoring the amount of landfill gas flow to engine 6 by the V-cone flow meter S/N 1104-0159 and the amount of landfill gas flow to engine 7 by the V-cone flow meter S/N 9062901 during this monitoring period, which results in an incorrect flow calculation.				
6. Nature of responses provided by the project participants:	The Engine No.6 and Engine No.7 flow power equations and error function equation are corrected to the updated Cf (referring to V-cone calibration certificates) and V-cone flow sizing sheets. The correction is amended for ERs calculation and amended algorithm is presented as per support document provided. This correction was also done for LFG flow to Engine No.6 for the period when V-cone flow meter S/N 1104-0159 was being used during the 2 nd monitoring period.				
7. Assessment of such responses:	The PP has corrected the algorithm by applying the corrections of the values to the flow parameters for power equation and error function equation to the Engine 6 and Engine 7. The verification team checked the correction applied to the algorithms and confirms that the algorithms are now corrected. The verification team further reviewed the corrected LFG flow to Engine 6 (from 01/11/2011 till 31/03/2012) and Engine 7 (from 27/01/2011 till 31/03/2012) for monitored flow data in every minutes and its hourly and monthly aggregation as reported in the Emission Reduction (ER) spreadsheet. The flow from Engine 6 is now changed from 2,146,040.21 m³/hr to 2,175,553.28 m³/hr and that of Engine 7 is changed from 807,800.42 m³/hr to 795,035.95 m³/hr during the 3rd monitoring period. Hourly values of LFG flow to Engine 6 and Engine 7 have now been correctly reported and used for ER calculation of the 3rd monitoring period. The correction of power equation and error function for LFG flow calculation of the aforementioned V-cone flow meter was applied not only during this 3rd monitoring period but also during the period it was used in the 2nd monitoring period, i.e. flow meter S/N 1104-0159 (Engine6) which was used in the 2nd monitoring period since 27/07/2011 till 31/10/2011. This was confirmed by reviewing the corrected algorithm, corrected minute data sheet and corrected ER calculation sheet of 2nd monitoring period. The ER calculation sheet of the 3rd monitoring period was also corrected by deduct 171 tCO₂e for correction the amount of ER which was previously claimed during the 2nd monitoring period. The finding is therefore closed.				
8. References to resulting changes in the monitoring report or supporting annexes:					

ER calculation spreadsheet
Section E.4 of the MR

1. Grade / Ref:	CAR 05/ Section E4, Annex E, of the MR Version 2 and ER calculation sheet_ v1	2. Date:	21/05/2012	3. Status:	Closed
4. Requirement	Paragraph 233 of CDM VVS (EB 65 Annex 4) Version 02.0				
5. Nature of the Issue Raised:	The calibration reports of the V-cone flow meters used for measurement of LFG flow enter to the following equipment, as listed below, show average value of percent error are within the maximum permission limit (+0.5%), while percent error in some use ranges are out of this acceptable limit. However the PP concluded that these calibration results are "Pass" without correction of the measured data for the range which have error out of acceptable limit.. • The calibration report of V-cone flow meter for Flare 2 S/N 9062916 (Certificate Number LC1106-080) shown %error for use range of 995.94 Nm3/hr is +0.92%, which is out of acceptable limit. • The calibration report of V-cone flow meter for Flare 3 SN 9061205 (Certificate Number LC1106-075) shown %error for use range of 1,492.54 Nm3/hr is +0.75%, which is out of acceptable limit. • The calibration report of V-cone flow meter for Engine 1 S/N 9062903 (Certificate Number LC1106-025) shown %error for use range of 402.35 Nm3/hr and 602.74 Nm3/hr are +1.42% and +1.08% respectively, which are out of acceptable limit. • The calibration report of V-cone flow meter for Engine 3 S/N 9062907 (Certificate Number LC1106-026) shown %error for use range of 604.19 Nm3/hr is +1.48%, which is out of acceptable limit. • The calibration report of V-cone flow meter for Engine 4 S/N 9062913 (Certificate Number LC1106-027) shown %error for range of 201.90 Nm3/hr and 598.09 Nm3/hr are – 2.88% and +1.50% respectively, which are out of acceptable limit. • The calibration report of V-cone flow meter for Engine 5 S/N 1104-0160 (Certificate Number LC1106-082) shown %error for use range of 398.76 Nm3/hr, 602.61Nm3/hr and 1000 Nm3/hr are +1.86%, +0.82% and – 1.35% respectively, which are out of acceptable limit. • The calibration report of V-cone flow meter for Engine 6 S/N 1104-0159 (Certificate Number LC1106-081) shown %error for use range of 201.78 Nm3/hr, and 800 Nm3/hr are +1.25% and + 0.60% respectively, which are out of acceptable limit. • The calibration report of V-cone flow meter for Engine 7 S/N 9062901 (Certificate Number LC1106-024) shown %error for use range of 401.54 Nm3/hr, 801.34 Nm3/hr, 1600 Nm3/hr, and 2000Nm3/hr are +1.10%, +1.61%, -1.22% and -1.98% respectively, which are out of acceptable limit. • The calibration report of V-cone flow meter for Engine 8 S/N 9062914 (Certificate Number LC1109-045) shown %error for range of 201.34 Nm3/hr is - 0.85% which is out of acceptable limit.				
6. Nature of responses provided by the project participants:	Referring to the V-cone technical specification, the Discharge Coefficient (C_f) is a constant value in the application sizing sheet used to calculate the discharge flow. As per the manufacturer's specifications, in order to get a representative value for C_f for individual Vcone flow meters, an average C_f is used, and the flow				

calculated accordingly.

The Accredited Laboratory performed the calibration according to the manufacturer's guidance and In-house method (based on ISO 5167-1: 2003) and confirms the equipment accuracy interpretation is within an accuracy range of $\pm 0.5\%$. The Accreditation Laboratory clarification memo as provided in the support document.

7. Assessment of such responses:

The accredited calibration laboratory, who calibrated these V-cone flow meters, explains in their confirmation letter that interpretation and judgement method which determine average error from all calibration range as representative %error of V-cone flow meter to compare with a required accuracy range of $\pm 0.5\%$ is correct and in accordance with the V-cone manufacture's manual which instruct using the average Cf (Discharge Flow Coefficient) value. The registered monitoring plan describes that the proposed flow meter for LFG monitoring will work on the differential pressure measurement principle with associated differential pressure gauge having and accuracy of $\pm 0.5\%$. The manufacturer's specification of the applied V-cone flow meters also indicated accuracy of $\pm 0.5\%$ those are confirmed by the accredited laboratory which used the manufacturer's guidance and follows ISO5167-1:2003. Therefore the confirmation that the V-cone meters are within the desired acceptable limits of an accuracy range of $\pm 0.5\%$ is acceptable and is in line with the registered monitoring plan.

8. References to resulting changes in the monitoring report or supporting annexes:

None

1. Grade / Ref:	CAR 06/ MR Version 2 Section E.4 and ER calculation sheet_v1	2. Date:	21/05/2012	3. Status:	Closed
4. Requirement	Paragraph 233 of CDM VVS (EB 65 Annex 4) Version 02.0				
5. Nature of the Issue Raised:	Algorithms used for mass balancing of LFG flow are not fully in accordance with the registered monitoring plan. The result of mass balance by using these algorithms shows that the total LFG flow after mass balanced for several durations is higher than the value of Total LFG flow before mass balance..				
6. Nature of responses provided by the project participants:	The algorithms used for mass balancing LFG flow were corrected to be consistence with the registered monitoring plan and PDD.				
7. Assessment of such responses:	Algorithms used for mass balancing of LFG flow was revised to be in accordance with the registered monitoring plan. This was confirmed by reviewing the revised Minute monitored data sheet that contains the revised mass balance results. . The ER spreadsheet resulted by this corrected minute data presents reduction in total amount of emission reduction in comparison with the earlier version. The ER spreadsheet resulted by this corrected minute data was also reviewed and confirmed to be correct.				
8. References to resulting changes in the monitoring report or supporting annexes:	ER calculation spreadsheet Section E.4 of the MR				

1. Grade / Ref:	CAR 07/ MR Version 2 Section E.4 and ER calculation sheet_v1	2. Date:	21/05/2012	3. Status:	Closed
4. Requirement		Paragraph 244 of CDM VVS (EB 65 Annex 4) Version 02.0			
5. Nature of the Issue Raised:					
Results of flare efficiency determination in some periods does not comply with the condition provided in the tool for the selected option which use the default value for the flare efficiency of the enclosed flares as stated in the registered PDD and applicable “Tool to determine project emissions from flaring gases containing methane”. For example, - Hourly Flare efficiency of Flare 2 during 14/02/2012 04:00:00 which indicated in Annex A (ER Calculation Sheet Version 1) as 90% is incorrect. - Hourly Flare efficiency of Flare 3 during 29/01/2012 13:00:00 which states as 50% efficiency is incorrect - Hourly Flare efficiency of Flare 3 during 18/01/2012 04:00:00, 23/01/2012 08:00:00 and during 31/01/2012 01:00:00 which states in hourly sheet of Annex A of the MR as 90% are also incorrect, These incorrect %flare efficiency also lead to incorrect value of PE_{flare} which was calculated from the determined hourly flare efficiency.					
6. Nature of responses provided by the project participants:					
The algorithm for determining flare efficiency in the system is corrected. Revised emission reduction calculation is submitted.					
7. Assessment of such responses:					
The algorithm applied for the determination of the flare efficiency was revised. This also includes the additional condition to determine whether flow flare is higher than maximum flow rate and whether % methane content is higher than maximum % methane content defined in flare specification provided by the manufacturer. This correction leads to the overall reduction in the ER calculation result in comparison with the earlier version. Review of the revised hourly ER calculation sheet confirms that hourly flare efficiency determination is correct. Therefore this finding can be closed.					
8. References to resulting changes in the monitoring report or supporting annexes:					
ER calculation spreadsheet MR section E.4.					

1. Grade / Ref:	CAR 08/ MR Version 2 Section E.4 and ER calculation sheet_v1	2. Date:	21/05/2012	3. Status:	Closed
4. Requirement	Paragraph 233 of CDM VVS (EB 65 Annex 4) Version 02.0				
5. Nature of the Issue Raised:					

Method implemented for treatment of missing or corrupted data for %CH ₄ , Temperature and Pressure does not comply with process for “Treatment of missing or corrupted data” indicated in the registered PDD.	
6. Nature of responses provided by the project participants:	
Method for treatment of the missing data was corrected to be in accordance with the registered PDD by taking the lower value of the parameter one hour before the error and one hour after, or the average value of parameter from the previous 24 hours if there is evidence that neither of these values is representative.	
7. Assessment of such responses:	
Method implemented for treatment of missing/error data for the monitored parameters i.e %CH ₄ , Temperature and Pressure (Minute monitored data sheet) were reviewed and confirmed to be consistent with the registered monitoring plan. This correction leads to the overall reduction in the ER calculation result in comparison with the earlier version. The team has reviewed this result of ER calculation and confirm to be correct.	
8. References to resulting changes in the monitoring report or supporting annexes:	
ER calculation spreadsheet Section E.4 of the MR	

1. Grade / Ref:	CAR 09/ MR Version 2 Section E.4 and ER calculation sheet_v1	2. Date:	21/05/2012	3. Status:	Closed
4. Requirement		Paragraph 244 of CDM VVS (EB 65 Annex 4) Version 02.0			
5. Nature of the Issue Raised:					
The emission factor (CEF _{elec, BL,y} or EF _{EL}) is not in accordance with the registered PDD.					
6. Nature of responses provided by the project participants:					
The CEF _{elec, BL,y} is corrected to 0.5742 in the revised Monitoring Report, Section E.4 in line with the ex-ante data option for OM and BM.					
7. Assessment of such responses:					
The fixed ex-ante value of CEF _{elec, BL,y} (or EF _{EL}) is correctly applied in Section E.4. of the revised MR and ER calculation sheet. This lead to increasing of BE _{elec, y} (Baseline emission for exported electricity) from 10,712 tCO ₂ e to be 12,030 tCO ₂ e and increasing of PE _{EC,y} (Project emission from imported electricity) from 1.86 tCO ₂ e to be 2.09 tCO ₂ e. In conclusion the effect of correcting the value of the CEF _{elec, BL,y} by applying the fixed ex-ante value as provided in the registered PDD results in increasing of 1,317.77 tCO ₂ e emission during this monitoring period in comparison with the previous calculation version. However, this is considered to be correct as comply with the registered PDD. Therefore this finding can be closed.					
8. References to resulting changes in the monitoring report or supporting annexes:					
Section E.4. of the MR ER calculation spreadsheet					

1. Grade / Ref:	CAR 10/ MR Version 2 Section E.4., Annex E and ER calculation sheet_v1	2. Date:	21/05/2012	3. Status:	Closed
4. Requirement	Paragraph 233 of CDM VVS (EB 65 Annex 4) Version 02.0				
5. Nature of the Issue Raised:	The calibration of Gas analyser S/N 31426 was done on 03/06/2011 by MIT Co., Ltd., the accredited lab accredited by TLAS (The Thai Laboratory Accreditation Scheme, Thai Industrial Standards Institute). However, its accreditation scope does not include calibration of gas analyser. The PP need to clarify how to ensure that this calibration laboratory has capability to calibrate gas analyser according to the manufacture's specification.				
6. Nature of responses provided by the project participants:	Laboratory (MIT) has confirmed that the Gas analyser calibration method follows the manufacture's specification. The MIT's clarification letter is provided in support document.				
7. Assessment of such responses:	Refer to the registered monitoring plan of methane fraction in landfill gas which described that "Analysers will be calibrated according to the manufacturer's specifications" and confirmation letter dated 23/05/2012 from the calibration laboratory states that they have calibrated the gas analyser following the manufacturer's specification. The requirement of the registered monitoring plan does not require that the calibration shall be done by accredited lab, but the registered monitoring plan described "Analysers will be calibrated according to the manufacturer's specification and subject to a regular maintenance in accordance to manufacturer's recommendation". Although, this lab is not accredited for calibration of the specific type of the analyser, it is an accredited calibration lab by TLAS (Thai Laboratory Accreditation Scheme; Thai Industrial Standard Institute) and has facility for similar calibration. Verification team also confirmed from the maintenance record verified at the site visit that the gas analyser is being subjected to regular maintenance as per the manufacturer's recommendation. Therefore it is accepted that the laboratory has necessary resources and management system in place to have good laboratory practice as required and the calibration of the gas analyser is as per the registered monitoring plan.				
8. References to resulting changes in the monitoring report or supporting annexes:	None				

1. Grade / Ref:	CAR 11/ MR Version 3	2. Date:	13/06/2012	3. Status:	Closed
4. Requirement	• Paragraph 225(b) of CDM VVS (EB 65 Annex 4) Version 02.0 • Paragraph 197 of CDM Project Standard (EB 65 Annex 5) Version 01.0 • Guidelines for completing the monitoring report form (EB66 Annex 20)Version 2.0 • Monitoring Report Form (F-CDM-MR) Version 02.0				
5. Nature of the Issue Raised:	Base on completeness check of the MR Version 3, the following are not in conformance with the “Guidelines for completing the monitoring report form” as per Annex20 to EB66. 1. The UNFCCC logos are missing in each page headers of the MR, which is not in accordance with paragraph 11 to Annex 20 of EB66. Though the logos are provided on the header of MR pages 24 and 29, these are not in line with the MR form (F-CDM-MR Version 02.0) 2. The MR shows two Sectoral Scopes (Scope 1 and Scope 13) while only Sectoral scope 13 is applicable as stated in the UNFCCC webpage for this project activity. 3. The footnote in page 1 is not applicable 4. Different fonts used in the MR at many places that is not in accordance with paragraph 11 to Annex 20 of EB66. 5. Symbol for the unit of temperature used in MR is not in recognised format 6. The equation provided in Section E of the MR includes equation reference number (1) to (9) and (12) to (13) without equation reference no. (10) & (11) 7. Reference to electronic spread sheet of $TDL_{j,y}$ determination is not provided in the section E.2 of MR. 8. The statement provided under section E.3 of the MR that “leakage effects need to be accounted under ACM0001 version 11” is not consistence with the registered PDD.				
6. Nature of responses provided by the project participants:	The corrections were made as shown in the revised MR				
7. Assessment of such responses:	The monitoring report was revised to address the issues. This revised Monitoring report is found to be in accordance with the “Guidelines for completing the monitoring report form”				
8. References to resulting changes in the monitoring report or supporting annexes:	All respective pages, sections of the MR as mentioned in the finding statement.				

1. Grade / Ref:	CL 01/ MR Version 2 Section D.2.	2. Date:	21/05/2012	3. Status:	Closed
4. Requirement	Paragraph 233 of CDM VVS (EB 65 Annex 4) Version 02.0				
5. Nature of the Issue Raised:	Whilst the registered PDD required calibration of gas analyzer according to the manufacturer's specification. The PP has also performed monthly zero check and monthly gas span using certified standard gas in addition of annual calibration by the external laboratory. The PP need to clarify how to ensure that this monthly gas span and adjustment using certified standard gas follows the instruction provided by the manufacturer.				
6. Nature of responses provided by the project participants:	The gas analyzer calibration is annually calibrated by the accredited laboratory accordingly to the Manufacturer's specification. The used Gas Analyzer is valid and meets with the $\pm 2.0\%$ Full Scale Deflection as present in the calibration certificate. The monthly span check is the regular maintenance check in accordance with the manufacturer's recommendation. It shall be clarified that the standard methane gas, certificate cylinder 1665482 has "the uncertainty estimate (ISO GUM compliant) with a confidential level of 95%, and a coverage factor (k) equal to 2". Barometric pressure isn't used, because the local barometric pressure variance is very small with the pressure value is around 1007~1010mBar, and therefore the effect on calibration/accuracy being very small indeed. The pressure effect correction according to equation in the manual is around 1.02. The true reading = display $\times (1.009 \sim 1.002)$. Therefore, the difference is minimum. The formula is presented below. All factory calibrations take into account the pressure when the calibration is made and normalise the readings so that the instrument would read correctly for standard sea level pressure of 1013.25 mBar (101.325 kPa). It is possible to obtain the true reading from the display value using : $True \%v / v = Display \times \left\{ \frac{P_0}{1.5 \times P - 0.5 \times P_0} \right\} = Display \times \left\{ \frac{1013.25}{1.5 \times P - 506.62} \right\}$ where P = ambient pressure (mBar) $P_0 = 1013.25 \text{ mBar}$				
7. Assessment of such responses:	Base on the PP explanation above and on the site visit, the team confirmed that this monthly gas span and calibration has been done by qualified staff, who was				

trained on this calibration method by the gas analyzer's manufacturer. The valid certified standard methane gas has been used for this purpose. This confirms that the PP has calibrated the gas analyzer according to the manufacturer's specification. Though the barometric pressure has not been used, this does not effect to the monitoring results due to the following reason:

Considering the local ambient atmospheric pressure during November 2011 – March 2012, the results show that this pressure was in the range 1003 – 1021 mBar. After re-checked with the manufacturer's user manual, the minimum and maximum error that came from the calibration without using ambient atmospheric pressure was -1.1 and +1.5%, respectively. When combined this error to the analyzer's error, the overall error of this measurement was still in its accuracy range. Therefore this finding can be closed.

8. References to resulting changes in the monitoring report or supporting annexes:	
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None

1. Grade / Ref:	CL 02/ MR Version 2 Section D.2.	2. Date:	21/05/2012	3. Status:	Closed
4. Requirement	Paragraph 233 of CDM VVS (EB 65 Annex 4) Version 02.0				
5. Nature of the Issue Raised:	Please clarify why the value of Operation Hours of the energy plant indicated in Section D.2. of the MR Version 2 for Engine 2, 3, 5, 6, 7 and 9 are inconsistent with the value recorded in operating log book and the Excel sheet which record total operating hours of each engine which values was read at the end of this monitoring period.				
6. Nature of responses provided by the project participants:	The revised Operation Hours of the energy plant in Section D.2 are corrected (accordingly to actual engine manual reading log sheet) in the Monitoring Report.				
7. Assessment of such responses:	Value of Operation hour of the energy plant in Section D.2. of the MR was revised to present the operation hours of the respective generator sets during the current monitoring period. This is in accordance with the value read from the run meter of each generator set reading from SCADA at the end of this monitoring period.				
8. References to resulting changes in the monitoring report or supporting annexes:	Section D.2 of the MR				

1. Grade / Ref:	CL 03/ MR Version 2 Section B.1	2. Date:	21/05/2012	3. Status:	Closed
4. Requirement	Paragraph 225 (b) of CDM VVS (EB 65 Annex 4) Version 02.0				
5. Nature of the Issue Raised:	The following discrepancies noted in the MR Version 2 need clarification <u>Section B.1.</u> - Rated power for Generator set provided in Section B.1. of the MR is not correct. <u>Annex D</u> - The model of V-cone flow meter used for measurement of LFG total which provided in Annex D is not correct - Model of V-Cone flow meter used for measurement of LFG Flare was provided in Annex D as two models, while the PP has not used V-cone flow meter model RVM-VS08IJJF63N2 for measurement quantity of LFG flare during this monitoring period. - The name of Manufacturer of Type N Thermocouple 32-N-LS-176-6.0-2I-TXLIN/EXI is incorrectly indicated. <u>Annex E</u> - Serial Number of Thermocouple are incorrectly indicated for S/N22641C/2, S/N22641C/3, S/N22641C/1 - Note C: End date of equipment was incorrectly indicated. - Note D: It was indicated that the instrument did not operate until 20120704 (4 July 2012), while the current period is March 2012 and July 2012 has not come yet.				
6. Nature of responses provided by the project participants:	<u>Section B.1 :</u> - The rated power for Generator set is corrected to 1500 r/minute. The monitoring report section B.1 is corrected accordingly. <u>Annex D :</u> - The model of V-cone flow meter of LFG total is corrected from KVS14IIKC23FSN to KVS14IIKD23FSN - The Model V-cone flow meter used for measurement of LFG Flare was only one model. The used model RVM-VS08IJJF63N2 is taken out of the monitoring report. - The name of Manufacturer of Type N Thermocouple 32-N-LS-176-6.0-2I-TXLIN/EXI is corrected to Uniflare (from TC.Ltd.) <u>Annex E :</u> - The Serial Numbers of Thermocouple in Monitoring Report are S/N22641C/2, S/N22641C/3, S/N22641C/1. - Note C, indicated that Flare#1 did not operate between 20111221 until 20120319. The equipment end data in Annex E only indicates Thermocouple TTC 9393A and TTC 9393 B installation end period, which refers to verification end period 20120331.				

- Note D, The Flare#2 did not operate from 20111218 until 20120104. The ending date of the period is corrected from 20120704 to 20120104.

7. Assessment of such responses:

All error in the MR which mentioned in this detail finding statement were corrected as confirmed from the revised MR.

8. References to resulting changes in the monitoring report or supporting annexes:

Section B.1., Annex D and Annex E of the MR