



Verification and certification report form for CDM project activities

(Version 01.0)

Complete this form in accordance with the "Attachment: Instructions for filling out the verification and certification report form for CDM project activities" at the end of this form.

VERIFICATION AND CERTIFICATION REPORT

Title of the project activity	Bangkok Kamphaeng Saen East: Landfill Gas to Electricity Project
Reference number of the project activity	UNFCCC ID: 3462 TN P-No. : MY-PVer 15/13 – 15/136
Version number of the verification and certification report	1.1
Completion date of the verification and certification report	22/04/2016
Monitoring period number and duration of this monitoring period	Monitoring Period Number: 6 Monitoring Period: 01-11--2014 to 31-10-2015 (including both days)
Version number of monitoring report to which this report applies	4.0
Crediting period of the project activity corresponding to this monitoring period	21-01-2011 to 20-01-2018 (including both days)
Project participant(s)	Bangkok Greenpower Co., Ltd. Xentolar Holdings Limited Sindicatum Carbon Capital Ltd.
Host Party	The Kingdom of Thailand
Sectoral scope(s), selected methodology(ies), and where applicable, selected standardized baseline(s)	13: ACM0001 ver. 11 - Consolidated baseline and monitoring methodology for landfill gas project activities
Estimated GHG emission reductions or net anthropogenic GHG removals for this monitoring period in the registered PDD	230,940 t CO ₂ e
Certified GHG emission reductions or net anthropogenic GHG removals for this monitoring period	398,735 t CO ₂ e
Name of DOE	TÜV NORD CERT GmbH

Name, position and signature of the approver of the verification and certification report	 Rainer Winter Final Approver
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SECTION A. Executive summary

Xentolar Holdings Limited has commissioned the TÜV NORD JI/CDM Certification Program to carry out the 6th periodic verification of the project:

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

with regard to the relevant requirements for CDM project activities.

This verification covers the period from 01-11-2014 to 31-10-2015 (including both days).

The project reduces GHG emissions due to avoidance of methane emission from Landfill which the gas is recovered and utilized for electricity generation. Excess gas is destroyed in three enclosed ground flares.

Details of the project location are given in table A-1 below:

Table A-1: Project Location

No.	Project Location
Host Country	Kingdom of Thailand
Region:	Nakhon Pathom Province
Project location address:	T. Sasimhum, A. Kamphaeng Saen
Latitude:	14° 03' 50.62" N
Longitude:	99° 56' 50.96" E

The project activity is a fully integrated renewable energy power generation project with LFG collection system installed and operating.

The electricity generation capacity of the project is 8 MW consisting of 8 units of 1.063 MW gas engines exporting approx. 57,000 MWh/y to the Thai national grid.

Basic technical details of the project are summarized in table A-2.

Table - A-2: Technical data of the project activity

Parameter / Item	Unit / Details	Value
Generator		
Type	Model	Jenbacher JGS320 engines
Electrical efficiency	%	40
Capacity	MW	1.063
No. of Genset	-	8
Flare		
Type	-	Enclosed Flare
Capacity	Nm ³ /h	300 - 2,000
Flare temperature	°C	500-1200
Methane combustion efficiency	%	>98
No. of Flares	-	3

As a result of this verification, the verifier confirms that:

- all operations of the project are implemented and installed as planned and described in the validated project design document.
- the monitoring plan is in accordance with the applied approved CDM methodology, i.e., ACM0001 ver. 11.0
- the installed equipment essential for measuring parameters required for calculating emission reductions are calibrated appropriately.
- the monitoring system is in place and functional. The project has generated GHG emission reductions.

As the result of the 6th periodic verification, the verifier confirms that the GHG emission reductions are calculated without material misstatements in a conservative and appropriate manner. TÜV NORD JI/CDM CP herewith confirms that the project has achieved emission reductions in the above mentioned reporting period as follows:

Emission reductions: 398,735 tCO₂e

SECTION B. Verification team, technical reviewer and approver**B.1. Verification team member**

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)	Involvement in			
						Desk review	On-site inspection	Interview(s)	Verification findings
1.	Team Leader / Verifier / Technical Expert	EI	Cheong	Chun Yuen (Robert)	TUV NORD Malaysia	x	x	x	x

B.2. Technical reviewer and approver of the verification and certification report

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)
1.	Technical reviewer	EI	Lubanga	David	
2.	Technical reviewer	IR	Winter	Stefan	TÜV NORD CERT GmbH
3.	Approver	IR	Winter	Rainer	TÜV NORD CERT GmbH

SECTION C. Application of materiality**C.1. Consideration of materiality in planning the verification**

In order to ensure a complete, transparent and timely execution of the verification task the team leader has planned the complete sequence of events necessary to arrive at a substantiated final verification opinion.

Various tools have been established in order to ensure an effective verification planning.

Materiality Threshold

The verification is based on the materiality threshold identified in table C-1 below:

Table C-1: Applied Materiality Threshold

	Threshold	Related to
☐	0.5 %	Emission reductions or removals for registered CDM project activities achieving a total emission reduction or removal equal to or more than 500,000 tonnes of carbon dioxide equivalent per year ¹ ;
☒	1 %	Emission reductions or removals for registered CDM project activities achieving a total emission reduction or removal of between 300,000 and 500,000 tonnes of carbon dioxide equivalent per year;
☐	2 %	Emission reductions or removals for registered large-scale CDM project activities achieving a total emission reduction or removal of 300,000 tonnes of carbon dioxide equivalent per year or less;

¹ A year refers to a period of 12 consecutive months.

	Threshold	Related to
☐	5 %	Emission reductions or removals for registered small-scale CDM project activities other than registered CDM project activities covered under next category below;
☐	10 %	Emission reductions or removals for the type of registered CDM project activities referred to in decision 3/CMP.6, paragraph 38 (referred to as microscale project activities).

Strategic Analysis

At the beginning of the verification the verification team leader has assessed the nature, scale and complexity of the verification tasks by carrying out a strategic analysis of all activities relevant to the project activity.

Risk analysis and detailed audit testing planning

For the identification and assessment of potential reporting risks and to determine the necessary detailed audit testing procedures for residual risk areas the following table is used.

No.	Risk that could lead to material errors, omissions or misstatements	Assessment of the risk		Response to the risk in the verification plan and/or sampling plan
		Risk level	Justification	
1.	Transfer of raw data in server to ER spreadsheet	Medium	Error caused by computer software incompatible	During onsite visit interview CDM coordinator and VP Compliance another computer system will be used to reduce the error for data transfer.

On the basis of the risk analysis the verification has been planned. A detailed audit / verification plan has been prepared and submitted to the project participant(s) in due time before the site visit.

C.2. Consideration of materiality in conducting the verification

Based on the verification planning the verification has been carried out. The concept of materiality has been considered. A breakdown of the chosen approaches is included in the following table.

Parameter	Approach ⁺	Errors* detected	Findings reference	Correc- ted	Remaining verification risk
LFG _{total,y}	CDC	☐		☐	Not material
LFG _{flare,y}	CDC	☐		☐	Not material
LFG _{electricity,y}	CDC	☐		☐	Not material
PE _{flare,y}	CDC	☐		☐	Not material
ω _{CH4,y}	CDC	☐		☐	Not material
T	CDC	☐		☐	Not material
P	CDC	☐		☐	Not material
EL _{LFG}	CDC	☐		☐	Not material
EL _{import}	CDC	☐		☐	Not material
Operation of the energy plant	CDC	☐		☐	Not material
T _{flare}	CDC	☐		☐	Not material
Aggregate					Materiality threshold not exceeded

*) incl. omissions and misstatements

^{+) Verification Approaches:}

CDC:	Complete data check of data including all data aggregation steps
NDC:	Non-complete data check – omissions not material
SPL:	Sampling approach (all data available)
ASP:	Acceptance Sampling
COM:	Data check at higher data aggregation levels and sampling at original data levels

The verification was basically carried out as per the verification plan. However, based on the actual situation on-site and the errors, omissions and misstatements identified during the verification minor deviations from the original plan occurred. However, due to the insignificance no major revision of the overall plan was required. Esp. there was no need for significant modification of the sampling approaches.

SECTION D. Means of verification

D.1. Desk review

During the desk review all documents initially provided by the client and publicly available documents relevant for the verification were reviewed. The main documents are listed below:

- the last revision of the PDD including the monitoring plan^{/PDD2/},
- the last revision of the validation report^{/VAL/},
- documentation of previous verifications^{/VER/}
- the monitoring report, including the claimed emission reductions for the project^{/MR/},
- the emission reduction calculation spreadsheet^{/ER/}.

Other supporting documents, such as publicly available information on the UNFCCC website and background information were also reviewed.

D.2. On-site inspection

Duration of on-site inspection: 08/12/2015 to 09/12/2015				
No.	Activity performed on-site	Site location	Date	Team member
1.	Opening Meeting, Plant Inspection, MR review, calibrations records	Kamphaeng Sean	08/12/2015	Cheong, Chun Yuen (Robert)
2	Generation records, ER, document review, Reporting & closing meeting		09/12/2015	

D.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Sangchai	Pongsthon	Bangkok Greenpower / CDM Coordinator /IM01/	08/12/2015 09/12/2015	Site Inspection, Calibration reports, Review of MR, ER calculation, Raw Data in server, Secondary data in ER spreadsheet, Downtime / Operation	Cheong, Chun Yuen (Robert)
2	Pulnil	Rachaneewan	Bangkok Greenpower / VP Compliance /IM01/			
3	Mariyappan	Jay	Sindicatum Sustainable Resources /			

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
			Managing Director /IM02/		records, Electricity invoices, data archiving	
4	Chancharoenkot	Pantip	Khampaeng Sean East & West Landfill / General Manager /IM03/	09/12/2015	Landfill operation	

D.4. Sampling approach

D.4.1 Sampling during monitoring

☒	No sampling approach has been used by the PP to determine the monitored parameters				
☐	A sampling approach has been taken for the following monitored parameter(s):				
	Parameter	Sampling approach ¹⁾	Sampling Type ²⁾	Population	Sample Size

¹⁾ Sampling Approaches:

SiRS: Simple Random Sampling
 StRS: Stratified Random Sampling
 SS: Systematic Sampling
 CS: Cluster Sampling
 MSS: Multi-stage Sampling

²⁾ Sampling Types:

PS: Parameter Sampling

D.4.2 Sampling approaches during verification

☒	No sampling approach has been used by the VT to verify the monitored parameters				
☐	A sampling approach has been applied by the VT for the following monitored parameter(s):				
	Parameter	Sampling approach ¹⁾	Sampling Type ²⁾	Population	Sample Size
	Name_of Parameter:	SiRS	PS		
	Name_of Parameter:	StRS	AS		
	Name_of Parameter:	StRS	AS		

¹⁾ Sampling Approaches:

SiRS: Simple Random Sampling
 StRS: Stratified Random Sampling
 SS: Systematic Sampling
 CS: Cluster Sampling
 MSS: Multi-stage Sampling

²⁾ Sampling Types:

AS: Acceptance Sampling
 PS: Parameter Sampling
 COM: Full data check at higher data aggregation levels and sampling at original data levels

D.5. Clarification requests, corrective action requests and forward action requests raised

Areas of verification findings	No. of CL	No. of CAR	No. of FAR
Compliance of the monitoring report with the monitoring report form (E.1)	0	0	0
Compliance of the project implementation with the registered PDD (E.3)	0	1	0
Post-registration changes (E.4)	0	0	0
Compliance of the monitoring plan with the monitoring methodology including applicable tool and standardized baseline (E.5)	0	0	0
Compliance of monitoring activities with the registered monitoring plan (E.6)	0	2	0
Compliance with the calibration frequency requirements for measuring instruments (E.7)	0	0	0
Assessment of data and calculation of emission reductions or net removals (E.8)	0	0	0
Others (please specify)	0	0	0
Total	0	3	0

SECTION E. Verification findings

E.1. Compliance of the monitoring report with the monitoring report form

Means of verification	A draft monitoring report was submitted to the verification team by the project participants. The DOE has made this report publicly available prior to the start of the verification activities. No comments were received. By means of the UNFCCC website it has been checked whether the latest applicable MR template CDM-MR-FORM has been used. Further it has been checked whether the latest instructions for filling out the MR template have been followed. Every section has been checked against the respective guidance. The following sources of information have been used in this context: • /MR/ • /MRT/ • /unfccc/	
Findings	☐ ☐ ☐	The latest reporting template CDM-MR-FORM as listed on the UNFCCC website has been used for the Monitoring Report to be uploaded. The latest instructions for filling out the MR have been followed. No adverse finding has been identified in the course of this verification. The respective requirements have widely been complied with; however; the following issues needed to be addressed in this context:
Conclusion	☒ ☐	No CARs / CLs have been raised in this context. No correction was required in the context. The project is in line with the respective requirements. The raised CARs / CLs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings could be

		closed out. For details please refer to Appendix 4.
	The verification team has checked all sections of the MR and confirms by means of comparing the MR that has been used with the standardized MR template.	

E.2. Remaining forward action requests from validation and/or previous verification

During the validation the validating DOE might have raised issues that could not be closed or resolved during the validation stage. For this purpose FARs might have been raised. Likewise FARs might have been raised in the course of previous verifications.

In the course of this verification the latest version of the PDD ^{/PDD2/} and the previous verification report ^{/VER/}, where applicable, have been checked in order to identify any remaining forward action requests. For the current monitoring period the following applies:

(i) Open issues from validation:

☐	There were no open issues which have been addressed in the latest version of the validation report.
☒	All open issues from the validation have been appropriately addressed in the context of previous verifications.
☐	All issues related to the validation have been appropriately addressed in the course of the current monitoring period (for details please refer to appendix 4)
☐	The following issues related to the validation have not yet been appropriately addressed (for details please refer to appendix 4):
	- N/A

(ii) Open issues from previous verifications:

☐	N/A – as this is the first monitoring period for this CDM project activity.
☒	There were no open issues which have been addressed in the previous verification report
☐	All issues related to the previous verification have been appropriately addressed in the course of the current monitoring period (for details please refer to appendix 4)
☐	The following issues related to the previous verification have not yet been appropriately addressed (for details please refer to appendix 4):
	- N/A

E.3. Compliance of the project implementation with the registered project design document

Means of verification	The onsite assessment was carried out on 08/12/2015 to 09/12/2015. On the basis of this site visit and the reviewed project documentation it can be confirmed that with regards to the realized technology, the project equipment, as well as the monitoring and metering equipment, the project has been implemented and operated as described in the approved revised / registered PDD. ^{/PDD1/PDD2/} During the onsite assessment it could be observed that the project activity captures landfill gas (LFG) from the Bangkok Kampheang Saen East landfill to generate electricity for export to the Thailand National Grid. The project activity was registered as a CDM project on 21/01/2011. The project activity has requested a post registration change during monitoring period 3 which was approved by UNFCCC EB on 08/02/2013. The project activity applies the renewable 7 years crediting period with the first crediting period from 21/01/2011 till 20/01/2018. The monitoring period for this reporting is from 01/11/2014 to 31/10/2015 (both dates inclusive).
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	The LFG recovery and flaring was fully commission since 25/06/2010. The gas engines were commissioned in stages. The first engine has been commissioned and started operation since 18/05/2010 and the last engine (engine number 8) was commissioned and started operation since 27/01/2012. The project activity was considered to be fully commissioned and operated since 27/01/2012. The equipment installed for the project activity is as per Table A-2 above. During the onsite assessment, the verification team has inspected the gas engines / generators, flaring systems, transformers and other peripheral equipment to confirm that there are no changes during this monitoring period. The project is implemented and the equipment specifications were in accordance with the description in the registered / approved revised PDDs. /PDD1/PDD2/ The electricity generated using the LFG was exported to the Thailand National Grid (EGAT / PEA). The verification team has checked and verified the invoices to confirm the amount of electricity exported and imported for this monitoring period. The project activity imports electricity from the Thai Grid during the non-operational hours. /E1/E2/ Interviews with operational personnel have been carried out, generation records, equipment / instrument specifications, calibration records, operation records were checked in this context. The following sources of information have been used in this context: • /PDD2/ • /MR/ • /VVS/ • /ER/ • /C1-C7/ • /E1/E2/ • /EI1-EI8/ • /MD1- MD6/ • /QA1/ • /O1/O2/O4/ • /MTR/ • /IM01/ • /unfccc/										
Findings	<table border="1"> <tr> <td data-bbox="456 1570 531 1675">☒</td> <td data-bbox="531 1570 1412 1675">The project has been implemented as described in the latest version of the PDD as well as in section B.1 of the monitoring report. No deviations thereof have been identified in the course of this verification.</td> </tr> <tr> <td data-bbox="456 1675 531 1832">☐</td> <td data-bbox="531 1675 1412 1832"> The following deviations from the registered / approved project design and or the project description in the MR have been identified in the course of this verification (for further details please refer to section E.4): - N/A </td> </tr> <tr> <td data-bbox="456 1832 531 1937">☒</td> <td data-bbox="531 1832 1412 1937"> In this context the following CARs, CLs have been raised: Refer CL.E3-01 raised in appendix 4 </td> </tr> <tr> <td data-bbox="456 1937 531 2033">☒</td> <td data-bbox="531 1937 1412 2033"> <i>In case of phased implementation:</i> N/A </td> </tr> <tr> <td data-bbox="456 2033 531 2072">☐</td> <td data-bbox="531 2033 1412 2072">The phased implementation has correctly and in sufficient detail been</td> </tr> </table>	☒	The project has been implemented as described in the latest version of the PDD as well as in section B.1 of the monitoring report. No deviations thereof have been identified in the course of this verification.	☐	The following deviations from the registered / approved project design and or the project description in the MR have been identified in the course of this verification (for further details please refer to section E.4): - N/A	☒	In this context the following CARs, CLs have been raised: Refer CL.E3-01 raised in appendix 4	☒	<i>In case of phased implementation:</i> N/A	☐	The phased implementation has correctly and in sufficient detail been
☒	The project has been implemented as described in the latest version of the PDD as well as in section B.1 of the monitoring report. No deviations thereof have been identified in the course of this verification.										
☐	The following deviations from the registered / approved project design and or the project description in the MR have been identified in the course of this verification (for further details please refer to section E.4): - N/A										
☒	In this context the following CARs, CLs have been raised: Refer CL.E3-01 raised in appendix 4										
☒	<i>In case of phased implementation:</i> N/A										
☐	The phased implementation has correctly and in sufficient detail been										

		described in the latest version of the PDD.
	☐	The description in section 3.1 of the MR differs in content or the level of detail from the latest version of the PDD. However, the description in the MR is correct and reflects the situation during the site inspection.
	☐	The project description in the PDD / MR is not deemed sufficient. The detailed implementation timeline is as follows: N/A
Conclusion	☐	No CARs / CLs have been raised in this context. No correction was required in the context. The project is in line with the respective requirements.
	☒	The raised CARs / CLs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings could be closed out. For details please refer to Appendix 4.
	It could be concluded by means of site visit, document check and interview it could be verified that the project is implemented and operated in line with the registered PDD and the applied methodology.	

E.4. Post-registration changes

- ☒ By means of site visit, document check and interview it could be verified that the project is implemented and operated in line with the registered PDD and the applied methodology.
- ☐ Post registration changes have been identified and are assessed in detail in the subsequent steps E.4.1 to E.4.7.

E.4.1. Temporary deviations from the registered monitoring plan, monitoring methodology or standardized baseline

It has been checked whether Temporary deviations from the registered monitoring plan (TDfrMP) or Temporary deviations from monitoring methodology or standardized baseline (TDfMM) have been applied during this monitoring period. The result is summarized in the table below.

☒	No Temporary deviations from the registered monitoring plan (TDfrMP) or Temporary deviations from monitoring methodology or standardized baseline (TDfMM) have been submitted to the UNFCCC prior to the current monitoring period.		
☐	The following TDfrMP or TDfMM have been approved or are under approval by the UNFCCC		
	1	Title	
		Status	☐ under approval; ☐ approved (approval No.:)
		Appr. date	
		Ref. No.	
	2	Title	
		Status	☐ under approval; ☐ approved (approval No.:)
		Appr. date	
		Ref. No.	
☒	During the verification of the current MP no need for a TDfrMP or TDfMM has been identified. The monitoring plan is in accordance with the approved methodology applied by the PA		
☐	An approval of the following TDfrMP or TDfMM is to be requested from the EB for the current MP as appendix 1 of the project standard does not apply. Please refer to the related PRC report submitted along with this issuance request for further details w.r.t. the assessment of the PRC.		
	1	Issue:	

	2	Issue:	
☐	The following TDfrMP or TDfMM for which appendix 1 of the PS is applicable have been applied:		
	1	Issue:	
	2	Issue:	

E.4.2. Corrections

It has been checked whether any corrections to project information or parameters fixed at validation have been approved during this monitoring period or submitted with this monitoring report. The result is summarized in the table below.

☒	During the verification of the current MP no need for corrections has been identified.		
☐	The following corrections have been applied:		
	1	Issue:	
	2	Issue:	
	The PDD has been revised accordingly: (New) version No.: Revision date:		
	It is confirmed that the updated / corrected information is an accurate reflection of the actual project information and that the corrected parameters are in accordance with the applied methodology and the monitoring plan.		
	☐ A related post registration change has been submitted prior to the issuance request. The approval has been received on DD/MM/YYYY via approval number PRC-XXXX-00Z. ☐ A related post registration change is submitted along with this issuance request. Please refer to the related PRC report submitted along with this issuance request for further details w.r.t. the assessment of the PRC.		

E.4.3. Changes to the start date of the crediting period

☒	N/A - as this is not the first verification within the crediting period
☐	The PPs do not intend to change the start date of the crediting period.
☐	As the change in the start date was below the related time period as indicated in PS § 277 and § 278 no prior approval was required but only a notification. This notification has been submitted by the PP without involvement of the DOE. The change and new start date has been checked from the related UNFCCC project webpage.
☐	The PPs intend to change the start date of the crediting period. As the intended change in start date beyond the related time period as indicated in PS § 279 prior approval by the Board is required. For detailed assessment of the change please refer to related PRC validation report. As per assessment in this report the DOE confirms that the change to the start date of the crediting period are in line with the related requirements of the VVS and PS.
☐	The approval to change the start date of the crediting period has been received on DD/MM/YYYY via approval number PRC-XXXX-00Z

E.4.4. Inclusion of a monitoring plan to a registered project activity

☒	N/A - as this monitoring plan was part of the registered PDD
☐	In line with PS § 281 or § 282 the PP has forwarded a monitoring plan to the DOE for validation.

	No prior approval of the monitoring plan was required as the PP in line with PS § 282 wished to submit the monitoring plan together with the request for issuance for the first monitoring period. Please refer to the related PRC report submitted along with this issuance request for further details w.r.t. the assessment of the PRC..
☐	In line with § 282 the PP submitted a monitoring plan prior to the submission of the request for issuance for validation to the DOE. A DOE has assessed the monitoring plan in line with related VVS requirements and submitted a related PRC report for prior approval. The approval has been received on DD/MM/YYYY via approval number PRC-XXXX-00Z.

E.4.5. Permanent changes from registered monitoring plan, monitoring methodology or standardized baseline

It has been checked whether any permanent changes from the registered monitoring plan (PCfrMP) or applied methodologies (PCfMM) including standardized baselines (PCfSB) have been approved prior or during this monitoring period or submitted with this monitoring report. The result is summarized in the table below.

☐	No PCfrMP, PCfMM or PCfSB have been submitted to the UNFCCC prior to the current monitoring period		
☒	The following PCfrMP, PCfMM or PCfSB have been approved or are under approval by the UNFCCC		
	1	Title	Add parameters related to the monitoring of project emissions from temporary fossil fuel consumption
		Status	☐ under approval; ☒ approved
		Appr.date	08/02/2013
		Ref. No.	PRC-3462-001
	2	Title	
		Status	☐ under approval; ☐ approved
		Appr.date	
		Ref.No.	
☒	During the verification of the current MP no need for a PCfrMP, PCfMM or PCfSB has been identified. The monitoring plan is in accordance with the approved methodology applied by the PA		
☐	An approval of the following PCfrMP, PCfMM or PCfSB is to be requested from the EB for the current MP as appendix 1 of the project standard does not apply.		
	1	Issue:	
	2	Issue:	
☐	The following PCfrMP, PCfMM or PCfSB for which appendix 1 of the PS is applicable have been applied:		
	1	Issue:	
	2	Issue:	

E.4.6. Changes to the project design of a registered project activity

It has been checked whether any changes to the project design (CoPD) have been approved prior or during this monitoring period or submitted with this monitoring report. The result is summarized in the table below.

☐	No CoPD has been submitted to the UNFCCC prior to the current monitoring period
☒	The following CoPD have been approved or are under approval by the UNFCCC

	1	Title	Use of a diesel generator when there is no on-site electricity and no availability of electricity from the grid
		Status	☐ under approval; ☒ approved
		Appr.date	08/02/2013
		Ref. No.	PRC-3462-001
	2	Title	
		Status	☐ under approval; ☐ approved
		Appr.date	
		Ref.No.	
☒	During the verification of the current MP no need for a CoPD has been identified. The monitoring plan is in accordance with the approved methodology applied by the PA		
☐	An approval of the following CoPD.is to be requested from the EB for the current MP as appendix 1 of the project standard does not apply.		
	1	Issue:	
	2	Issue:	
☐	The following CoPD for which appendix 1 of the PS is applicable have been applied:		
	1	Issue:	
	2	Issue:	

E.4.7. Types of changes specific to afforestation and reforestation project activities

☒	N/A - as this monitoring plan was part of the registered PDD
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E.5. Compliance of monitoring plan with the monitoring methodology including applicable tool and standardized baseline

Means of verification	The monitoring report and emissions reduction calculations are in line with the requirements of the approved revised PDD version 9.0 monitoring plan as well as with the applied methodology ACM0001 version 11.0. The reporting procedures reflect the requirements of the approved revised monitoring plan. The LFG captured, flared and combusted in the gas engines to generate electricity for export were recorded continuous and consolidated once every month. By means of comparison of the MR with (i) the applied CDM methodology (ii) all applicable CDM Meth tools The verification team has checked whether the MP is in compliance with the MP related requirements of the applied methodology & tools The following sources of information have been used in this context: • /MR/ • /ACM1/ • /TA/TEC/TEF/TF/TFF/TW/ • /unfccc/	
Findings	☒	The MP is completely in accordance with the approved methodology applied by the CDM project (last registered/approved version of the PDD)

	☒	The breakdown of MP accordance of the referenced tools is as follows:		
		1	Title (of the tool)	Tool for the demonstration and assessment of additionality
			Version	5.2
			MP compliance	☐ full compliance ☐ findings have been raised ☒ N/A (for MP)
		2	Title (of the tool)	Tool to determine project emissions from flaring gases containing methane
			Version	1
			MP compliance	☒ full compliance ☐ findings have been raised ☐ N/A
		3	Title (of the tool)	Tool to calculate the emission factor for an electricity system
			Version	2
			MP compliance	☒ full compliance ☐ findings have been raised ☐ N/A
		4	Title (of the tool)	Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site
			Version	4
			MP compliance	☒ full compliance ☐ findings have been raised ☐ N/A
		5	Title (of the tool)	Tool to calculate baseline, project and/or leakage emissions from electricity consumption
			Version	1
			MP compliance	☒ full compliance ☐ findings have been raised ☐ N/A
		6	Title (of the tool)	Tool to calculate project or leakage or CO ₂ emissions from fossil fuel combustion
			Version	2
		MP compliance	☒ full compliance ☐ findings have been raised ☐ N/A	
	☐	The breakdown of MP accordance of the applicable SB is as follows:		
		1	Title (of the tool)	
		Version		
		MP compliance		
☐	In this context the following CARs, CLs, FARs have been raised:			

Conclusion	☒	No CARs / CLs / FARs have been raised in this context. No correction was required. The project is in line with the respective requirements.
	☐	The raised CARs / CLs / FARs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings could be closed out. For details please refer to Appendix 4.
		The applied methodology and subscribed applicable tools are consistent with the versions in UNFCCC website. No standardised baseline established by the host country DNA.

E.6. Compliance of monitoring activities with the registered monitoring plan

E.6.1. Data and parameters fixed ex ante or at renewal of crediting period

Means of verification		The verification team has checked the ex-ante parameters and data stated in Section D.1 of MR and compared with section B.6.2 of the approved revised PDD whether all parameters fixed ex-ante for the crediting period have been applied correctly. The grid emission factor applied is an ex-ante value at the time of project registration. The methane GWP applied in this monitoring period is 25 in accordance to decision 4/CMP7 and § 66 of EB69. The following sources of information have been used in this context: • /MR/ • /ER/ • /PDD2/ • /EB69/ • /NVS/ • /unfccc/
Findings	☒	The MR and the ER calculation have considered the parameters fixed ex-ante or at the renewal of the crediting period correctly, no deviations have been observed.
	☐	The following deviations from the parameters fixed ex-ante or at renewal of crediting period have been identified in the course of this verification: - N/A
	☐	In this context the following CARs, CLs, FARs have been raised:
Conclusion	☒	No CARs / CLs / FARs have been raised in this context. No correction was required. The project is in line with the respective requirements.
	☐	The raised CARs / CLs / FARs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings could be closed out. For details please refer to Appendix 4.
		The data and parameters listed in the section D.1 of MR was cross checked with the applied methodology, subscribed tools, approved revised PDDs, ER and are consistent.

E.6.2. Data and parameters monitored

Means of verification	During the verification all relevant monitoring parameters (as listed in chapter B.7.1 of the PDD) have been verified with regard to the (i) appropriateness of the applied measurement / determination method, (ii) the correctness of the values applied for ER calculation, (iii) the accuracy, and applied QA/QC measures. The monitoring equipment used to monitor the respective parameters stated in the MR has been checked. It can be confirmed that all the equipment used are consistent with the registered / approved revised PDDs. The type and specification of the equipment were checked against the specification to confirm the suitability and accuracy for measuring the respective parameters. /EI2/EI4 to EI7/ During this monitoring period, there were several shutdowns due to maintenance of the grid system and gas engines. The operation records were checked and verified with the daily records captured in the monitoring system to ensure the data is zero during those downtime periods. /MD1-MD6/ER/RD1/ All parameters are continuously monitored and the data are captured on 1 minute interval basis and recorded in the SCADA system. The verification team has checked archived data in the SCADA system to confirm the data are real In the monitoring system, the data captured in the server adopts the Coordinated Universal Time (UTC). Therefore, to derive at the local Thai time zone, 7 hours have to be added to the UTC recorded time. The verification team has cross-checked the data captured by the server and could confirm that it corresponds with the local time when it was reported. /RD1/ER/ The results as well as the verification procedure are described parameter-wise in the project specific verification checklist (Appendix 5).	
Findings	Refer CAR E.6-01 and CAR E.6-02 raised. For details please refer to appendix 4	
Conclusion	☐	No CARs / CLs / FARs have been raised in this context. No correction was required. The project is in line with the respective requirements.
	☒	The raised CARs / CLs / FARs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings could be closed out. For details please refer to Appendix 4.
During the verification all relevant monitoring parameters (as listed in chapter B.7.1 of the approved revised PDD) have been verified with regard to the appropriateness of the applied measurement / determination method, the correctness of the values applied for ER calculation, the accuracy, and applied QA/QC measures. The results as well as the verification procedure are described parameter-wise in the project specific verification checklist. All records needed for monitoring are archived in line with the requirements of the monitoring plan in the approved revised PDD version 9. No significant lack of evidence and missing data was detected during the on-site verification. It could be evidenced that the monitoring system ensures for continuous operation. It can be confirmed that all monitoring parameters have been measured / determined without material misstatements and in line with all applicable standards and relevant requirements.		

E.6.3. Implementation of sampling plan

Means of verification	The verification team has been checked whether the PPs have applied a sampling approach to determine the monitored values. The following sources of information have been used in this context: • /MR/ • /ER/ • /PDD2/.			
Findings	☒	The PPs have not applied sampling approaches for the parameters monitored.		
	☐	The PPs have applied sampling approaches for the following parameters monitored.		
		1	Parameter:	
			Name:	
			Description on how the sampling efforts and survey comply with the validated sampling plan:	
		2	Parameter:	
Name:				
Description on how the sampling efforts and survey comply with the validated sampling plan:				
☐	In this context the following CARs, CLs, FARs have been raised:			
Conclusion	☒	No CARs / CLs / FARs have been raised in this context. No correction was required. The project is in line with the respective requirements.		
	☐	The raised CARs / CLs / FARs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings could be closed out. For details please refer to Appendix 4.		
No sampling was applied to determine the monitored parameters.				

E.7. Compliance with the calibration frequency requirements for measuring instruments

Means of verification	During the verification the relevant monitoring equipment has been checked whether the calibration requirements have been met; especially if the calibration frequency is in line with the requirements of the validated PDD and/or the applicable calibration standards. The calibration frequency of the electricity meters, flow meters, temperature transmitters, pressure transmitters and methane gas analysers were cross-checked with the approved revised PDD against the calibration reports. The calibration frequency, validity and calibration dates for all instruments are listed in Appendix 6. The calibration records cover the monitoring period were maintained and verified by the verification team. The monitoring instruments were changed / exchanged due to calibration expiry date or faulty. The operation records and work statements were
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	reviewed to confirm the changes. /MD1-MD6/ The date of changing and / or exchanging the monitoring instrument is listed in Annex E of the MR. All the dates were checked with the work statement /MD1-MD6/ to confirm the dates are correctly provided. It was made known to the verification team that the project proponent has spare units for all monitoring instruments. The spare units will be used to replace those instruments which are due for offsite calibration and / or faulty. Therefore, it could be evident in Annex E of the MR that there is repetition of serial numbers in the monitoring instruments. The verification team has checked the work statements against the Annex E of the MR to confirm the replacement / exchange of the monitoring instrument. The checked shown that there are repetition of some serial numbers for the same period. /MD1-MD6/ The verification team has checked the specification sheet in Annex D with the instrument specification to confirm the replaced unit is the same as the one being replaced. /EI2/EI4 to EI7/ The check could confirm that the replaced instruments have the same accuracy and monitoring range. The calibration reports for all meters covering the reporting period were verified for the frequency and traceability to third party calibration laboratory. /C1-C5/ The calibration report for electricity meters which measures the export and import of electricity were verified and traceable to the Provincial Electricity Authority (PEA) standard. /C6/ The summary of the calibration information is provided in Annex E of the MR and Appendix 6 of this report. The verification team has checked all the calibration certificates to ensure the validity of the calibration. The calibrations are conducted according to manufacturing requirements and international standard. /C1-C6/ The results as well as the verification procedures are described equipment-wise in the project specific verification checklist (Appendix 5). The following sources of information have been used in this context: • /MR/ • /PDD2/ • /C1-C6/ • /EI2/EI4 – EI7/ • /MD1-MD6/						
Findings	<table border="1"> <tr> <td data-bbox="454 1444 534 1556">☒</td> <td data-bbox="534 1444 1412 1556">Based on the details listed in appendix 6 the verification team can confirm that all installed monitoring equipment has been duly calibrated for this entire monitoring period.</td> </tr> <tr> <td data-bbox="454 1556 534 1937">☐</td> <td data-bbox="534 1556 1412 1937"> Based on the assessment and information as per appendix 6 delay(s) in calibration have been identified. The PP has 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. From the related calibration certificates and emission reduction calculation the verification team confirms that the maximum permissible error has been applied in a conservative manner so that the adjusted measured values due to the delayed calibration result in fewer claimed emission reductions. For details please refer to appendix 6 </td> </tr> <tr> <td data-bbox="454 1937 534 2033">☐</td> <td data-bbox="534 1937 1412 2033"> In this context the following CARs, CLs, FARs have been raised: </td> </tr> </table>	☒	Based on the details listed in appendix 6 the verification team can confirm that all installed monitoring equipment has been duly calibrated for this entire monitoring period.	☐	Based on the assessment and information as per appendix 6 delay(s) in calibration have been identified. The PP has 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. From the related calibration certificates and emission reduction calculation the verification team confirms that the maximum permissible error has been applied in a conservative manner so that the adjusted measured values due to the delayed calibration result in fewer claimed emission reductions. For details please refer to appendix 6	☐	In this context the following CARs, CLs, FARs have been raised:
☒	Based on the details listed in appendix 6 the verification team can confirm that all installed monitoring equipment has been duly calibrated for this entire monitoring period.						
☐	Based on the assessment and information as per appendix 6 delay(s) in calibration have been identified. The PP has 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. From the related calibration certificates and emission reduction calculation the verification team confirms that the maximum permissible error has been applied in a conservative manner so that the adjusted measured values due to the delayed calibration result in fewer claimed emission reductions. For details please refer to appendix 6						
☐	In this context the following CARs, CLs, FARs have been raised:						
Conclusion	<table border="1"> <tr> <td data-bbox="454 2033 534 2078">☒</td> <td data-bbox="534 2033 1412 2078">No CARs / CLs / FARs have been raised in this context. No correction</td> </tr> </table>	☒	No CARs / CLs / FARs have been raised in this context. No correction				
☒	No CARs / CLs / FARs have been raised in this context. No correction						

		was required. The project is in line with the respective requirements.
	☐	The raised CARs / CLs / FARs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings could be closed out. For details please refer to Appendix 4.
		Based on the details listed in appendix 6 the verification team could confirm that all installed monitoring equipment has been duly calibrated for this entire monitoring period. Based on the above the DOE could confirm that the measuring instruments have been duly calibrated and remained valid for this entire monitoring period. The monitoring and instruments diagram is in accordance with the actual situation implemented at project site.

E.8. Assessment of data and calculation of emission reductions or net removals

E.8.1. Calculation of baseline GHG emissions or baseline net GHG removals by sinks

Means of verification	According to the approved revised / registered PDD, the approved baseline and monitoring methodology applied by the project is ACM0001 version 11. The GHG emission reduction of the project is calculated as follows: $ER_y = BE_y - PE_y$ Where: ER_y = Emissions reduction in year y (tCO₂e/y) BE_y = Baseline emissions in year y (tCO₂e/y) PE_y = Project emissions in year y (tCO₂e/y) The equation used to determine the baseline emission stated in the monitoring report is consistent with the registered/revised PDD where: $BE_y = (MD_{project,y} - MD_{BL,y}) * GWP_{CH_4} + EL_{LFG,y} * CEF_{elec,BL,y} + ET_{LFG,y} * CEF_{ther,BL,y}$ $MD_{project,y}$ is measurement of the quantity of methane that have been destroyed/combusted during this monitoring period. $MD_{project,y}$ is determined as the follow: $MD_{project,y} = MD_{flared,y} + MD_{electricity,y}$ $MD_{flared,y}$ is the quantity of LFG being combusted in the flare system add the amount of methane being flare according to the flaring efficiency. In order to determine the amount of methane flared, the LFG flared is multiplied with the methane density and concentration. The methane concentration is continuously monitored while the density applies the default value provided by the Tool to determine project emissions from flaring gases containing methane version 1. The PP applies the default value for flaring efficiency. The data were checked to confirm the default values applied are correct. The methane GWP applied in this monitoring period is 25 in accordance to decision 4/CMP7 and § 66 of EB69. $MD_{electricity,y}$ is the quantity of LFG combusted by the gas engines. In order to determine the amount of methane combusted, the LFG combusted is multiplied with the methane density and concentration. The methane concentration is continuously monitored while the density applies is the default value from the Tool to determine project emissions from flaring gases containing methane version 1. The PP has applied a conservative approach where the lower value of either $MD_{total,y}$ or $MD_{flared,y} + MD_{electricity,y}$ was used to calculate $MD_{project,y}$.
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	MD_{BL,y} is zero since there is no methane destruction requirements according to host country regulation. The baseline emission reduction for exporting the generated electricity to the grid is calculated using the monitored data of EL_{LFG,y} multiply with the grid emission factor (CEF_{elec,BL,y}). ET_{LFG,y} is zero since no thermal energy is being generated. The grid emission factor applied is an ex-ante value 0.57420 tCO₂/MWh which was available during the project registration. The following documents were verified and/or checked to confirm and crosscheck that the BE_y is correctly calculated as per ER spreadsheet and noted in MR: • Monthly export electricity invoices^{/E1/} • Raw Data^{/RD1/} During the verification the calculation of baseline GHG emissions has been checked. In detail the following has been verified: • Transparency: It has been checked whether the calculation of baseline emissions is fully traceable and, where used, the Excel calculation provides all calculation formulae. • Parameter consistency: It has been checked whether all internal and external parameters and data used for the calculation are applied consistently in the monitoring report and the calculation spreadsheet. • Correctness: It has been checked whether the applied formulae and methods for calculating baseline emissions are in accordance with the monitoring plan and the approved methodology. • Completeness: It has been checked whether all calculations are complete and without omissions. Based on the monitored data, the baseline emissions were 400,085 tCO₂e The following sources of information have been used in this context: • /MR/ • /ER/ • /E1/
Findings	☒ The calculation of the baseline emissions was found to be fully compliant with the above stated principles. The calculations of baseline GHG emissions or baseline net GHG removals have been carried out in accordance with the formulae and methods described in the registered monitoring plan, the applied methodology and, where applicable, the applied standardized baseline. Any assumptions used in emission or removal calculations have been justified. Appropriate emission factors, IPCC default values, GWPs and other reference values have been correctly applied. No errors, miscalculations, omissions, misstatements or incomplete information has been identified.
	☐ The verification team has identified mistakes in the baseline emissions calculation or the underlying calculation approaches.
	☐ In this context the following CARs, CLs, FARs have been raised:
Conclusion	☒ No CARs / CLs / FARs have been raised in this context. No correction was required. The project is in line with the respective requirements.

	☐	The raised CARs / CLs / FARs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings could be closed out. For details please refer to Appendix 4.
		The calculations of baseline GHG emissions have been carried out in accordance with the equations and methods described in the approved revised monitoring plan and applied methodology. Any assumptions used in emission or removal calculations have been justified. Appropriate emission factor and other reference values have been correctly applied. It can be confirmed that the baseline calculation is overall correct.

E.8.2. Calculation of project GHG emissions or actual net GHG removals by sinks

Means of verification		The project emission included in this project activity is emission from the combusting diesel to generate backup electricity and import of electricity where: $PE_y = PE_{EC,y} + PE_{FC,j,y}$ The electricity imported is continuously monitored. The verification team has verified related invoices to confirm the amount of electricity imported. The grid emission factor applied is an ex-ante value at the time of project registration. There is no diesel consumed during this monitoring period. Therefore, there are no project emissions from combustion of diesel. This was verified during onsite, the emergency standby diesel generator was not sighted. Thus, the imported electricity is the project emissions. Therefore: $PE_y = 1,350 \text{ tCO}_2\text{e}$ During the verification the calculation of project GHG emissions has been checked. In detail the following has been verified: • Transparency: It has been checked whether the calculation of project emissions is fully traceable and, where used, the Excel calculation provides all calculation formulae. • Parameter consistency: It has been checked whether all internal and external parameters and data used for the calculation are applied consistently in the monitoring report and the calculation spreadsheet. • Correctness: It has been checked whether the applied formulae and methods for calculating project emissions are in accordance with the monitoring plan and the approved methodology. • Completeness: It has been checked whether all calculations are complete and without omissions. The verification team had reviewed the calculations presented are considered correct. The following sources of information have been used in this context: • /MR/ • /ER/ • /E2/
Findings	☒	The calculation of the project emissions was found to be fully compliant with the above stated principles. The calculations of project GHG emissions or actual net GHG removals have been carried out in accordance with the formulae and methods

		described in the registered monitoring plan, the applied methodology and, where applicable, the applied standardized baseline. Any assumptions used in emission or removal calculations have been justified. Appropriate emission factors, IPCC default values, GWPs and other reference values have been correctly applied. No errors, miscalculations, omissions, misstatements or incomplete information have been identified.
	☐	The verification team has identified mistakes in the project emissions calculation or the underlying calculation approaches.
	☐	In this context the following CARs, CLs, FARs have been raised:
Conclusion	☒	No CARs / CLs / FARs have been raised in this context. No correction was required. The project is in line with the respective requirements.
	☐	The raised CARs / CLs / FARs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings could be closed out. For details please refer to Appendix 4.
	The project emissions have been calculated correctly.	

E.8.3. Calculation of leakage GHG emissions

Means of verification	During the verification it has been checked whether leakage emissions have to be considered and in cases where leakage emissions have to be calculated, the respective calculation of leakage GHG emissions has been checked. According to the approved revised PDD, there is no GHG emission caused by leakage emission of the proposed project activity. Therefore, leakage is considered to be zero ($LE_y = 0$) The following sources of information have been used in this context: • /MR/ • /ER/ • /PDD2/ • /ACM1/	
Findings	☒	No leakage emissions were to be considered ($LE = 0$).
	☒	The calculation of the leakage emissions was found to be fully compliant with the above stated principles (see 8.1 and 8.2). The calculations of leakage GHG emissions have been carried out in accordance with the formulae and methods described in the registered monitoring plan, the applied methodology and, where applicable, the applied standardized baseline. Any assumptions used in leakage emissions calculations have been justified. Where applicable, appropriate emission factors, IPCC default values, GWPs and other reference values have been correctly applied. No errors, miscalculations, omissions, misstatements or incomplete information have been identified.
	☐	The verification team has identified mistakes in the project emissions calculation or the underlying calculation approaches.
	☐	In this context the following CARs, CLs, FARs have been raised:
Conclusion	☒	No CARs / CLs / FARs have been raised in this context. No correction was required. The project is in line with the respective requirements.

	☐	The raised CARs / CLs / FARs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings could be closed out. For details please refer to Appendix 4.
	No leakage has to be considered according to the approved revised PDD.	

E.8.4. Summary of calculation of GHG emission reductions or net anthropogenic GHG removals by sinks

Means of verification	Section E.4 of MR demonstrates the summary of GHG emission reductions for the monitoring period and calculated according to the applied methodology. The emission reduction is calculated for this monitoring period as follows: $\text{ER} = \text{BE}_y - \text{PE}_y$ $= 400,085 - 1,350$ $= \mathbf{398,735 \text{ tCO}_2\text{e}}$ To be conservative, the total baseline emissions for biogas extracted are rounded down as integer. Project emissions are rounded-up to the next integer. ☒ The MR includes in section E.4 a summary table of the emission reductions calculation. ☒ The summary table specified the total baseline, project and leakage emissions as well as the total emission reductions separately. ☒ The values as specified in the ER summary table are correct; no issues have been identified during the verification which requires changes in the ER calculation. ☐ During the verification issues with impact on the ER calculation have been identified. The verification team has checked the MR includes a summary table of the emission reductions calculation specifying separately - Total baseline emissions, - Total project emissions, - Total leakage, - Total emission reductions. It has been assessed whether the values are correct or need to be revised as a consequence of issues identified above.
Findings	☒ Section E.4 of the MR includes in a summary table of the emission reductions calculation. ☒ The summary table specified the total baseline, project and leakage emissions as well as the total emission reductions separately. ☒ The values as specified in the ER summary table are correct; no issues have been identified during the verification which requires changes in the ER calculation. ☐ During the verification issues with impact on the ER calculation have been identified. ☐ In this context the following CARs, CLs, FARs have been raised:
Conclusion	☒ No CARs / CLs / FARs have been raised in this context. No correction was required. The project is in line with the respective requirements. ☐ The raised CARs / CLs / FARs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings could be closed out. For details please refer to Appendix 4.

	To conclude, from the reviewed and replication of data input to the ER calculation, it can be confirmed the data stated in the MR is overall correct The summary table in the MR has been filled correctly and the values are in line with the related emissions reduction spreadsheet.
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E.8.5. Comparison of actual GHG emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD

Means of verification	The verification team has checked if the MR includes a comparison of actual values of the monitoring period with the estimations in the registered PDD. Section E.5 of the MR includes a comparison of the calculated actual emission reductions with the ex-ante calculated values in the approved revised PDD. For this monitoring period from 01/11/2014 to 31/10/2015 (both days included) the project achieved 398,735 tCO₂e of GHG emission reductions. The estimated ex-ante GHG emission reductions in the approved revised / registered PDD for this monitoring period are 230.940 tCO₂e was based on Case A situation.	
Findings	☐	Case 1: The ex-ante estimated value was found to be proportionally higher than the ex-post determined value. No further action is deemed required.
	☐	Case 2: The ex-ante estimated value fits very good to the actually monitored value. No further justification is deemed required.
	☒	Case 3: The ex-ante estimated value was found to be proportionally lower than the ex-post determined value.
	☐	In this context the following CARs, CLs, FARs have been raised:
Conclusion	☒	No CARs / CLs / FARs have been raised in this context. No correction was required. The project is in line with the respective requirements.
	☐	The raised CARs / CLs / FARs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings could be closed out. For details please refer to Appendix 4.
	The ex-ante estimated value was found to be proportionally lower than the ex-post determined value.	

E.8.6. Remarks on difference from estimated value in registered PDD

Means of verification	Section E.5 of the MR includes a comparison of the actual emissions reduction with the ex-ante calculated values in the approved revised PDD as below. Ex-ante ERs: 230,940 tCO₂e for 365 days (273,081tCO₂e/a) based on CASE A Ex-ante ERs: 362,579 tCO₂e for 365 days (336,868 tCO₂e/a) based on CASE B /RER/ Ex-post ERs: 398,735 tCO₂e for 365 days Difference: 167,795 tCO₂e (CASE A) or 36,156 tCO₂e (CASE B) The comparison is based on 365 days (61 days in 2014 and 304 days in 2015) of the monitoring period. The ex-ante calculated value was found to be proportionally lower than the ex-post determined value. A justification is provided in the MR. The reason of the higher emission reduction is mainly the revised applied GWP_{CH4} value applied
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from 01/01/2013 onwards (25 instead of 21), higher waste amounts tipped and operation performance.

The verification team has verified the engines operation performance which confirms that the engines have lower down times and the gas engines were operating more efficient than ex-ante estimated. ^{/MD1/} As per registered PDD 7200 h per year have been considered equal to 82.2 % load (7200/8760 x 100%). During the monitoring period the operations hours and annual load are as following:

Engine	Operation hours	Load (for 365 days = 8,760 h)
Engine #1	8,278	94.5
Engine #2	8,188	93.5
Engine #3	8,137	92.9
Engine #4	8,220	93.8
Engine #5	8,454	96.5
Engine #6	8,504	97.1
Engine #7	8,396	95.8
Engine #8	8,523	97.3
Average	8,338	95.2

This substantiates the high performance of the engines.

The verification team has checked with the waste tipping records to confirm that waste tipping was stopped on 31/07/2015 during the monitoring period by means of interview with the General Manager of the landfill operator and onsite inspection. ^{/IM03/EWP/}

When applying the GWP_{CH4} of 21, the ex-post emission reductions would be 340,607 tCO₂e and when compared CASE A ex-ante ER is approximately 32.2% more. When compared to CASE B, the ex-post emission reductions lower by 7%.

Both CASE A and CASE B were originally validated as part of the registration, included in the ER sheet for registration. ^{/RER/}

Based on the above stated it is the opinion of the verification team that the difference of the emission reductions is due to the high performance of the engine, continuation of the waste tipping until 31/07/2015 which increases the LFG amount as well as the change to the higher methane GWP.

There were no changes to the project design for this monitoring period and the equipment remain the same as describe in table A-2 above and section B.1 of MR. ^{/E11/}

Therefore, the justification for the increased in ERs as provided is comprehended.

Section E.6 of the MR describes the justification for the ex-post ERs were higher than the ex-ante determined for both CASE A and CASE B.

For this monitoring period, the actual emission reductions were found higher than the estimated emission reductions in the approved revised PDD version 12.0

Findings



No further justification or explanation is deemed required as actual emissions of this MP do not exceed significantly the ex-ante calculated emission reductions (applicable for case 1 and 2).



For case 3: The PP has provided a related justification in the MR. The reasons for the increase are as follows:

Change in the GWP for methane from 21 to 25 as from 01/01/2013 as

		compared to the registered PDD and higher operation performance at 22.84 hours / day for the gas engines as compared to 19.7 hours/day (7,200 hours/year) stated in the registered PDD
	☐	In this context the following CARs, CLs, FARs have been raised:
Conclusion	☒	No CARs / CLs / FARs have been raised in this context. No correction was required. The project is in line with the respective requirements.
	☐	The raised CARs / CLs / FARs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings could be closed out. For details please refer to Appendix 4.
	The PP has demonstrated the reasons for higher CERs in section E.6 of MR. Based on the above stated it is the opinion of the verification team that the difference of the emission reductions is due to the high performance of the engines, continued waste tipping until 31 July 2015 and change of the methane GWP. Therefore, the justification for the increased in ERs as provided is comprehended.	

E.8.7. Actual GHG emission reductions or net anthropogenic GHG removals by sinks during the first commitment period and the period from 1 January 2013 onwards

Means of verification	The verification team has checked chapter E.5 of the MR and the emission reduction calculation sheet ^{/ER/} .											
Findings	☒ The MR in section E.5 includes a summary table of the ER breakdown a) <i>ER up to 31/12/2012 and</i> b) <i>ER from 01/02/2013 onwards</i>											
	☒ The breakdown of the ERs during the first commitment period and from 01/01/2013 onwards is as follows:											
	☐ The ER have completely been generated during the first commitment period											
	☒ The ERs have completely been generated from 01/01/2013 onwards,											
	☐ The ERs have partly been generated during the first commitment period and partly from 01/01/2013 onwards.											
	☐ The breakdown of the ERs is correct, considering the applicable guidance.											
	<table><tr><td></td><td>until 31/12/2012</td><td>from 01/10/2013</td><td>Sum</td></tr><tr><td>Emission reductions [tCO₂e]</td><td>NA</td><td>398,735</td><td>398.735</td></tr></table>					until 31/12/2012	from 01/10/2013	Sum	Emission reductions [tCO ₂ e]	NA	398,735	398.735
	until 31/12/2012	from 01/10/2013	Sum									
Emission reductions [tCO ₂ e]	NA	398,735	398.735									
Conclusion	☒	No CARs / CLs / FARs have been raised in this context. No correction was required. The project is in line with the respective requirements.										
	☐	The raised CARs / CLs / FARs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings could be closed out. For details please refer to Appendix 4.										
	The emission reductions generated for this monitoring period are from the 2 nd commitment period from 01/01/2013 onwards.											

SECTION F. Internal quality control

Before the submission of the final verification report a technical review of the whole verification procedure was carried out. The technical reviewers are competent GHG auditors being appointed for the scope this project falls under. The technical reviewers are not considered to be part of the verification team and thus not involved in the decision making process up to the technical review.

As a result of the technical review process the verification opinion and the topic specific assessments as prepared by the verification team leader may have been confirmed or revised. Furthermore reporting improvements might have been achieved.

After the successful technical review an overall (esp. procedural) assessment of the complete verification has been carried out by a senior assessor located in the accredited premises of TÜV NORD.

After this step the submission for requesting for issuance is conducted.

SECTION G. Verification opinion

Xentolar Holdings Limited has commissioned the TÜV NORD JI/CDM Certification Program to carry out the 6th periodic verification of the project: **“Bangkok Kamphaeng Saen East: Landfill Gas to Electricity Project”**, with regard to the relevant requirements for CDM project activities. The project reduces GHG emissions due to avoidance of methane emission from Landfill which the gas is recovered and utilized for electricity generation. This verification covers the period from 01/11/2014 to 31/10/2015 (including both days).

As a result of this verification, the verifier confirms that:

- all operations of the project are implemented and installed as planned and described in the validated project design document,
- the monitoring plan is in accordance with the applied approved CDM methodology, i.e., ACM0001 ver. 11.0,
- the installed equipment essential for measuring parameters required for calculating emission reductions are calibrated appropriately,
- the monitoring system is in place and functional. The project has generated GHG emission reductions,
- the GHG emission reductions are calculated without material misstatements in a conservative and appropriate manner.

TÜV NORD JI/CDM CP further confirms that the project has achieved emission reductions in the above mentioned reporting period as follows:

Emission reductions: 398,735 tCO₂e.

SECTION H. Certification statement

As a duly accredited DOE, TÜV NORD CERT confirms that the project

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

registered under

UNFCCC-No. : 3462

has achieved emission reductions in accordance with all applicable requirements for registered CDM project activities during the current monitoring period

MP-No.: 6

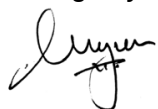
from: 01/11/2014

to: 31/10/2015

(including both days) as follows:

Emission reductions: 398,735 tCO₂e.

Subang Jaya, 22/04/2016



Cheong, Chun Yuen (Robert)
Team leader

Appendix 1. Abbreviations

Abbreviations	Full texts
CA	Corrective Action / Clarification Action
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CO ₂	Carbon dioxide
CO _{2eq}	Carbon dioxide equivalent
CL	Clarification Request
DEDE	Department of Alternative Energy and Department of Efficiency
DVerR	Draft Verification Report
ER	Emission Reduction
ERC	Energy Regulatory Commission
FAR	Forward Action Request
GE	General Electric
GHG	Greenhouse gas(es)
IM	Interview Memo
MIT	Miracle International Technical
MOI	Ministry of Industry
MP	Monitoring Plan
MR	Monitoring Report
PA	Project Activity
PDD	Project Design Document
PEA	Provincial Electricity Authority
PP	Project Participant
QA/QC	Quality Assurance / Quality Control
TMC	Thermology Co., Ltd
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation and Verification Standard

Appendix 2. Competence of team members and technical reviewers



Statement of Competence
Appointment and authorization according to the procedures
of the TUV NORD J/CCDM Certification Program

Mr. Robert Cheong

SCHEME	STATUS	VALID UNTIL
CDM	Senior Assessor (Validation, Verification)	2018-04-01
VCS	Senior Assessor	2018-04-01

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA
1.2	Renewables
3.1	Energy demand
13.1	Solid waste and wastewater

128 - Rev. 7, Date: 2015-12-16

001-VA065-F20 rev3 / 2013-10-28



Statement of Competence
Appointment and authorization according to the procedures
of the TUV NORD J/CCDM Certification Program

Mr. David Lubanga

SCHEME	STATUS	VALID UNTIL
CDM	Lead Assessor (Validation, Verification)	2018-10-20
VCS / ISO 14064-2	Lead Assessor	2018-10-20

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA
1.2	Renewables
3.1	Energy demand

251 - Rev. 4, Date: 2015-10-21

001-VA065-F20 rev3 / 2013-10-28



Statement of Competence
Appointment and authorization according to the procedures
of the TUV NORD J/CCDM Certification Program

Mr. Stefan Winter

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

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA
1.1	Thermal energy generation
1.2	Renewables
2.1	Energy distribution
3.1	Energy demand
4.1	Cement and lime production
4.2	Paper
5.2	Caprolactam, nitric and adipic acid
9.1	Aluminium and magnesium production
9.2	Iron, steel and Ferro-alloy production
13.1	Solid waste and wastewater
13.2	Manure

163 - Rev. 4, Date: 2015-01-05

001-VA065-F20 rev3 / 2013-10-28

Appendix 3. Documents reviewed or referenced

No.	Author	Reference	Title	References to the document	Provider
1	UNFCCC	/ACM1/	ACM0001 - Consolidated baseline and monitoring methodology for landfill gas project activities version 11		Others
2	DOE	/CPM/	TÜV NORD JI / CDM CP Manual (incl. CP procedures and forms)		Others
3	UNFCCC	/EB69/	EB 69 Meeting Report §66		Others
4	UNFCCC	/GLMP/	Guidelines: Completing the monitoring report form (EB 75, Annex 7)		Others
5	UNFCCC	/GT/	Glossary "CDM terms" (version 08.0)	https://cdm.unfccc.int/filestorage/external/20150226124447549-glos_CDM.pdf/glos_CDM.pdf?t=UmZ8bnFjODI3fDCW9A3vJwR03kQQh4sbLiYu	Others
6	IPCC	/IPCC/	1. 1996 IPCC Guidelines for National Greenhouse Gas Inventories: work book 2. 2006 IPCC Guidelines for National Greenhouse Gas Inventories: work book	www.ipcc-nggip.iges.or.jp	Others
7	UNFCCC	/KPI/	Kyoto Protocol (1997)	http://unfccc.int/kyoto_protocol/items/2830.php	Others
8	UNFCCC	/MA/	Decision 3/CMP. 1 (Marrakesh – Accords)	http://cdm.unfccc.int/Reference/OPMOP/index.html	Others
9	UNFCCC	/MRT/	Monitoring Report Form (CDM-MR-FORM), Version 5.1	https://cdm.unfccc.int/Reference/PDDs_Forms/index.html	Others
10	UNFCCC	/PDD1/	Project Design Document for CDM project: "Bangkok Kamphaeng Saen East: Landfill Gas to Electricity Project" version 8 dated 13/08/2010		Others
11	UNFCCC	/PDD2/	Revised Project Design Document for CDM project: "Bangkok		Others

No.	Author	Reference	Title	References to the document	Provider
			Kamphaeng Saen East: Landfill Gas to Electricity Project ” version 9 dated 02/07/2012		
12	UNFCCC	/PRC/	Post Registration Changes Report for CDM project “ Bangkok Kamphaeng Saen East: Landfill Gas to Electricity Project ” dated 07/08/2012		Others
14	UNFCCC	/PSI/	CDM Project Standard (Version 9.0)	http://cdm.unfccc.int/Reference/Standards/index.html	Others
15	UNFCCC	/TAI/	Tool for the demonstration and assessment of additionality version 5.2		Others
16	UNFCCC	/TEC/	Tool to calculate baseline, project and/or leakage emissions from electricity consumption version 1		Others
17	UNFCCC	/TEF/	Tool to calculate the emission factor for an electricity system version 2		Others
18	UNFCCC	/TFI/	Tool to determine project emissions from flaring gases containing methane version 1		Others
19	UNFCCC	/TFF/	Tool to calculate project or leakage or CO ₂ emissions from fossil fuel combustion version 2		Others
20	UNFCCC	/TWI/	Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site version 4		Others
21	PP	/VAL/	Validation Report for CDM project “ Bangkok Kamphaeng Saen East: Landfill Gas to Electricity Project ” version 1.2, dated 18/01/2011		Others
22	PP	/VER/	Documents of previous verifications (Monitoring report, verification report, ER calculation sheet)		Others
23	UNFCCC	/VVS/	CDM Validation and Verification Standard (Version 09.0)	http://cdm.unfccc.int/Reference/Standards/index.html	Others
24	PP	/MR/	Monitoring Report version 1.0 dated 10/11/2015 Monitoring Report version 2.0 dated 04/01/2016 Monitoring Report version 3.0 dated 28/01/2016 Monitoring Report version 4.0 dated		PP

No.	Author	Reference	Title	References to the document	Provider
			22/04/2016		
25	PP	/ER/	Annex A ER spreadsheet version 1.0 dated 10/11/2015 Annex A ER spreadsheet version 2.0 dated 04/01/2016		PP
		Calibration			
26	MIT & TMC	/IC1/	LFG total: FT9261A DP flow meter SN. 9061212 / 5058730 calibrated by SITIIAS on 22/10/2013 valid till 21/10/2015 SN. 9062918 / 5058755 calibrated by MIT on 25/09/2015 valid till 24/09/2017 PT9261A pressure transmitter SN. 5466002 calibrated by MIT on 03/06/2014 valid till 02/06/2015 SN. 5466080 calibrated by MIT on 25/05/2015 valid till 24/05/2016 TT9261A Temperature Transmitter SN: 080638016 calibrated by TMC on 15/07/2014 valid till 14/07/2015 SN. 080625360 calibrated by TMC on 10/07/2015 valid till 09/07/2016 FT9261B DP flow meter SN. KT13050301399 / 02886985 calibrated by SITIIAS on 05/06/2013 valid till 04/06/2015 SN 9061213 / 5058731 calibrated by MIT on 22/01/2014 valid till 21/01/2016 PT9261B pressure transmitter SN. 5466003 calibrated by MIT on 03/06/2014 valid till 02/06/2015 SN. 5466089 calibrated by MIT on 25/05/2015 valid till 24/05/2016 TT9261B SN: 100208514 calibrated by TMC on 15/07/2014 valid till 14/07/2015 SN. N1249/693062 calibrated by TMC on 10/07/2015 valid till 09/07/2016		Others
27	MIT & TMC	/IC2/	LFG flare Flare 1 FT9391 V-cone DP flow meter SN. 9062916 / 5058745 calibrated by MIT on 25/06/2013 valid till 24/06/2015 SN 9061209 / 5058737 calibrated by MIT on 11/03/2015 valid till 10/03/2017 PT9391 Pressure Transmitter		Others

No.	Author	Reference	Title	References to the document	Provider
			SN: 5466004 calibrated by MIT on 03/06/2014 valid till 02/06/2015 SN: 5466010 calibrated by MIT on 25/05/2015 valid till 24/05/2016 TT9391 temperature transmitter SN: 080625397 calibrated by TMC on 15/07/2014 valid till 15/07/2015 SN: 090536657 calibrated by TMC on 10/07/2015 valid till 09/07/2015 Flare 2: FT9491 V-cone DP flow meter SN: 10071510 / 5476731 calibrated by MIT on 19/04/2013 valid till 18/04/2015 SN: 9061205 / 5058733 calibrated by TMC on 11/03/2015 valid till 10/03/2017 PT9491 Pressure transmitter Serial no. 5466006 calibrated by MIT on 03/06/2014 valid till 02/06/2015 Serial no. 5466005 calibrated by MIT on 25/05/2015 valid till 24/05/2016 TT9491 Temperature transmitter SN: 08065432 calibrated by TMC on 15/07/2014 valid till 14/07/2015 SN: 080625400 calibrated by TMC on 10/07/2015 valid till 09/07/2016 Flare 3: FT9591 V-cone DP flow meter: SN: 10071509 / 4959893 calibrated by MIT on 19/04/2013 valid till 18/04/2015 SN: 9061210 / 5058738 calibrated by MIT on 11/03/2015 valid till 10/03/2017 PT9591 Pressure transmitter SN: 5466083 calibrated by MIT on 03/06/2014 valid till 02/06/2015 SN: 5466015 calibrated by MIT on 25/05/2015 valid till 24/05/2016 TT9591 temperature transmitter SN: 080638034 calibrated by TMC on 15/07/2014 valid till 14/07/2015 SN: N1249.693066 calibrated by TMC on 10/07/2015 valid till 09/07/2016		
28	MIT & TMC	IC3/	LFG Electricity (gas engine) Engine 1: EFT9001 V-cone DP flow meter SN: 10071504 / 5476737 calibrated by MIT on 23/12/2013 valid till		Others

No.	Author	Reference	Title	References to the document	Provider
			22/12/2015 SN: 9062901 / 5058784 calibrated by MIT on 29/06/2015 valid till 28/06/2015 EPT9001 Pressure transmitter SN: 02443480 calibrated by MIT on 03/06/2014 valid till 02/06/2015 SN: 02300672 calibrated by MIT on 26/05/2015 valid till 25/05/2016 ETT9001 Temperature Transmitter SN: 080638031 calibrated by TMC on 19/02/2014 valid till 18/02/2015 SN: 100208540 calibrated by TMC on 17/04/2014 valid till 16/04/2015 SN: N1249.693067 calibrated by TMC on 16/02/2015 valid till 15/02/2016 Engine 2: EFT9002 V-cone DP flow meter SN: 9062914 / 5058767 calibrated by MIT on 30/08/2013 valid till 29/08/2015 SN: 9062903 / 5058756 calibrated by MIT on 29/06/2015 valid till 28/06/2017 EPT9002 pressure transmitter SN: 02443481 calibrated by MIT on 03/06/2014 valid till 02/06/2015 SN: 02300672 calibrated by MIT on 26/05/2015 valid till 25/05/2016 ETT9002 Temperature transmitter SN: 090536658 calibrated by TMC on 19/02/2014 valid till 18/02/2015 SN: 100208516 calibrated by TMC on 17/07/2014 valid till 16/07/2015 SN: 080638043 calibrated by TMC on 17/02/2015 valid till 16/02/2016 Engine 3: EFT9003 V-cone DP flow meter SN: 10071505 / 5476725 calibrated by MIT on 19/04/2013 valid till 18/04/2015 SN: 1104-0159 / 02443472 calibrated by MIT on 11/03/2015 valid till 10/03/2017 EPT9003 Pressure transmitter SN: 02715553 calibrated by MIT on 03/06/2014 valid till 02/06/2015 SN: 02300674 calibrated by MIT on 26/05/2015 valid till 25/05/2016 ETT9003 Temperature transmitter SN: 090543121 calibrated by TMC on 19/02/2014 valid till 18/02/2015 SN: 080638069 calibrated by TMC		

No.	Author	Reference	Title	References to the document	Provider
			on 17/07/2014 valid till 16/07/2015 SN: N1249.693065 calibrated by TMC on 11/02/2015 valid till 10/02/2016 Engine 4: EFT9004 V-cone DP flow meter SN: 10071506 / 4964086 calibrated by MIT on 19/04/2013 valid till 18/04/2015 SN: 1104-0160 / 02443474 calibrated by MIT on 11/03/2015 valid till 10/03/2017 EPT9004 Pressure transmitter SN: 02777923 calibrated by MIT on 03/06/2014 valid till 02/06/2015 SN: 02150750 calibrated by MIT on 26/05/2015 valid till 25/05/2015 ETT9004 Temperature transmitter SN: 090536683 calibrated by TMC on 19/02/2014 valid till 18/02/2015 SN: 100208541 calibrated by TMC on 17/07/2014 valid till 16/05/2015 SN: 090543121 calibrated by TMC on 10/07/2015 valid till 09/07/2016 Engine 5: EFT9005 V-cone DP flow meter SN: 9062907 / 5058760 calibrated by MIT on 24/06/2013 valid till 23/06/2015 SN: 10071506 / 4964086 calibrated by MIT on 30/05/2015 valid till 29/05/2017 EPT9005 Pressure transmitter SN: 02777924 calibrated by MIT on 03/06/2014 valid till 02/06/2015 SN: 02166915 calibrated by MIT on 26/05/2015 valid till 25/05/2016 ETT9005 SN: 100098212 calibrated by TMC on 19/02/2014 valid till 18/02/2015 SN: 090543121 calibrated by TMC on 11/02/2015 valid till 10/02/2016 SN: 090543120 calibrated by TMC on 16/02/2015 valid till 15/02/2016 Engine 6: EFT9006 V-cone DP flow meter SN: 9062903 / 5058756 calibrated by MIT on 24/06/2013 valid till 23/06/2015 SN: 10071505 / 5476725 calibrated by MIT on 29/05/2015 valid till 28/05/2017 EPT9006 Pressure transmitter SN: 02150753 calibrated by MIT on		

No.	Author	Reference	Title	References to the document	Provider
			24/10/2014 valid till 23/10/2015 SN: 02715553 calibrated by MIT on 02/06/2015 valid till 01/06/2016 ETT9006 Temperature transmitter SN: 080638042 calibrated by TMC on 19/02/2014 valid till 18/02/2015 SN: 090536658 calibrated by TMC on 11/02/2015 valid till 10/02/2016 Engine 7: EFT9007 V-cone DP flow meter SN: 10071502 / 5615483 calibrated by MIT on 19/04/2013 valid till 18/04/2015 SN: 9062913 / 5058766 calibrated by MIT on 11/03/2015 valid till 10/03/2017 EPT9007 Pressure transmitter SN: 02150751 calibrated by MIT on 24/10/2014 valid till 23/10/2015 SN: 02777923 calibrated by MIT on 02/06/2015 valid till 01/06/2016 ETT9007 Temperature transmitter SN: 100211940 calibrated by TMC on 19/02/2014 valid till 18/02/2015 SN: 100208537 calibrated by TMC on 17/07/2014 va.id till 16/07/2015 SN: N1249.693026 calibrated by TMC on 10/07/2015 valid till 09/07/2015 Engine 8: EFT9008 V-cone DP flow meter SN: 9062901 / 5058746 calibrated by MIT on 24/06/2013 valid till 23/06/2015 SN: 10071502 / 5615483 calibrated by MIT on 30/05/2015 valid till 29/05/2017 EPT9008 Pressure transmitter SN: 02166916 calibrated by MIT on 24/10/2014 valid till 23/10/2015 SN: 02777924 calibrated by MIT on 02/06/2015 valid till 01/06/2015 ETT9008 Temperature transmitter SN: 090543120 calibrated by TMC on 19/02/2014 valid till 18/02/2015 SN:100098212 calibrated by TMC on 11/02/2015 valid till 10/02/2016		
29	Edinburgh Instrument	IC4I	Methane Gas Analyser 9261 A SN: 31421 calibrated by Edinburgh Instrument on 17/04/2014 valid till 16/04/2015 SN: 29864 calibrated by Edinburgh Instrument on 03/10/2014 valid till		Others

No.	Author	Reference	Title	References to the document	Provider
			02/10/2015 and by MIT on 28/08/2015 valid till 27/08/2016		
30	TMC	/C5/	Flare thermocouple Flare 1: TTC9393A Thermocouple SN: 080614321 calibrated by TMC on 22/03/2014 valid till 21/03/2015 SN: 08014320 calibrated by TMC on 25/02/2015 valid till 24/05/2016 TTC9393B Thermocouple SN: 090326010 calibrated by TMC on 22/03/2014 valid till 21/03/2015 SN: 090325007 calibrated by TMC on 25/02/2015 valid till 24/02/2016 TTC9393C Thermocouple SN: 080614290 calibrated by TMC on 22/03/2014 valid till 21/03/2015 SN: 090326012 calibrated by TMC on 25/02/2015 valid till 24/02/2016 Flare 2: TTC9493A Thermocouple SN: 080614290 calibrated by TMC on 22/03/2014 valid till 21/03/2015 SN: 090326013 calibrated by TMC on 25/02/2015 valid till 24/02/2016 TTC9493B Thermocouple SN: 080614323 calibrated by TMC on 22/03/2014 valid till 21/03/2015 SN: 080614289 calibrated by TMC on 25/02/2015 valid till 24/02/2016 TTC9493C Thermocouple SN: 090326006 calibrated by TMC on 22/03/2014 valid till 21/03/2015 SN: 080614306 calibrated by TMC on 25/02/2015 valid till 24/02/2016 Flare 3 TTC9593A Thermocouple SN: 080614379 calibrated by TMC on 22/07/2014 valid till 21/07/2015 SN: 080614373 calibrated by TMC on 25/02/2015 valid till 25/03/2016 TTC9593B Thermocouple SN: 090326009 calibrated by TMC on 02/07/2014 valid till 01/07/2015 SN: 090329527 calibrated by TMC on 25/02/2015 valid till 24/02/2016 TTC9593C Thermocouple SN: 090329544 calibrated by TMC on 01/07/2014 valid till 30/06/2015 SN: 080614305 calibrated by TMC on 25/02/2015 valid till 24/02/2015		Others
31	PEA	/C6/	EPMP – Primary export power		Others

No.	Author	Reference	Title	References to the document	Provider
			meter SN: 201005194 PEA15850695 calibrated by PEA on 02/07/2014 valid till 01/07/2015 and on 01/07/2015 valid till 30/06/2016 PEA Temporary Meter: SN:205610126 PEA19936983 calibrated by PEA on 25/05/2015 valid till 24/05/2016 EPMS – Secondary export power meter SN: 212607309 calibrated by PEA on 02/07/2014 valid till 01/07/2015 and on 01/07/2015 valid till 30/06/2016 Temporary Meter: SN: 205610065 PEA 19936983 calibrated by PEA on 25/05/2015 valid till 24/05/2016 IPMP – Primary import power meter SN: 201006718 PEA15852219 calibrated by PEA on 02/07/2014 valid till 01/07/2015 and on 01/07/2015 valid till 30/06/2016 PEA Temporary meter: SN: 205610065 PEA19936922 calibrated by PEA on 25/05/2015 valid till 24/05/2015 IPMS – Secondary import power meter Secondary Import Meter, SN: 210422526 calibrated by PEA 02/07/2014 valid till 01/07/2015 and on 01/07/2015 valid till 30/06/2016 Temporary Import Meter: SN: 205610065 PEA19936922 calibrated by PEA on 25/05/2015 valid till 24/05/2016		
32	Linde	IC7I	Span gas Certificate of Composition issued by Linde from 28/03/2014 valid till 27/03/2018 and from 28/03/2015 valid till 27/03/2018		Others
			Electricity Invoices		
33	PEA	IE1I	Monthly Reading Electricity Export and Import to PEA November 2014 to October 2015		Others
34	PEA	IE2I	Monthly Invoices to PEA November 2014 to October 2015		Others
			Equipment & Instruments		

No.	Author	Reference	Title	References to the document	Provider
35	GE	/EI1/	GE Gas Engines Specification		Others
36	Honeywell & Uniflare	/EI2/	Honeywell STT 3000 thermocouple Uniflare Type N Thermocouple and Transmitter Assembly		Others
37	Carbon Recycle	/EI3/	Flare specification		Others
38	Kingsway / Kent / Lamways	/EI4/	1. Kingsway V-cone flow meter 2. Shanghai Kent V-cone flow meter 3. KVS Lamways V-cone flow meter 4. V-Cone flow factor and sizing		Others
39	Rosemount	/EI5/	Rosemount 3051 Pressure Transmitter		Others
40	Honeywell	/EI6/	Honeywell STT 171 temperature transmitter Honeywell STT 830 temperature transmitter		Others
41	Guardian	/EI7/	Guardian Methane Analyser Specification Guardian Methane Analyser operating manual		Others
42	EDMI	/EI8/	EDMI Electricity Meter Specification		Others
		QA/QC procedures			
43	PP	/QA1/	CDM Monitoring and Quality Control Manual version 11 dated 27/10/2015		PP
		Maintenance and Downtime			
44	PP	/MD1/	Gas engine operation records for November 2014 to October 2015 Gas Engine service report for November 2014 to October 2015		PP
45	PP	/MD2/	Flare operation records for November 2014 to October 2015 Flare work statement for November 2014 to October 2015		PP
46	PP	/MD3/	Biogas plant operation records for November 2014 to October 2015 Gas plant work statement for November 2014 to October 2015		PP
47	PP	/MD4/	Engine Equipment Downtime November 2014 to October 2015		PP
48	PP	/MD5/	Flare Equipment Downtime November 2014 to October 2015		PP

No.	Author	Reference	Title	References to the document	Provider
49	PP	/MD6/	Biogas Plant Equipment Downtime November 2014 to October 2015		PP
50	PP	/MD7/	Gas analyser monthly site calibration November 2014 to October 2015.		PP
		Raw data			
51	PP	/RD1/	Raw data for November 2014 to October 2015		PP
		Others			
52	PP	/O1/	Internal Audit conducted on 28/10/2015		PP
53	PP	/O2/	Management Review Meeting dated 28/10/2015		PP
54	DEDE	/O3/	Annual Report Thailand Energy Statistics 2014 (Preliminary) by DEDE Department Ministry of Energy, Thailand Transmission Line Loss Calculation 2014		Others
55	PP	/O4/	Engine Power generated from October 2014 to October 2015 Engine Power Factor calculation for 8 engines from April October to September 2014		PP
56	PP	/O5/	SWDS waste tipped profile up to October 2014 Waste Tipping Contract Landfill layout drawing Landfill law and regulations		PP
57	PP	/O6/	Monitoring instrument measuring range		PP
58	DEDE / ERC / MOI	/O7/	Controlled Energy License issued by DEDE dated 2014-03-04 Electricity Production License issued by Energy Regulatory Commission dated 2012-02-02 Plant Operating License issued by Ministry of Industry dated 2010-03-02		Others
59	PP	/RER/	Revised_50018_BKK_E_Revised_Gas_Model_for_FAM_V11_230712_Case B Chosen (Revised) 50018_BKK_E_Revised_Gas_Model for FAM_V11_230712		PP
60	PP	/EWPI/	BKK East Waste Profile G15 up to		PP

No.	Author	Reference	Title	References to the document	Provider
			201507		
61		/dna-HP/	DNA of Thailand	http://www.tgo.or.th/english/	
62		/dna-SP/	DNA of United Kingdom of Great Britain and Northern Ireland	http://www.environment-agency.gov.uk/business/topics/pollution/129666.aspx	
63		/unfccc/	UNFCCC	http://cdm.unfccc.int	
64		/ipcc/	IPCC publications	www.ipcc-nggip.iges.or.jp	

Appendix 4. Clarification requests, corrective action requests and forward action requests

Table 1. Remaining FAR from validation and/or previous verification

FAR ID	xx	Section no.	E.2	Date: DD/MM/YYYY
Description of FAR				
Project participant response (1st round)				Date: DD/MM/YYYY
Documentation provided by project participant (1st round)				
☐	Changes in the PDD	Section(s):	New version No.:	
☐	Changes in MR	Section(s):	New version No.:	
☐	Changes in XLS	Worksheet(s):	New version No.:	
☐	Other:			
DOE assessment (1st round)				Date: DD/MM/YYYY
Conclusion <i>Tick the appropriate checkbox</i>		☐ Additional action should be taken (finding remains open) ☐ The finding is closed		

Table 2. CL from this verification

CAR ID	E3-01	Section no.	B.1, Annex F	Date: 08/12/2015
Description of CAR				
MR version 1.0 Section B.1, Annex F: The PP is requested to include the non-compliance events of in the table.				
Project participant response (1st round)				
The non-compliance events of monitoring instrument have been included in the Annex F. Special Events of the revised MR version 2.0. The events are included monitoring instrument replacement, failure and calibration.				
Documentation provided by project participant (1st round)				Date: 18/12/2015
☐	Changes in the PDD	Section(s):	New version No.:	
☒	Changes in MR	Section(s): Annex F	New version No.: 2.0	
☐	Changes in XLS	Worksheet(s):	New version No.:	
☐	Other:			
DOE assessment (1st round)				Date: 28/12/2015

MR version 2.0 Section B.1, Annex F: The non-compliance events of monitoring instrument that include monitoring instrument replacement, failure and calibration have been included in the Annex F.

Conclusion

Tick the appropriate checkbox

- ☐ Additional action should be taken (finding remains open)
☒ The finding is closed

Table 3. CAR from this verification

CAR ID	E.6.01	Section no.	Section D.2	Date: 08/12/2015
Description of CL				
MR version 1.0 Section D.2, Parameter TDL _{j,y} : The page or table of the referred document for the source of data is not stated.				
Project participant response (1st round)				Date: 18/12/2015
The reference table number and page number for the source of Parameter TDL _{j,y} has been included in the section D.2 Parameter TDL _{j,y} of the revised MR report version 2.0				
Documentation provided by project participant (1st round)				
☐	Changes in the PDD	Section(s):		New version No.:
☒	Changes in MR	Section(s): D.2 Parameter TDL _{j,y}		New version No.: 2.0
☐	Changes in XLS	Worksheet(s):		New version No.:
☐	Other:			
DOE assessment (1st round)				Date: 28/12/2015
MR version 2.0, Section D.2, Parameter TDL _{j,y} : The table and page number for the reference source is updated according to Annual Report Energy Balance in Thailand 2014 by DEDE Department Ministry of Energy, Thailand				
Conclusion				
<i>Tick the appropriate checkbox</i>		☐ Additional action should be taken (finding remains open) ☒ The finding is closed		

CAR ID	E.6-02	Section no.	D.2 & ER spreadsheet	Date: 08/12/2015
Description of CAR				
MR version 1.0 Section D.2, Parameter FC _{i,j,y} : The value of monitored parameter refers to the ER spreadsheet. However, it is not indicated in the spreadsheet.				
Project participant response (1st round)				
The value of monitored parameter FC _{i,j,y} has now indicated in the revised ER spreadsheet version 2.0.				
Documentation provided by project participant (1st round)				Date: 18/12/2015
☐	Changes in the PDD	Section(s):		New version No.:
☐	Changes in MR	Section(s):		New version No.:
☒	Changes in XLS	Worksheet(s): 201411-201510		New version No.:
☐	Other:			
DOE assessment (1st round)				Date: 28/12/2015
MR version 2.0 Section D.2, Parameter FC _{i,j,y} : The value of monitored parameter refers to the ER spreadsheet. The ER spreadsheet is updated and includes a table to indicate zero consumption of fossil fuel.				
Conclusion				
<i>Tick the appropriate checkbox</i>		☐ Additional action should be taken (finding remains open) ☒ The finding is closed		

Table 4. FAR from this verification

FAR ID	xx	Section No.		Date: DD/MM/YYYY
Description of FAR				
Project participant response				Date: DD/MM/YYYY
Documentation provided by project participant				
☐	Changes in the PDD	Section(s):		New version No.:
☐	Changes in MR	Section(s):		New version No.:

CDM-VCR-FORM

☐ Changes in XLS	Worksheet(s):	New version No.:
☐ Other:		
DOE assessment		Date: DD/MM/YYYY
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the next periodic verification	

Appendix 5. Monitored Parameters

Table A-5: Periodic Verification Checklist – Monitored Parameters

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
1. LFG_{total,y}		Description: Total amount of landfill gas captured at Normal Temperature and Pressure		
a) Measurement / Determination method (VVS, §§ 389-393) Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)). Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements. Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.	/MR/ /PDD2/ /ACM1/ /RD1/ /ER/ /EI4-EI6/ /MD3/	<i>Description:</i> The total amount of LFG captured is measured continuously by a differential pressure V-cone flow meter and the data is captured on one minute basis and recorded in the SCADA system. The LFG flow rate is measured in cubic meter. To convert the recorded data to normalised flow rate, the LFG pressure and temperature is required. A pressure and temperature transmitter is installed next to the flow meter to capture the pressure and temperature data. For operational purposes, the PA has two gas lines installed. Each of gas line has one set differential pressure V-Cone flow meter, pressure transmitter and temperature transmitter. During the monitoring period, there was exchange of flow meter and transmitters due to calibration purposes. <i>Verifier's action:</i> During the onsite assessment the measuring instruments are inspected to verify the flow meter, pressure and temperature transmitter are installed. The instruments specifications are compared with the technical data sheet. . The documentation for the exchange of the monitoring instruments was verified and compared with the operation log sheet and work statements to confirm the exchange of the instrument.	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		The specification of the exchanged instrument was checked to ensure the similar instrument is installed. The data in ER spreadsheet was cross-checked with the raw data to confirm the data is captured every minute and aggregated on a daily, monthly and yearly basis. <i>Conclusion:</i> The parameter is monitored in accordance with the approved revised PDD and applied methodology		
b) Accuracy and QA/QC Procedure (VVS, §§ 394-400) <i>In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.</i> <i>Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance.</i> <i>Include calibration dates and information in validity of the installed monitoring equipment in the table in Annex 2.</i>	/MR/ /QA1/ /C1/ /EI4-EI6/ /IM01/	<i>Description:</i> The flow meter is calibrated once every 2 years based on manufacturer requirements. The pressure and temperature transmitter are calibrated annually according to manufacturer specifications. A summarized list of the instruments information such as type, accuracy, calibration is provided in Appendix 6 of this report. <i>Verifier's action:</i> The specifications of the instruments were reviewed to confirm the accuracy and type. The calibration certificates of the installed instruments were verified to confirm the validity. CDM Monitoring and Quality Control Manual was reviewed and operational personnel was interviewed. <i>Conclusion:</i> It is concluded that the accuracy and the QA/QC procedures are met.	OK	OK
c) Correctness (VVS, §§ 389-393)	/MR/ /PDD2/	☒ Correct ☐ Not correct (initial assessment) <i>Description:</i>	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<i>Determine whether the value given in the monitoring report is correct or determined in a conservative manner.</i> <i>In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.</i> <i>In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i>	/ER/ /RD1/ /QA1/	The total amount of LFG captured from the landfill can be determined by the summation of the LFG combusted by the gas engine (LFG_{electricity,y}) and LFG flare (LFG_{flare,y}). In order to be conservative, the lower value of either the monitored total LFG (LFG_{total,y}) or the summation of LFG engine (LFG_{electricity,y}) and LFG flare (LFG_{flare,y}) will be applied to calculate the emission reduction (MD_{Project,y}). This method was documented as "Mass Balance" in the CDM Monitoring and Quality Control Manual. <i>Verifier's action:</i> The ER spreadsheet was checked to confirm the conservative approach taken by the project proponent to calculate the ER for correctness. The mass balance calculation applied in the raw data calculation was checked against the documented method in the CDM Monitoring and Quality Control Manual. <i>Conclusion:</i> It is concluded that the value reported is correct and conservatively determined.		
2. LFG_{flare,y} (The same as FV_{RG,h}, different nomenclature for ACM0001 (version 11) and "Tool to determine project emissions from flaring gases containing methane")		Description: Amount of landfill gas flared at Normal Temperature and Pressure		
a) Measurement / Determination method (VVS, §§ 389-393) <i>Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).</i> <i>Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard</i>	/MR/ /PDD2/ /ACM1/ /ER/ /RD1/ /EI4-EI6/	<i>Description:</i> The amount of LFG flared is measured continuously by a differential pressure V-cone flow meter and the data is captured on one minute basis and recorded in the SCADA system. The LFG flow rate is measured in cubic meter. To convert the recorded data to normalised flow rate, the LFG pressure and temperature is required.	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<i>equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements. Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</i>	/MD2/ /ACM1/	A pressure and temperature transmitter is installed next to the flow meter to capture the pressure and temperature data. During the monitoring period, there was exchange of pressure and temperature transmitters due to calibration purposes. <i>Verifier's action:</i> During the onsite assessment the measuring instruments are inspected to verify the flow meter, pressure and temperature transmitter are installed. The instruments specifications are compared with the technical data sheet. The documentation for the exchange of the monitoring instruments was verified and compared with the operation log sheet and work statements to confirm the exchange of the instrument. The specification of the exchanged instrument was checked to ensure the similar instrument is installed. The data in ER spreadsheet was cross-checked with the raw data to confirm the data is captured every minute and aggregated on a daily, monthly and yearly basis. <i>Conclusion:</i> The parameter is monitored in accordance with the approved revised PDD and applied methodology		
b) Accuracy and QA/QC Procedure (VVS, §§ 394-400) <i>In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.</i>	/MR/ /QA1/ /C2/ /EI4-EI6/ /ER/	<i>Description:</i> The flow meter is calibrated once every 2 years based on manufacturer requirements. The pressure and temperature transmitters are calibrated annually according to manufacturer specifications. A summarized list of the instruments information such as type, accuracy, calibration is provided in Appendix 6 of this report	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<i>Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance.</i> <i>Include calibration dates and information in validity of the installed monitoring equipment in the table in Annex 2.</i>		<i>Verifier's action:</i> The specifications of the instruments were reviewed to confirm the accuracy and type. The calibration certificates of the installed instruments were verified to confirm the validity. CDM Monitoring and Quality Control Manual was reviewed and operational personnel was interviewed. <i>Conclusion:</i> It is concluded that the accuracy and the QA/QC procedures are met.		
c) Correctness (VVS, §§ 389-393) <i>Determine whether the value given in the monitoring report is correct or determined in a conservative manner.</i> <i>In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.</i> <i>In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i>	/MR/ /PDD2/ /ER/ /RD1/	☒ Correct ☐ Not correct (initial assessment) <i>Description:</i> The value applied is a direct monitored data. As conservative approach, the emission reduction ($MD_{Project,y}$) will be calculated using the lower value of either the monitored total LFG ($LFG_{total,y}$) or the summation of the LFG engine ($LFG_{electricity,y}$) and LFG flare ($LFG_{flare,y}$). This method has been documented as "Mass Balance" in the CDM Monitoring and Quality Control Manual. <i>Verifier's action:</i> The ER spreadsheet was checked to confirm the conservative approach taken by the project proponent to calculate the ER for correctness. The mass balance calculation applied in the raw data calculation was checked against the documented method in the CDM Monitoring and Quality Control Manual. . <i>Conclusion:</i>	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		It is concluded that the value reported is correct and applied conservatively.		
3. LFG_{electricity,y}		Description: Amount of landfill gas combusted in power plant at Normal Temperature and Pressure		
a) Measurement / Determination method (VVS, §§ 389-393) Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)). Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements. Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.	/ MR/ / PDD2/ / ER/ / ACM1/ / RD1/ / EI4-EI6/ / MD1/ / O4/ / C3/ / QA1/	<i>Description:</i> The total amount of LFG captured is measured continuously by a differential pressure V-cone flow meter and the data is captured on one minute basis and recorded in the SCADA system. The LFG flow rate is measured in cubic meter. To convert the recorded data to normalised flow rate, the LFG pressure and temperature is required. A pressure and temperature transmitter is installed next to the flow meter to capture the pressure and temperature data. During the monitoring period, there was exchange of the flow meters and transmitters due to calibration purpose. According to the CDM Monitoring and Quality Control Manual. In the event of failure or corruption of on-line monitoring systems or maintenance that causes erroneous data, the LFG amount combusted by the gas engine will be back calculated using the monitored gross electricity generated and LFG energy content of previous monitoring periods. The formula applied for the back calculation as below: <u>Energy Input Required from LFG</u> LFG Energy Content Where: Energy Input Required from LFG is the monitored gross electricity generated of previous monitoring periods.	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		LFG Energy content is the average monitored methane concentration of previous monitoring period multiply with Energy content of 1% methane gas which is 0.099kWh/m³. This value has been checked for consistent with the information supplied by the gas engine supplier. <i>Verifier's action:</i> During the onsite assessment the measuring instruments are inspected to verify the flow meter, pressure and temperature transmitter are installed. The instruments specifications are compared with the technical data sheet. . The documentation for the exchange of the monitoring instruments was verified and compared with the operation log sheet and work statements to confirm the exchange of the instrument. The specification of the exchanged instrument was checked to ensure the similar instrument is installed. The exchanging of the monitoring equipment was documented. The verification team has reviewed the operation log sheet and samples of the work statement to confirm the exchange of the equipment. The specification of the exchanged equipment was checked to ensure the similar equipment is installed. The data in ER spreadsheet was cross-checked with the raw data to confirm the data is captured every minute and aggregated on a daily, monthly and yearly basis. The back calculation applied for the amount of LFG amount utilised was checked against the method documented in the CDM Monitoring and Quality Control Manual. The verification team considered the method applied is conservative because of the following:		

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		1. The data utilized for the calculation was continuous monitored data captured by the SCADA system. 2. The Energy Input Required from LFG was determined on engine specific. This has shown that the project proponent had considered that each engine may have slight differences which can vary the calculation. 3. The verification team has replicated the values using previous monitoring periods data to cross-check the data applied is conservative. It can be concluded that the method applied to back calculate the amount of LFG utilized for electricity generation is conservative and appropriate.. <i>Conclusion:</i> The parameter is monitored in accordance with the approved revised PDD.		
b) Accuracy and QA/QC Procedure (VVS, §§ 394-400) <i>In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.</i> <i>Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance.</i> <i>Include calibration dates and information in validity of the installed monitoring equipment in the table in Annex 2.</i>	/MR/ /QA1/ /C3/ /EI4-EI6/ /IM01/	<i>Description:</i> The flow meter is calibrated once every 2 years based on manufacturer requirements. The pressure and temperature transmitter are calibrated annually according to manufacturer specifications. A summarized list of the instruments information such as type, accuracy, calibration is provided in Appendix 2 of this report. <i>Verifier's action:</i> The specifications of the instruments were reviewed to confirm the accuracy and type. The calibration certificates of the installed instruments were verified. CDM Monitoring and Quality Control Manual was reviewed and	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		operational personnel was interviewed. <i>Conclusion:</i> It is concluded that the accuracy and the QA/QC procedures are met.		
c) Correctness (VVS, §§ 389-393) <i>Determine whether the value given in the monitoring report is correct or determined in a conservative manner.</i> <i>In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.</i> <i>In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i>	/MR/ /ER/ /RD1/ /QA1/ /C3/	☒ Correct ☐ Not correct (initial assessment) <i>Description:</i> The value applied is a direct monitored data. A conservative approach for emission reduction ($MD_{Project,y}$) calculation, the lower value of the either the monitored total LFG ($LFG_{total,y}$) or the summation of the LFG engine ($LFG_{electricity,y}$) and LFG flare ($LFG_{flare,y}$) is applied. This method is based on the "Mass Balance" in the CDM Monitoring and Quality Control Manual. <i>Verifier's action:</i> The ER spreadsheet was checked to confirm the conservative approach taken by the project proponent to calculate the ER for correctness. The mass balance calculation applied in the raw data calculation was checked against the documented method in the CDM Monitoring and Quality Control Manual. . <i>Conclusion:</i> It is concluded that the value applied is correct	OK	OK
4. PE_{flare,y}		Description: Project emissions from flaring of the residual gas stream in year y		
a) Measurement / Determination method (VVS, §§ 389-393) <i>Describe how the monitoring parameter was measured / determined. Focus primarily on the</i>	/MR/ /PDD2/ /TF/	<i>Description:</i> The parameter is the monitoring of project emissions from flaring.	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<i>original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).</i> <i>Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements. Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</i>	/ER/ /ACM1/	The flaring efficiency is determined from the monitoring of the flare stack temperature and LFG flow rate. According to the applied tool for flaring, Tool to determine project emission from flaring containing methane, the flare efficiency is determined based on the flare stack temperature of 500°C for the number of minutes of flaring achieved in an hour <i>h</i> and meeting the operation requirement of the flare system recommended by the flare manufacturer. The flare manufacturer specifications as follows: 1. Flare temperature: 500 to 1,200°C 2. Flow rate: 250 to 2,000Nm³/h 3. Methane concentration: 20 to 65% When the flare in operation for more than 40 minutes in the hour <i>h</i> meeting the manufacturer's specifications as above, the flare efficiency of 90% will be applied. When the flare in operation for more than 40 minutes in the hour <i>h</i> but not meeting the manufacturer's specifications as above, the flare efficiency of 50% will be applied applied. When the flare in operation for more than 20 minutes in the hour <i>h</i> with the temperature of less than 500°C the flare efficiency of 0% will be applied. The flare data is measured continuously when the flare is in operation and recorded in the SCADA system. <i>Verifier's action:</i> The flare efficiency applied in the ER spreadsheet is reviewed that the temperature and flow rate is achieved in order to apply the 90% or 50% default value in accordance to manufacturer specifications. The data is linked to parameters T_{flare} and LFG_{flare,y} and Other		

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		flare operating parameters was verified. <i>Conclusion:</i> The parameter is monitored in accordance with the registered PDD and applied methodology		
b) Accuracy and QA/QC Procedure (VVS, §§ 394-400) <i>In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.</i> <i>Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance.</i> <i>Include calibration dates and information in validity of the installed monitoring equipment in the table in Annex 2.</i>	/MR/ /ER/ /TF/ /QA1/ /IM01/	<i>Description:</i> The data is determined based on monitored parameters T_{flare} and $LFG_{\text{flare,y}}$ and other flare operating parameters <i>Verifier's action:</i> The flare efficiency applied in the ER spreadsheet is reviewed that temperature and flow rate is achieved in order to apply the 90% or 50% default value in accordance to manufacturer specifications. The data is linked to parameters T_{flare} and $LFG_{\text{flare,y}}$ and Other flare operating parameters. CDM Monitoring and Quality Control Manual was reviewed and operational personnel was interviewed. <i>Conclusion:</i> It is concluded that the accuracy and the QA/QC procedures are met.	OK	OK
c) Correctness (VVS, §§ 389-393) <i>Determine whether the value given in the monitoring report is correct or determined in a conservative manner.</i> <i>In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.</i> <i>In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i>	/MR/ /PDD2/ /ACM1/ /TF/ /ER/ /RD1/	☒ Correct ☐ Not correct (initial assessment) <i>Description:</i> The data is determined based on monitored parameters T_{flare} and $LFG_{\text{flare,y}}$ and Other flare operating parameters <i>Verifier's action:</i> The default value of the flare efficiency applied in ER spreadsheet to calculate the project emission was checked for correctness.	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		<i>Conclusion:</i> It is concluded that the parameter is correctly monitored and data applied is conservative.		
5. $\omega_{CH_4,v}$ (The same parameter as $f_{v_{CH_4,RG,h}}$ different nomenclature for ACM001(version 11) and “Tool to determine project emissions from flaring gases containing methane”)		Description: Methane fraction in the landfill gas		
a) Measurement / Determination method (VVS, §§ 389-393) Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)). Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements. Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.	/MR/ /PDD2/ /ACM1/ /RD1/ /QA1/ /ER/ /EI4/	<i>Description:</i> The methane concentration/fraction is continuously monitored by an online gas analyser and the data is captured on one minute basis and recorded in the SCADA system. The monitored data of not more than 1 hour time interval will be averaged and applied in the emission reduction calculations. The LFG is monitored on dry basis. During the monitoring period, there were several exchange of the gas analyser for calibration or malfunction <i>Verifier's action:</i> During the onsite assessment the measuring instrument was inspected to verify the analyser is installed for on-line continuous measurement. The documentation for the exchange of the analyser was verified and compared with the operation log sheet and work statements to confirm the exchange of the instrument. The specification of the exchanged instrument was checked to ensure the similar instrument is installed. The data in ER spreadsheet was cross-checked with the raw data to confirm the data is captured every minute and aggregated on a daily, monthly and yearly basis.	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		The ER spreadsheet was checked to confirm the average interval is not more than 1 hour. The LFG is confirmed to be dry gas as the average temperature of the LFG during the monitoring period is less than 60°C. Please refer to T- Temperature of Landfill gas for assessment. <i>Conclusion:</i> The parameter is monitored in accordance with the approved revised PDD and applied methodology		
b) Accuracy and QA/QC Procedure (VVS, §§ 394-400) <i>In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.</i> <i>Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance.</i> <i>Include calibration dates and information in validity of the installed monitoring equipment in the table in Annex 2.</i>	/MR/ /PDD2/ /EI7/ /C4/ /QA1/	<i>Description:</i> The gas analyser is calibrated annually based on the manufacturer requirements. A summarized list of the instruments information such as type, accuracy, calibration is provided in Appendix 6 of this report <i>Verifier's action:</i> The specification of the gas analyser was reviewed to confirm the accuracy and type. The calibration certificates were verified to confirm the validity. CDM Monitoring and Quality Control Manual was reviewed and operational personnel was interviewed. <i>Conclusion:</i> It is concluded that the accuracy and the QA/QC procedures are met.	OK	OK
c) Correctness (VVS, §§ 389-393) <i>Determine whether the value given in the monitoring report is correct or determined in a conservative manner.</i> <i>In case of conservative approaches used in lieu of the</i>	/MR/ /RD1/ /ER/ /QA1/	☒ Correct ☐ Not correct (initial assessment) <i>Description:</i> The value applied is a direct monitored data. <i>Verifier's action:</i>	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<i>monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.</i> <i>In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i>		The raw data were check to confirm the consistency of the data applied in the ER spreadsheet for correctness. In the event of any data failure, for conservativeness, zero will be applied. <i>Conclusion:</i> It is concluded that the value reported is correct and applied conservatively.		
6. T		Description: Temperature of the landfill gas		
a) Measurement / Determination method (VVS, §§ 389-393) <i>Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).</i> <i>Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements. Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</i>	/MR/ /PDD2/ /ACM1/ /RD1/ /ER/ /EI6/ /QA1/	<i>Description:</i> The temperature of the landfill gas is continuously measured by a temperature transmitter and the data is captured on one minute basis and recorded in the SCADA system. A temperature transmitter is installed on each gas line. For accurate reading, the temperature transmitters were installed near to the gas flow meter. The PA has 2 main gas pipelines, 3 flare systems and 8 gas engines. Temperature transmitters are installed at each of the main gas pipelines, at the flare systems and gas engines to measure the LFG temperature. The temperature data is directly linked to the gas flow meter to calculate the normalized gas volume. During the monitoring period, there were several exchanges of the temperature transmitters for calibration purposes. According to the CDM Monitoring and Quality Control Manual. In the event of failure or corruption of on-line monitoring systems or maintenance that causes erroneous data and any such data captured will be considered as zero. <i>Verifier's action:</i>	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		During the onsite assessment the measuring instruments are inspected to verify the flow meter, pressure and temperature transmitter are installed. The instruments specifications are compared with the technical data sheet. The documentation for the exchange of the monitoring instruments was verified and compared with the operation log sheet and work statements to confirm the exchange of the instrument. The specification of the exchanged instrument was checked to ensure the similar instrument is installed. The CDM Monitoring and Quality Control Manual was reviewed to confirm that in case of data failure, the QA/QC procedure is applied. The ER spreadsheet was cross-checked with the raw data to confirm if there is data failure, no data applied in the ER calculation. <i>Conclusion:</i> The parameter is monitored in accordance with the approved revised PDD and applied methodology.		
b) Accuracy and QA/QC Procedure (VVS, §§ 394-400) <i>In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs. Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line</i>	/MR/ /QA1/ /EI6/ /C1 - C3/ /RD1/ /ER/	<i>Description:</i> The temperature transmitters are calibrated annually according to manufacturer specifications. A summarized list of the instruments information such as type, accuracy, calibration is provided in Appendix 6 of this report <i>Verifier's action:</i> The specifications of the instruments were reviewed to confirm the accuracy and type. The calibration certificates of the installed instruments were verified to confirm the validity.	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
with the latest EB guidance. Include calibration dates and information in validity of the installed monitoring equipment in the table in Annex 2.		CDM Monitoring and Quality Control Manual was reviewed and operational personnel was interviewed. The data in the ER spreadsheet was reviewed to cross-checked with the raw data for consistency. Conclusion: It is concluded the accuracy of the measurements are met.		
c) Correctness (VVS, §§ 389-393) Determine whether the value given in the monitoring report is correct or determined in a conservative manner. In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given. In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.	/MR/ /RD1/ /ER/	☒ Correct ☐ Not correct (initial assessment) Description: The value applied is a direct monitored data. Verifier's action: The ER spreadsheet was checked to confirm the conservative approach taken by the project proponent to calculate the ER for correctness. Conclusion: It is concluded that the value applied is incorrect due to delay in calibration for several transmitters.	OK	OK
7. P		Description: Pressure of the landfill gas		
a) Measurement / Determination method (VVS, §§ 389-393) Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)). Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the	/MR/ /PDD2/ /ACM1/ /EI5/ /RD1/ /ER/	Description: The pressure of the landfill gas is continuously measured by a pressure transmitter and the data is captured on one minute basis and recorded in the SCADA system. A pressure transmitter is installed on each gas line. For accurate reading, the pressure transmitters were installed near to the gas flow meter. The PA has 2 main gas pipelines, 3 flare systems and 8 gas engines. Pressure transmitters are installed at each of the main gas pipelines, at the flare systems and gas engines to measure	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<i>frequency of measurements as per the requirements. Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</i>		the LFG pressure. The pressure data is directly linked to the gas flow meter to calculate the normalized gas volume. During the monitoring period, there were several exchanges of the pressure transmitters for calibration purposes. According to the CDM Monitoring and Quality Control Manual. In the event of failure or corruption of on-line monitoring systems or maintenance that causes erroneous data and any such data captured will be considered as zero. <i>Verifier's action:</i> During the onsite assessment the measuring instruments are inspected to verify the flow meter, pressure and temperature transmitter are installed. The instruments specifications are compared with the technical data sheet. The documentation for the exchange of the monitoring instruments was verified and compared with the operation log sheet and work statements to confirm the exchange of the instrument. The specification of the exchanged instrument was checked to ensure the similar instrument is installed. The CDM Monitoring and Quality Control Manual was reviewed to confirm that in case of data failure, the QA/QC procedure is applied. The ER spreadsheet was cross-checked with the raw data to confirm if there is data failure, no data applied in the ER calculation. <i>Conclusion:</i> The parameter is monitored in accordance with the approved revised PDD and applied methodology.		

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
b) Accuracy and QA/QC Procedure (VVS, §§ 394-400) <i>In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.</i> <i>Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance.</i> <i>Include calibration dates and information in validity of the installed monitoring equipment in the table in Annex 2.</i>	/MR/ /QA1/ /EI5/ /C1-C3/ /RD1/ /ER/	<i>Description:</i> The absolute pressure transmitters are calibrated annually according to manufacturer specifications. A summarized list of the instruments information such as type, accuracy, calibration is provided in Appendix 6 of this report <i>Verifier's action:</i> The specifications of the instruments were reviewed to confirm the accuracy and type. The calibration certificates of the installed instruments were verified to confirm the validity. CDM Monitoring and Quality Control Manual was reviewed and operational personnel was interviewed. The data in the ER spreadsheet was reviewed to cross-checked with the raw data for consistency. <i>Conclusion:</i> It is concluded the accuracy of the measurements are met.	OK	OK
c) Correctness (VVS, §§ 389-393) <i>Determine whether the value given in the monitoring report is correct or determined in a conservative manner.</i> <i>In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.</i> <i>In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i>	/MR/ /RD1/ /RD2 /ER/	☒ Correct ☐ Not correct (initial assessment) <i>Description:</i> The value applied is a direct monitored data. <i>Verifier's action:</i> The ER spreadsheet was checked to confirm the conservative approach taken by the project proponent to calculate the ER for correctness. <i>Conclusion:</i> It is concluded that the value applied is incorrect due to delay in calibration for several transmitters.	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
8. EL_{LFG}		Description: Net quantity of electricity produced / exported using LFG		
a) Measurement / Determination method (VVS, §§ 389-393) Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)). Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements. Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.	/MR/ /PDD2/ /ACM1/ /EI8/ /E1/ /E2/ /ER/	<i>Description:</i> The electricity exported to the Grid is continuously measured by an electricity meter. There are two electricity meters installed, one primary main meter owned by PEA (Provincial Electricity Authority) and one as secondary backup meter owned by the project owner. In the event the primary meter fails, the exported electricity will be based on the secondary meter. The accuracy of the secondary back-up meter is the same as the primary main meter. <i>Verifier's action:</i> During the onsite assessment, the meters were inspected to confirm the specification and accuracy are the same. The electricity monthly records and invoices were reviewed. The data applied in the ER spreadsheet were cross-checked with the invoices. <i>Conclusion:</i> The parameter is monitored in accordance to the approved revised PDD and applied methodology.	OK	OK
b) Accuracy and QA/QC Procedure (VVS, §§ 394-400) In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have	/MR/ /QA1/ /EI8/ /C6/ /ER/	<i>Description:</i> The electricity meters are calibrated according to the Thailand standard annually by PEA. A summarized list of the instruments information such as type, accuracy, calibration is provided in Appendix 6 of this report <i>Verifier's action:</i>	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<i>been made for calculating ERs. Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance. Include calibration dates and information in validity of the installed monitoring equipment in the table in Annex 2.</i>	/IM01/	The calibration certificates were verified to confirm the validity and issued by by PEA. The meters specification was reviewed to confirm the accuracy of the equipment. CDM Monitoring and Quality Control Manual was reviewed and operational personnel was interviewed. The data in the ER spreadsheet was reviewed to cross-checked with the data for consistency. <i>Conclusion:</i> It is concluded the accuracy of the measurements are met.		
c) Correctness (VVS, §§ 389-393) <i>Determine whether the value given in the monitoring report is correct or determined in a conservative manner. In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given. In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i>	/MR/ /E1/ /E2/ /ER/	☒ Correct ☐ Not correct (initial assessment) <i>Description:</i> The amount of electricity exported is a direct measured data. <i>Verifier's action:</i> The monthly electricity reports issued by the PEA were reviewed to confirm the electricity amount applied in the ER calculation is correct. <i>Conclusion:</i> It is concluded that the parameter is monitored correctly in a conservative manner.	OK	OK
9. EL_{import} (The same parameter as EC_{PJ,i,y})		Description: Net amount of electricity imported from the grid for auxiliary use		
a) Measurement / Determination method (VVS, §§ 389-393) <i>Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied</i>	/MR/ /PDD2/ /ACM1/ /E1/	<i>Description:</i> The electricity imported from the Grid is continuously measured by an electricity meter. There are two electricity meters installed, one primary main	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<i>data aggregation trails (from ODL to data aggregation level zero (DAL0)).</i> <i>Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements. Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</i>	/EI8/ /ER/	meter owned by PEA (Provincial Electricity Authority) and one as secondary backup meter owned by the project owner. In the event the primary meter fails, the exported electricity will be based on the secondary meter. The accuracy of the secondary back-up meter is the same as the primary main meter. <i>Verifier's action:</i> During the onsite assessment, the meters were inspected to confirm the specification and accuracy are the same. The electricity monthly records and invoices were reviewed. The data applied in the ER spreadsheet were cross-checked with the invoices. <i>Conclusion:</i> The parameter is monitored in accordance to the approved revised PDD and applied methodology.		
b) Accuracy and QA/QC Procedure (VVS, §§ 394-400) <i>In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.</i> <i>Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance.</i> <i>Include calibration dates and information in validity of the installed monitoring equipment in the table in Annex 2.</i>	/MR/ /QA1/ /EI8/ /C6/ /IM01/	<i>Description:</i> The electricity meters are calibrated according to the Thailand standard annually by PEA. A summarized list of the instruments information such as type, accuracy, calibration is provided in Appendix of this report <i>Verifier's action:</i> The calibration certificates were verified to confirm the validity and issued by by PEA. The meters specification was reviewed to confirm the accuracy of the equipment. CDM Monitoring and Quality Control Manual was reviewed and operational personnel was interviewed.	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		The data in the ER spreadsheet was reviewed to cross-checked with the data for consistency. <i>Conclusion:</i> It is concluded the accuracy of the measurements are met.		
c) Correctness (VVS, §§ 389-393) <i>Determine whether the value given in the monitoring report is correct or determined in a conservative manner.</i> <i>In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.</i> <i>In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i>	/MR/ /ER/ /E2/	☒ Correct ☐ Not correct (initial assessment) <i>Description:</i> The amount of electricity imported is a direct measured data. <i>Verifier's action:</i> The monthly electricity reports issued by the PEA were reviewed to confirm the electricity amount applied in the ER calculation is correct. <i>Conclusion:</i> It is concluded that the parameter is monitored correctly in a conservative manner.	OK	OK
10. Operation of the energy plant		Description: Operation of the energy plant		
a) Measurement / Determination method (VVS, §§ 389-393) <i>Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).</i> <i>Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.</i> <i>Assess whether the measurement / determination method is in line with the registered monitoring plan</i>	/MR/ /ACM1/ /PDD2/ /MD1/ /MD4/ /ER/	<i>Description:</i> The operational hours of the gas engine are measured continuously by the run-hour meter installed at the gas engine and recorded in the SCADA system. The data are recorded on yearly basis. <i>Verifier's action:</i> During the onsite assessment, the run-hour meters installed at each engine were inspected. The operational log records were reviewed that is no exchange of gas engine during this monitoring period. The monitored of the engine operating hours will not affect the	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<i>of the PDD and the applied methodology.</i>		emission reduction calculations. Therefore the verification team considered the measurement is insignificant. <i>Conclusion:</i> The parameter is monitored in accordance with the approved revised PDD and applied methodology.		
b) Accuracy and QA/QC Procedure (VVS, §§ 394-400) <i>In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs. Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance. Include calibration dates and information in validity of the installed monitoring equipment in the table in Annex 2.</i>	/MR/ /MD1/ /MD4/ /QA1/	<i>Description:</i> The data is a direct monitored data. There is no calibration required and will checked during the service and maintenance of the engine. <i>Verifier's action:</i> The operation records of the engines were reviewed to confirm the engines service and maintenance was conducted. CDM Monitoring and Quality Control Manual was reviewed and operational personnel was interviewed. <i>Conclusion:</i> It is concluded the monitoring of the data is met. The monitored engine operating hours will not affect the emission reduction calculations. Therefore the verification team deemed the measurement is insignificant.	OK	OK
c) Correctness (VVS, §§ 389-393) <i>Determine whether the value given in the monitoring report is correct or determined in a conservative manner. In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given. In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i>	/MR/ /MD1/ /MD4/ /QA1/	☒ Correct ☐ Not correct (initial assessment) <i>Description:</i> The data is a direct monitored data. There is no calibration required and will checked during the service and maintenance of the engine. <i>Verifier's action:</i> The operation records of the engines were reviewed to confirm the engines service and maintenance was conducted.	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		CDM Monitoring and Quality Control Manual was reviewed and operational personnel was interviewed. <i>Conclusion:</i> It is concluded the monitoring of the data is met. The monitored engine operating hours will not affect the emission reduction calculations. Therefore the verification team deemed the measurement is insignificant.		
11. T_{flare}		Description: Temperature of the exhaust gas of the flare		
a) Measurement / Determination method (VVS, §§ 389-393) <i>Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).</i> <i>Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements. Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</i>	/MR/ /PDD2/ /TF/ /EI2/ /MD2/ /ER/	<i>Description:</i> The temperature of the flare systems exhaust is measured continuously by a type N Thermocouple and the data is recorded on one minute basis by the SCADA system. There are 3 thermocouples installed at each flare stack. When any of thermocouple captured the temperature of 500°C that maintained for 40 minutes in hour <i>h</i> (and related manufacturer operation parameters are met), the flaring efficiency of 90% will applies in accordance to the Tool to determine project emission from flaring gases containing methane.. During the monitoring period, there were several exchanges of the thermocouples for calibration purpose. There were no changes of the flare system. In case the thermocouples fail, it will be 100% project emission from flaring and will be accounted as zero in the emission reduction calculation. <i>Verifier's action:</i> During the onsite assessment, the installed thermocouples were inspected at each flare system. The thermocouples specifications are compared with the technical data sheet.	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		The documentation for the exchange of the thermocouples was verified and compared with the operation log sheet and work statements to confirm the exchange of the instrument. The specification of the exchanged instrument was checked to ensure the similar instrument is installed. The ER spreadsheet was cross-checked with the raw data to confirm when the flaring temperature is not achieved by any of the thermocouple and not meeting manufacturer specification, zero is applied in the ER calculation. When any one of the thermocouple capture the flaring temperature is above 500⁰C for more than 40minutes in an hour and meet manufacturer requirements, the 90% efficiency is applied in the ER calculations. <i>Conclusion:</i> The parameter is monitored in accordance with the approved revised PDD and applied methodology.		
b) Accuracy and QA/QC Procedure (VVS, §§ 394-400) <i>In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.</i> <i>Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance.</i> <i>Include calibration dates and information in validity of the installed monitoring equipment in the table in Annex 2.</i>	/MR/ /PDD2/ /TF/ /EI2/ /MD2/ /ER/ /IM01/	<i>Description:</i> The temperature of the flare systems exhaust is measured continuously by a calibrated type N Thermocouple. During the monitoring period, there were several exchanges of the thermocouples for calibration purpose. Calibration is conducted annually in accordance to manufacturer specification. <i>Verifier's action:</i> The documentation for the exchange of the thermocouples was verified and compared with the operation log sheet and work statements to confirm the exchange of the instrument. The specification of the exchanged instrument was checked to ensure the similar instrument is installed.	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		The calibration certificates of the installed instruments were verified to confirm the validity. CDM Monitoring and Quality Control Manual was reviewed and operational personnel was interviewed. The data in the ER spreadsheet was reviewed to cross-checked with the raw data for consistency. <i>Conclusion:</i> It is concluded the accuracy of the measurements are met.		
c) Correctness (VVS, §§ 389-393) <i>Determine whether the value given in the monitoring report is correct or determined in a conservative manner.</i> <i>In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.</i> <i>In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i>	/MR/ /ER/ /RD1/ /EI3/	☒ Correct ☐ Not correct (initial assessment) <i>Description:</i> The value applied is a direct monitored data. As conservative approach, no emission reduction from flaring will be accounted when the flaring requirements are not met. <i>Verifier's action:</i> The ER spreadsheet was checked to confirm the conservative approach taken by the project proponent to calculate the ER for correctness. <i>Conclusion:</i> It is concluded that the value applied in ER spreadsheet is correct.	OK	OK
12. $TDL_{j,y}$		Description: Average technical transmission and distribution losses for providing electricity to Source j		
a) Measurement / Determination method (VVS, §§ 389-393) <i>Describe how the monitoring parameter was measured / determined. Focus primarily on the</i>	/MR/ /PDD2/ /O3/	<i>Description:</i> The average transmission and distribution losses of the Thai National Grid will be checked annually by means of document review obtained from Department of Alternative Energy	CAR ~~E-6-01~~	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<i>original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).</i> <i>Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements. Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</i>	/ACM1/	Development and Efficiency (DEDE), Ministry of Energy, Thailand The data from the annual electricity report will be applied to calculate the transmission losses. <i>Verifier's action:</i> The calculation was reviewed to confirm the data applied is from the annual report issued by the Department of Alternative Energy Development and Efficiency (DEDE) The data applied in the ER spreadsheet was cross-checked with the calculated TDL. <i>Conclusion:</i> The parameter is monitored in accordance with the approved revised PDD and applied methodology. However, refer CAR E.6-01 raised		
b) Accuracy and QA/QC Procedure (VVS, §§ 394-400) <i>In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.</i> <i>Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance.</i> <i>Include calibration dates and information in validity of the installed monitoring equipment in the table in Annex 2.</i>	/MR/ /O3/	<i>Description:</i> The data is calculated using the data derived from the annual report issued by the Department of Alternative Energy Development and Efficiency (DEDE) No instrument is used to measure this parameter. <i>Verifier's action:</i> The annual report was reviewed for the data applied in the TDL calculation. CDM Monitoring and Quality Control Manual was reviewed and operational personnel was interviewed. The data in the ER spreadsheet was reviewed to cross-checked the applied data for consistency. <i>Conclusion:</i>	OK	OK

Checklist Item (incl. guidance for the verification team)	Refe- rence	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.								
		It is concluded that the data is accurate.										
c) Correctness (VVS, §§ 389-393) <i>Determine whether the value given in the monitoring report is correct or determined in a conservative manner. In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given. In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i>	/MR/ /O3/	☒ Correct ☐ Not correct (initial assessment) Description: The data is calculated using the data derived from the annual report issued by the Department of Alternative Energy Development and Efficiency (DEDE) Verifier´s action: The data applied in the TDL calculation was cross-checked the Annual Report for consistency. The data applied in the ER spreadsheet was checked for correctness. Conclusion: It is concluded that the value applied in ER spreadsheet is correct.	OK	OK								
13. Other flare operation parameters		Description: The flare efficiency is determined as set out in Annex A and B.										
a) Measurement / Determination method (VVS, §§ 389-393) <i>Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)). Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements. Assess whether the measurement / determination</i>	/MR/ /QA1/ /PDD2/ /TF/ /EI3/ /EI2/ /EI5/ /RD1/ /RD2/	Description: The other flare parameters that monitor the flares are operating within the specifications and to achieve the flare efficiency default values are as follows: <table><tr><th>Parameter</th><th>Range for technical specifications</th></tr><tr><td>Temperature of flare exhaust gas ($T_{flare,1}$)</td><td>500-1,200 °C</td></tr><tr><td>Methane fraction in landfill gas ($\omega_{CH4,y}$)</td><td>25-65%</td></tr><tr><td>Amount of landfill gas flared at Normal temperature and pressure (LFG_{flare})</td><td>300-2,000 Nm³/h</td></tr></table>	Parameter	Range for technical specifications	Temperature of flare exhaust gas ($T_{flare,1}$)	500-1,200 °C	Methane fraction in landfill gas ($\omega_{CH4,y}$)	25-65%	Amount of landfill gas flared at Normal temperature and pressure (LFG_{flare})	300-2,000 Nm³/h	OK	OK
Parameter	Range for technical specifications											
Temperature of flare exhaust gas ($T_{flare,1}$)	500-1,200 °C											
Methane fraction in landfill gas ($\omega_{CH4,y}$)	25-65%											
Amount of landfill gas flared at Normal temperature and pressure (LFG_{flare})	300-2,000 Nm³/h											

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<i>method is in line with the registered monitoring plan of the PDD and the applied methodology.</i>		<i>Verifier's action:</i> During the onsite assessment the following were reviewed: 1. The flare manufacturer specification to confirm the minimum LFG flow of 300Nm³/h must be achieved in order to meet the flaring systems efficiency of 90% for 40 minutes in the hour or 50% above 20 minutes up to 40 minutes in the hour; 2. The CDM Monitoring and QA/QC Manual that no emission reduction will be calculated when the gas flow is less than 300Nm³/h even the temperature of the flare exhaust is more than 500°C; 3. The methane concentration data for the monitoring period is more than 25%; 4. The flow rate data that any flow rate less than 300Nm³/h is considered as zero data in the ER calculations. 5. The flare temperature for any any of the thermocouple is more than 500°C for more than 40 minutes in the hour is 90% efficiency and between 20 to 40 minutes in the hour 50% efficiency is applied for the ER calculations. The ER spreadsheet was checked to verify the data input from the raw data for consistency. <i>Conclusion:</i> The parameter is monitored in accordance with the approved revised PDD and applied methodology.		
b) Accuracy and QA/QC Procedure (VVS, §§ 394-400) <i>In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most</i>	/MR/ /PDD2/ /QA1/ /EI2 – EI6/	<i>Description:</i> The measuring equipment that monitors this parameter are calibrated according to the manufacturer requirements. For details assessment refer to parameters $LFG_{flare,y}$, T_{flare} and $\omega_{CH4,y}$.	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<i>conservative assumptions theoretically possible have been made for calculating ERs.</i> <i>Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance.</i> <i>Include calibration dates and information in validity of the installed monitoring equipment in the table in Annex 2.</i>		A summarized list of the instruments information such as type, accuracy, calibration is provided in Appendix 6 of this report <i>Verifier's action:</i> The specifications of the instruments were reviewed to confirm the accuracy and type. The calibration certificates of the installed instruments were verified to confirm the validity. CDM Monitoring and Quality Control Manual was reviewed and operational personnel was interviewed. The data in the ER spreadsheet was reviewed to cross-checked with the data are applied consistent in the event the flaring requirements are not met. <i>Conclusion:</i> It is concluded the monitoring of the parameter is according to the approved revised PDD.		
c) Correctness (VVS, §§ 389-393) <i>Determine whether the value given in the monitoring report is correct or determined in a conservative manner.</i> <i>In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.</i> <i>In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i>	/MR/ /PDD2/ /ER/	☒ Correct ☐ Not correct (initial assessment) <i>Description:</i> The value applied is a direct monitored data from parameters $LFG_{flare,y}$, T_{flare} and $\omega_{CH4,y}$. <i>Verifier's action:</i> As conservative approach, no emission reduction from flaring will be accounted when the flaring requirements are not met. The ER spreadsheet was checked to verify the data are derived from parameters $LFG_{flare,y}$, T_{flare}, and $\omega_{CH4,y}$ for correctness <i>Conclusion:</i> It is concluded some data in ER spreadsheet are incorrect.	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
14. Regulatory requirements relating to landfill gas projects		Description: Regulatory requirements relating to landfill gas projects may affect the value of AF or MD_{reg,y}		
a) Measurement / Determination method (VVS, §§ 389-393) Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)). Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements. Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.	/MR/ /PDD2/	<i>Description:</i> The regulatory requirements related to LFG projects in Thailand are monitored through public information and government announcement on national regulation. During this monitoring period, no regulation was announced to by the host country to regulate LFG projects. <i>Verifier's action:</i> With the verification team local competent and information gather from the host country DNA it can be confirmed that there was no regulation announced by the host country government for methane capturing in LFG projects. <i>Conclusion:</i> It is concluded the parameter is monitored in accordance with the approved revised PDD.	OK	OK
b) Accuracy and QA/QC Procedure (VVS, §§ 394-400) In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs. Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance. Include calibration dates and information in validity of	/MR/ /PDD2/	<i>Description:</i> No monitoring equipment is involved in this parameter. The monitoring is based on host government regulation announcement. <i>Verifier's action:</i> With the local competent of the verification team, it can be confirmed that there was no legislation announced by the host country government for LFG projects <i>Conclusion:</i> It is concluded the parameter is monitored in accordance with the approved revised PDD.	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<i>the installed monitoring equipment in the table in Annex 2.</i>				
c) Correctness (VVS, §§ 389-393) <i>Determine whether the value given in the monitoring report is correct or determined in a conservative manner. In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given. In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i>	/MR/ /PDD2/	☒ Correct ☐ Not correct (initial assessment) <i>Description:</i> The data of this parameter is based on announcement by the host country government regulations for LFG projects. <i>Verifier's action:</i> With the local competent of the verification team, it can be confirmed that there was no regulation announced by the host country government on LFG projects <i>Conclusion:</i> It is concluded the parameter is monitored in accordance with the approved revised PDD.	OK	OK
15. FC_{i,j,y}		Description: Quantity of fuel type i combusted in process j during the year y		
a) Measurement / Determination method (VVS, §§ 389-393) <i>Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)). Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements. Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</i>	/MR/ /PDD2/ /ER/	<i>Description:</i> The fuel consumed will be measured using a ruler to determine the mass or volume and cross-checked with the fuel purchase invoices. The fuel used is diesel. There is no diesel consumed during this monitoring period. <i>Verifier's action:</i> During the onsite visit, records are reviewed and verified to confirm there is no diesel consumed or purchased for this monitoring period. The ER spreadsheet is checked and no data recorded. <i>Conclusion:</i>	CAR E-6-02	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		The monitoring of the parameter is in accordance to the approved revised PDD. Refer CAR E.6-02 raised		
b) Accuracy and QA/QC Procedure (VVS, §§ 394-400) <i>In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs. Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance. Include calibration dates and information in validity of the installed monitoring equipment in the table in Annex 2.</i>	/ MR / / PDD2 / / QA1 / / IM01 /	<i>Description:</i> There is no diesel fuel consumed during this monitoring period. <i>Verifier's action:</i> Since no diesel is consumed or purchased for this monitoring period, no data recorded. CDM Monitoring and Quality Control Manual was reviewed and operational personnel was interviewed. <i>Conclusion:</i> It is concluded that there is no diesel consumed for this monitoring period.	OK	OK
c) Correctness (VVS, §§ 389-393) <i>Determine whether the value given in the monitoring report is correct or determined in a conservative manner. In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given. In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i>	/ MR /	☒ Correct ☐ Not correct (initial assessment) <i>Description:</i> There is no diesel fuel consumed during this monitoring period. <i>Verifier's action:</i> Since no diesel is consumed or purchased in this monitoring period, no data recorded. <i>Conclusion:</i> It is concluded since no fuel consumed for this monitoring period therefore, no data recorded.	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
16. NCV_{i,y}		Description: Weighted average net calorific value of fuel type i in year y		
a) Measurement / Determination method (VVS, §§ 389-393) Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)). Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements. Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.	/MR/ /SR/ /PDD2/	<i>Description:</i> The type of fuel is diesel. The net calorific value applied was derived from Summary Report – the Study of Emission factor for an electricity generation of Thailand in Year 2010. <i>Verifier's action:</i> The Summary Report was reviewed for the NCV data applied in the ER spreadsheet and MR. <i>Conclusion:</i> The monitoring of the parameter is in accordance to the approved revised PDD.	OK	OK
b) Accuracy and QA/QC Procedure (VVS, §§ 394-400) In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs. Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance. Include calibration dates and information in validity of the installed monitoring equipment in the table in Annex 2.	/MR/ /SR/ /QA1/ /IM01/ /IM02/	<i>Description:</i> There is no measurement involved in this parameter. The value is derived from the Summary Report – the Study of Emission factor for an electricity generation of Thailand in Year 2010. <i>Verifier's action:</i> The summary report was reviewed for the value applied in the ER spreadsheet and MR is correct. CDM Monitoring and Quality Control Manual was reviewed and operational personnel was interviewed. <i>Conclusion:</i> It is concluded that value applied is in accordance to the summary report.	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
c) Correctness (VVS, §§ 389-393) Determine whether the value given in the monitoring report is correct or determined in a conservative manner. In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given. In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.	/MR/ /SR/	☒ Correct ☐ Not correct (initial assessment) Description: The value is derived from the Summary Report – the Study of Emission factor for an electricity generation of Thailand in Year 2010 Verifier's action: The summary report was reviewed to confirm the NCV applied is correct. Conclusion: It is concluded that the value in the monitoring report is correct.	OK	OK
17. EF_{CO2,i,y}		Description: Weighted average CO₂ emission factor of fuel type i in year		
a) Measurement / Determination method (VVS, §§ 389-393) Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)). Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements. Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.	/MR/ /IPCC/ /PDD2/ /ER/	Description: The type of fossil fuel that will be consumed by the project activity is diesel. The CO ₂ emission factor is a default value derived from 2006 IPCC Vol. 2 (Energy) Chapter 1 Table 1.4 at 95% confidence interval. Verifier's action: The data applied in the ER spreadsheet was cross-checked with 2006 IPCC to confirm the value applied is correct. Conclusion: It is concluded that the parameter is monitored in accordance to the approved revised PDD.	OK	OK
b) Accuracy and QA/QC Procedure (VVS, §§ 394-400) In case of measured (or estimated) values, check	/MR/ /IPCC/	Description: There is no measurement involved in this parameter.	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<i>whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.</i> <i>Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance.</i> <i>Include calibration dates and information in validity of the installed monitoring equipment in the table in Annex 2.</i>	/ER/ /QA1/ /IM01/	The value applied is derived from 2006 IPCC default value <i>Verifier's action:</i> The data applied in the ER spreadsheet was cross checked with IPCC guidelines. CDM Monitoring and Quality Control Manual was reviewed and operational personnel was interviewed. <i>Conclusion:</i> It is concluded that value applied is derived from 2006 IPCC.		
c) Correctness (VVS, §§ 389-393) <i>Determine whether the value given in the monitoring report is correct or determined in a conservative manner.</i> <i>In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.</i> <i>In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i>	/MR/ /IPCC/ /MR/	☒ Correct ☐ Not correct (initial assessment) <i>Description:</i> The value applied is derived from 2006 IPCC default value <i>Verifier's action:</i> The data applied in the ER spreadsheet was cross checked with IPCC guidelines for correctness. <i>Conclusion:</i> It is concluded that the value is derived from 2006 IPCC guidelines.	OK	OK

Appendix 6. Calibration dates and validity of installed monitoring equipment

Table A-6: Periodic Verification Checklist – Calibration details

Monitoring equipment	Related monitoring parameter as per applicable approved revised monitoring plan	Serial number	Type	Accuracy or accuracy class	Calibration date	Calibration Valid till	Calibration Frequency	Delay in calibration: yes/no	Period of delayed calibration
Flow Meter - FT 9261 A	LFG _{total}	9061212 / 5058730	V-Cone Flow Meter	22/01/2014 valid till $\pm 0.5\%$	22//10/2013	21/10/2015	2 yearly	☒ No ☐ Yes	
		9062918 / 5058755			25//09/2015	24/09/2017		☒ No ☐ Yes	
Flow Meter - FT 9261 B	LFG _{total}	KT130505030 1399 / 02886985			05/06/2013	04/06/2015		☒ No ☐ Yes	
		9061213 / 5058731			22/01/2014	21/01/2016		☒ No ☐ Yes	
Flow Meter - FT 9391	LFG _{flare}	9062916 / 5058745	V-Cone Flow Meter	$\pm 0.5\%$	25/06/2013	24/06/2015	2 yearly	☒ No ☐ Yes	
		9061209 / 5058737			11/03/2015	10/03/2017		☒ No ☐ Yes	
Flow Meter - FT 9491	LFG _{flare}	10071510 / 546731			19/04/2013	18/04/2015		☒ No ☐ Yes	
		9061205 / 5058733			11/03/2015	10/03/2017		☒ No ☐ Yes	
Flow Meter - FT 9591	LFG _{flare}	10071509 / 495983			19/04/2013	18/04/2015		☒ No ☐ Yes	
		9061210 / 5058738			11/03/2015	10/03/2017		☒ No ☐ Yes	
Flow Meter – EFT 9001	LFG _{electricity}	10071504 / 5476737	V-Cone Flow Meter	$\pm 0.5\%$	23/12/2013	22/12/2015	2 yearly	☒ No ☐ Yes	

Monitoring equipment	Related monitoring parameter as per applicable approved revised monitoring plan	Serial number	Type	Accuracy or accuracy class	Calibration date	Calibration Valid till	Calibration Frequency	Delay in calibration: yes/no	Period of delayed calibration
		9062901 / 5058764			29/06/2015	28/06/2017		☒ No ☐ Yes	
Flow Meter – EFT 9002	LFG _{electricity}	9062914 / 5058767			30/06/2013	29/06/2015		☒ No ☐ Yes	
		9062903 / 5058756			29/06/2015	28/06/2017		☒ No ☐ Yes	
Flow Meter – EFT 9003	LFG _{electricity}	10071505 / 5476725			19/04/2013	18/04/2015		☒ No ☐ Yes	
		1104-0159 / 02443472			11/03/2015	10/03/2017		☒ No ☐ Yes	
Flow Meter – EFT 9004	LFG _{electricity}	10071506 / 4964086			19/04/2013	18/04/2015		☒ No ☐ Yes	
		1104-0160 / 02443474			11/03/2015	10/03/2017		☒ No ☐ Yes	
Flow Meter – EFT 9005	LFG _{electricity}	9062907 / 5058760			24/06/2013	23/06/2015		☒ No ☐ Yes	
		10071506 / 4964086			30/05/2015	29/05/2017		☒ No ☐ Yes	
Flow Meter – EFT 9006	LFG _{electricity}	9062903 / 5058756			24/06/2013	23/06/2015		☒ No ☐ Yes	
		10071505 / 5476725			29/05/2015	28/05/2017		☒ No ☐ Yes	
Flow Meter – EFT 9007	LFG _{electricity}	10071502 / 5615483			19/04/2013	18/04/2015		☒ No ☐ Yes	
		9062913 / 5058766			11/03/2015	10/03/2017		☒ No ☐ Yes	
Flow Meter – EFT 9008	LFG _{electricity}	9062901 / 5058764			24/06/2013	23/06/2015		☒ No ☐ Yes	

Monitoring equipment	Related monitoring parameter as per applicable approved revised monitoring plan	Serial number	Type	Accuracy or accuracy class	Calibration date	Calibration Valid till	Calibration Frequency	Delay in calibration: yes/no	Period of delayed calibration
		10071502 / 5615483			30/05/2015	29/05/2017		☒ No ☐ Yes	
Gas Analyser – CH4 9261 A	ω _{CH4}	31421	Guardian Plus Infra-Red Gas Monitor	± 2.0% Full Scale Deflection	17/04/2014	16/04/2015	Annually	☒ No ☐ Yes	
		29684			03/10/2014	02/10/2015		☒ No ☐ Yes	
		29684			28/08/2015	27/08/2016		☒ No ☐ Yes	
Temperature Transmitter – Total: TT 9261 A	T	080638016	Honeywell Inor	0.3+(0.3+0.005 T)°C ± 0.15 % of Temperature Span	15/07/2014	14/07/2015	Annually	☒ No ☐ Yes	
		080625360			10/07/2015	09/07/2016		☒ No ☐ Yes	
Temperature Transmitter – Total: TT 9261 B	T	100208514			15/07/2015	14/07/2016		☒ No ☐ Yes	
		N1249.693062			10/07/2015	09/07/2016		☒ No ☐ Yes	
Temperature Transmitter – Flare: TT 9391	T	080625397	Honeywell Inor	0.3+(0.3+0.005 T)°C ± 0.15 % of Temperature Span	15/07/2014	14/07/2015	Annually	☒ No ☐ Yes	
		090536657			10/07/2015	09/10/2016		☒ No ☐ Yes	
Temperature Transmitter – Flare: TT 9491	T	080625432			15/07/2015	14/07/2016		☒ No ☐ Yes	
		080625400			10/07/2015	09/10/2016		☒ No ☐ Yes	
Temperature Transmitter – Flare: TT 9591	T	080638034			15/07/2014	14/07/2015		☒ No ☐ Yes	
		N1249.693066			10/07/2015	09/10/2016		☒ No ☐ Yes	

Monitoring equipment	Related monitoring parameter as per applicable approved revised monitoring plan	Serial number	Type	Accuracy or accuracy class	Calibration date	Calibration Valid till	Calibration Frequency	Delay in calibration: yes/no	Period of delayed calibration
Temperature Transmitter - Gas Engine: ETT 9001	T	080638021	Honeywell Inor	0.3+(0.3+0.005 T) °C ± 0.15 % of Temperature Span	19/02/2014	18/02/2015	Annually	☒ No ☐ Yes	
		100208540			17/04/2014	16/07/2015		☒ No ☐ Yes	
		N1249.693067			16/02/2015	15/02/2016		☒ No ☐ Yes	
Temperature Transmitter - Gas Engine: ETT 9002	T	090536658			19/02/2014	18/02/2015		☒ No ☐ Yes	
		100208515			17/07/2014	16/07/2015		☒ No ☐ Yes	
		080638042			17/02/2015	16/02/2016		☒ No ☐ Yes	
Temperature Transmitter - Gas Engine: ETT 9003	T	090543121			19/02/2014	18/02/2015		☒ No ☐ Yes	
		080638069			17/07/2014	16/07/2015		☒ No ☐ Yes	
		N1249.693065			11/02/2015	10/02/2016		☒ No ☐ Yes	
Temperature Transmitter - Gas Engine: ETT 9004	T	090536683			19/02/2014	18/02/2015		☒ No ☐ Yes	
		100208541			17/07/2014	16/07/2015		☒ No ☐ Yes	
		090543121			10/07/2015	09/07/2016		☒ No ☐ Yes	
Temperature Transmitter - Gas Engine: ETT 9005	T	100098212			19/02/2014	18/02/2015		☒ No ☐ Yes	
		090543121			11/02/2015	10/02/2016		☒ No ☐ Yes	

Monitoring equipment	Related monitoring parameter as per applicable approved revised monitoring plan	Serial number	Type	Accuracy or accuracy class	Calibration date	Calibration Valid till	Calibration Frequency	Delay in calibration: yes/no	Period of delayed calibration
		090543120			16/02/2015	15/02/2016		☒ No ☐ Yes	
Temperature Transmitter - Gas Engine: ETT 9006	T	080638042			19/02/2014	18/02/2015		☒ No ☐ Yes	
		090536658			11/02/2015	10/02/2016		☒ No ☐ Yes	
Temperature Transmitter - Gas Engine: ETT 9007	T	100211940			19/02/2014	18/02/2015		☒ No ☐ Yes	
		100208537			17/07/2014	16/07/2015		☒ No ☐ Yes	
		N1249.693026			10/07/2015	09/07/2016		☒ No ☐ Yes	
Temperature Transmitter - Gas Engine: ETT 9008	T	090543120			19/02/2014	18/02/2015		☒ No ☐ Yes	
		100098212			11/02/2015	10/02/2016		☒ No ☐ Yes	
Pressure Transmitter - Total: PT 9261 A	P	5466002	Rosemount	± 0.075 % of span	03/06/2014	02/06/2015	Annually	☒ No ☐ Yes	
		5466080			25/05/2015	24/05/2016		☒ No ☐ Yes	
Pressure Transmitter - Total: PT 9261 B	P	5466003			03/06/2014	02/06/2015		☒ No ☐ Yes	
		5466089			25/05/2015	24/05/2016		☒ No ☐ Yes	
Pressure Transmitter - Flare: PT 9391	P -	5466004	Rosemount	± 0.075 % of span	03/06/2014	02/06/2015	Annually	☒ No ☐ Yes	
		5466010			25/05/2015	24/05/2016		☒ No ☐ Yes	

Monitoring equipment	Related monitoring parameter as per applicable approved revised monitoring plan	Serial number	Type	Accuracy or accuracy class	Calibration date	Calibration Valid till	Calibration Frequency	Delay in calibration: yes/no	Period of delayed calibration
Pressure Transmitter – Flare: PT 9491	P	5466006			03/06/2014	02/06/2015		☒ No ☐ Yes	
		5466007			25/05/2015	24/05/2016		☒ No ☐ Yes	
Pressure Transmitter – Flare: PT 9591	P	5466083			03/06/2014	02/06/2015		☒ No ☐ Yes	
		5466015			25/05/2015	24/05/2016		☒ No ☐ Yes	
Pressure Transmitter – Gas Engine: EPT 9001	P	02443480	Rosemount	± 0.075 % of span	03/06/2014	02/06/2015	Annually	☒ No ☐ Yes	
		02300672			26/05/2015	25/06/2016		☒ No ☐ Yes	
Pressure Transmitter – Gas Engine: EPT 9002	P	02443481			03/06/2014	02/06/2015		☒ No ☐ Yes	
		02300672			26/05/2015	25/06/2016		☒ No ☐ Yes	
Pressure Transmitter – Gas Engine: EPT 9003	P	02715553			03/06/2014	02/06/2015		☒ No ☐ Yes	
		02300674			26/05/2015	25/06/2016		☒ No ☐ Yes	
Pressure Transmitter – Gas Engine: EPT 9004	P	02777923			03/06/2014	02/06/2015		☒ No ☐ Yes	
		02150750			26/05/2015	25/06/2016		☒ No ☐ Yes	
Pressure Transmitter – Gas Engine: EPT 9005	P	02777924			03/06/2014	02/06/2015		☒ No ☐ Yes	
		02166915			26/05/2015	25/06/2016		☒ No ☐ Yes	

Monitoring equipment	Related monitoring parameter as per applicable approved revised monitoring plan	Serial number	Type	Accuracy or accuracy class	Calibration date	Calibration Valid till	Calibration Frequency	Delay in calibration: yes/no	Period of delayed calibration
Pressure Transmitter – Gas Engine: EPT 9006	P	02150753			24/10/2014	23/10/2015		☒ No ☐ Yes	
		02715553			02/06/2015	01/06/2016		☒ No ☐ Yes	
Pressure Transmitter – Gas Engine: EPT 9007	P	02150751			02166916	23/10/2015		☒ No ☐ Yes	
		02777923			02/06/2015	01/06/2016		☒ No ☐ Yes	
Pressure Transmitter – Gas Engine: EPT 9008	P	02166916			02166916	23/10/2015		☒ No ☐ Yes	
		02777924			02/06/2015	01/06/2016		☒ No ☐ Yes	
Electric Meter: Primary	EL _{LFG}	201005194 / PEA 15650695	EDMI	Class 0.5S	02/07/2014 01/07/2015	01/07/2015 30/06/2016	Annually	☒ No ☐ Yes	
		205610126 / PEA 19936983			25/05/2015	24/05/2016		☒ No ☐ Yes	
Electric Meter: Secondary	EL _{LFG}	212607309			02/07/2014 01/07/2015	01/07/2015 30/06/2016		☒ No ☐ Yes	
		205610126 / PEA 19936983			25/05/2015	24/05/2016		☒ No ☐ Yes	
Electric Meter: Primary	EL _{import}	201006718 / PEA 15852219	EDMI	Class 0.5S	02/07/2014 01/07/2015	01/07/2015 30/06/2016		☒ No ☐ Yes	
		205610065 / PEA 19936922			25/05/2015	24/05/2016		☒ No ☐ Yes	
Electric Meter: Secondary	EL _{import}	210422526			02/07/2014 01/07/2015	01/07/2015 30/06/2016		☒ No ☐ Yes	
		205610065 PEA 19936922			25/05/2015	24/05/2016		☒ No ☐ Yes	

Monitoring equipment	Related monitoring parameter as per applicable approved revised monitoring plan	Serial number	Type	Accuracy or accuracy class	Calibration date	Calibration Valid till	Calibration Frequency	Delay in calibration: yes/no	Period of delayed calibration
Type N Thermocouple: TTC 9393 A	T _{flare}	080614321	Honeywell	Accuracy Class II (allowable deviation $\pm(0.0075\text{t})$)	22/03/2014	21/03/2015	Annually	☒ No ☐ Yes	
		080614320			25/02/2015	24/02/2016		☒ No ☐ Yes	
Type N Thermocouple: TTC 9393 B	T _{flare}	090326010			22/03/2014	21/03/2015		☒ No ☐ Yes	
		090326007			25/02/2015	24/02/2016		☒ No ☐ Yes	
Type N Thermocouple: TTC 9393 C	T _{flare}	080614298			22/03/2014	21/03/2015		☒ No ☐ Yes	
		090326012			25/02/2015	24/02/2016		☒ No ☐ Yes	
Type N Thermocouple: TTC 9493 A	T _{flare}	080614290			22/03/2014	21/03/2015		☒ No ☐ Yes	
		090326013			25/02/2015	24/02/2016		☒ No ☐ Yes	
Type N Thermocouple: TTC 9493 B	T _{flare}	080614323			22/03/2014	21/03/2015		☒ No ☐ Yes	
		080614289			25/02/2015	24/02/2016		☒ No ☐ Yes	
Type N Thermocouple: TTC 9493 C	T _{flare}	090326006			22/03/2014	21/03/2015		☒ No ☐ Yes	
		080614306			25/02/2015	24/02/2016		☒ No ☐ Yes	
Type N Thermocouple: TTC 9593 A	T _{flare}	080614379			22/03/2014	21/03/2015		☒ No ☐ Yes	
		080614373			25/02/2015	24/02/2016		☒ No ☐ Yes	

Monitoring equipment	Related monitoring parameter as per applicable approved revised monitoring plan	Serial number	Type	Accuracy or accuracy class	Calibration date	Calibration Valid till	Calibration Frequency	Delay in calibration: yes/no	Period of delayed calibration
Type N Thermocouple: TTC 9593 B	T _{flare}	090326009			22/03/2014	21/03/2015		☒ No ☐ Yes	
		090329527			25/02/2015	24/02/2016		☒ No ☐ Yes	
Type N Thermocouple: TTC 9593 C	T _{flare}	090329544			22/03/2014	21/03/2015		☒ No ☐ Yes	
		080614305			25/02/2015	24/02/2016		☒ No ☐ Yes	