



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	Biogas Plant at United Plantations Berhad, UIE Palm Oil Mill
Reference number of the project activity	3622
Version number of the verification and certification report	02.1
Completion date of the verification and certification report	15 February 2016
Monitoring period number and duration of this monitoring period	Monitoring period 02; 01/08/2013 – 31/12/2014 (518 days)
Version number of monitoring report to which this report applies	05
Crediting period of the project activity corresponding to this monitoring period	01/10/2011 – 30/09/2021; 10 years (Fixed)
Project participant(s)	1) United Plantations Berhad (Malaysia) 2) Ministry of Climate and Energy (Denmark)
Host Party	Malaysia
Sectoral scope(s), selected methodology(ies), and where applicable, selected standardized baseline(s)	Sectoral scope 13: Waste handling and disposal
Estimated GHG emission reductions or net anthropogenic GHG removals for this monitoring period in the registered PDD	20,274 tCO _{2e}
Certified GHG emission reductions or net anthropogenic GHG removals for this monitoring period	19,814 tCO _{2e}
Name of DOE	TÜV Rheinland (China) Ltd
Name, position and signature of the approver of the verification and certification report	Henri Phan; DOE Manager

SECTION A. Executive summary

The Contracting Client Organization has commissioned the DOE TÜV Rheinland (China) Ltd. to perform the second periodic verification of the registered project activity titled “Biogas Plant at United Plantations Berhad, UIE Palm Oil Mill in Malaysia”, with UNFCCC reference number of 3622, registration date of 26 January 2011 and crediting period from 01 October 2011 – 30 September 2021. The verification for the period from 01 August 2013 – 31 December 2014 (first and last day included) has been performed based on the document review of the Monitoring Report /2/, Approve/Registered PDD /4/, supporting documents, on-site assessment and interviews with the stakeholders, resolution of outstanding issues and issuance of the verification report.

The project is carried out at one location, which is UIE Palm Oil Mill at Pantai Remis, Perak, Malaysia. This is the 2nd monitoring period and the project has been implemented accordingly throughout this monitoring period with no remaining phases that have not started. The project activity involved installation of a closed tank anaerobic digestion technology, based on the continuous flow stirred tank reactor system (CSTR) with sludge return design to replace the existing deep open lagoon system for anaerobic digestion for palm oil mill effluent (POME) treatment at UIE Palm Oil Mill. The biogas generated is captured in the enclosed anaerobic digester tanks utilized for steam generation in the existing biomass waste fired boiler at the mill. The existing biomass fired boiler was fitted with a 1000 Nm³/h biogas burner with automatic control to allow for both biogas and biomass waste firing. The biogas partially displaces some biomass. Excess biogas from the digesters is flared using a closed flare system.

During this 2nd monitoring period, there were no changes made to the monitoring plan as approved by the UNFCCC. There was, however, a temporary deviation from the registered monitoring plan as discussed in Section B.2.1 of the final monitoring report /2/ which was due to malfunction of the data logger (Daqstation S/N: S5K202141) located at the biogas plant from the period of 01/03/2014 – 13/06/2014. This resulted in inability to monitor the following 2 parameters:

FV_{digester,h}: “volumetric flow rate of the residual gas in dry basis at normal conditions NTP (273.15K, 101.325 kPa) in the hour h.

FV_{flare,h}: “volumetric flow rate of the residual gas flared in dry basis at normal conditions NTP (273.15K, 101.325 kPa) in the hour h.

The project participant has accounted for this deviation by using the opening and closing values of actual flow readings taken at the flowmeter’s display and making conservative assumptions to estimate the emissions reductions during this period, which will be explained further in this report.

The DOE has raised 8 clarifications and 6 corrective action requests, all of which have been successfully resolved by PPs. No new forward action requests have been raised during this verification, while 2 FARs that were raised during the 1st verification period were resolved during this 2nd verification. The verification team, through the verification process, confirmed that the emission reductions achieved by the project activity during the monitoring period were correctly calculated in the monitoring report, Version 05, dated 28 November 2015 /2/ based on the approved monitoring methodology, AMS-III.H version 13 and the monitoring plan of the approved/ revised PDD /4/. Therefore, DOE TÜV Rheinland (China) Ltd. certifies the emission reductions amounting to 19,814 tCO_{2e} for the period from 01 August 2013 – 31 December 2014 (first and last day included) and requests the CDM-EB to issue the CERs.

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	OR	Yong Tau Lan	Nelly	TÜV Rheinland Malaysia Sdn. Bhd.	X	X	X	X
2.	Verifier	OR	Ng Siew Theng	Carol	TÜV Rheinland Malaysia Sdn. Bhd.	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	IR	Tang	Walter	TÜV Rheinland (China) Ltd.
2.	Approver	IR	Phan	Henri	TÜV Rheinland (China) Ltd.

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

In compliance with Guidelines on the application of materiality in verifications (version 02.0) /11/, the assessment on the materiality in verification is conducted in the following step-wise procedures:

- 1) The project is a small-scale CDM project activity with total emission reductions or removal of less than 300,000 tonnes of carbon dioxide equivalent per year. The applicable materiality threshold for this project is therefore in accordance with clause (d) of clause 361 of the CDM Validation and Verification Standard /8/, i.e. 5% materiality threshold shall be applied;
- 2) As stipulated in the paragraph 17 of Guidelines on the application of materiality in verifications (version 02.0) /11/, the materiality threshold shall apply to the total emission reductions or removals actually achieved. As verified in the section 3.4, the total emission reductions actually achieved during the monitoring period is 19,814 tCO₂e, thus the materiality threshold of the project activity is identified to be 990.7 tCO₂e, i.e. 19,814 tCO₂e *5%= 990.7 tCO₂e;

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.	Risk of unreasonable calculation of the total emission achieved during monitoring period due to using wrong	Low	<ul style="list-style-type: none"> - The likelihood is low. The sources of data for monitoring parameters had been fixed in the PDD, hence it is unlikely that the wrong data is used. The calculation method has also been fixed in the PDD. - The impact is high. It can results in completely wrong estimation of emission 	All the monitoring data records and calculations in the emissions reductions sheet will be checked completely

	data or wrong calculation method		reductions produced	
2.	Risk of the measurement equipment malfunction or not properly calibrated during the monitoring period.	High	<ul style="list-style-type: none"> - The likelihood of malfunction or non-calibration occurring is low as all monitoring equipment are periodically checked and calibrated as stipulated in the PDD /4/ and monitoring report /2/. - The impacts is high because if the measurement equipment malfunctions or is not properly calibrated and continuously produces wrong data, then all resulting calculations will be inaccurate 	All calibration certificate of monitoring meters and the metrological authorization to the calibration entity will be checked to sufficiently ensure the accuracy of all meters during the monitoring period.
3.	Risk of change in monitoring method for one or more parameters	Low	<ul style="list-style-type: none"> - The likelihood is low as the type of monitoring equipment to be used for monitoring of each parameter has been defined in the PDD as the project participant is aware that any change will result in request for deviation and delay/inability to certify their emissions reductions - The impact is high because if monitoring method is not consistent in the PDD, this will result in request for deviation 	During site visit, all monitoring points for each parameter listed in the monitoring plan were visited to confirm that the equipment type and monitoring method used is consistent with the PDD. Relevant personnel involved in recording monitoring results were also interviewed to ensure their understanding of the process and consistency with the PDD requirements.

C.2. Consideration of materiality in conducting the verification

- ✓ The consideration of materiality in conducting the verification of this project was as flowing three major steps:
 - a) The emissions reductions calculation spreadsheet /5/ and monitoring data records including raw data station data logger spreadsheets /14/ and all monitoring records on-site were checked and confirmed to be complete data set to reasonably calculate the total emission reductions achieved during the monitoring period;
 - b) The calibration certificates of all monitoring equipment and the competency/legal approval of the calibration entity were checked to sufficiently ensure the accuracy of all meters during the monitoring period;
 - c) After cross checking the emission reduction calculation spreadsheet/5/ with the monitoring data records and calibration records, the verification team found that, the verification team had confirmed that all data used for emission reduction calculations could be traced to actual monitoring records, the accurate calibration of all monitoring equipment was assured, and there were no significant errors, omissions or misstatements detected that could have potentially been material, either individually or in aggregate. Minor inconsistencies in data detected in the emission reductions sheet compared to the monitoring records were raised as corrective action requests and corrected accordingly by the project participant.
- ✓ As there were no significant errors, omissions or misstatements detected that would have resulted in the materiality threshold of 990.7 tCO₂e being exceeded, the verification team did not need to revise the verification plan or plan for further audit procedures.
- ✓ In conclusion, the verification team can conclude that the claimed emission reductions of 19,814 tCO₂e during the monitoring period from 01 August 2013 – 31 December 2014 are free from material errors, omissions or misstatements, with a reasonable level of assurance.

SECTION D. Means of verification**D.1. Desk review**

Desk review of the monitoring plan, monitoring report, monitoring methodology, project design document, applicable tools in particular attention to the frequency of measurements, quality of metering equipment's including calibration requirements, QA/QC procedures and other relevant documents. Please refer to Appendix 3 for the list of documents.

D.2. On-site inspection

TÜV Rheinland verification team carried out an on-site visit dated (15/04/2015 - 16/04/2015) and performed interviews with the project representatives and stakeholders.

Verification Team along with onsite observation, objective evidence collections, data generation and recording analysis also considered the views obtained in these interviews while arriving at Verification Opinion.

Duration of on-site inspection: 15/04/2015 - 16/04/2015				
No.	Activity performed on-site	Site location	Date	Team member
1.	Monitoring Report Discussion: <ul style="list-style-type: none"> • Original data check and data trail till the reported values • Final cross check & traceability of data from site visit to monitoring report • Data sources and assumptions • GHG emission reductions calculation • Monitoring data compilation • Online data storage system maintenance & control • Reporting & data integrity check Project implementation: <ul style="list-style-type: none"> • Information flow for monitoring presentation • CDM monitoring procedures • Data collection procedures • QA/QC procedures • ER Spreadsheet Review • Follow-up FARs identified in validation 	UIE Palm Oil Mill	15/04/2015	1) Nelly Yong Tau Lan (Team Leader) 2) Carol Ng Siew Theng (Auditor)
2.	Plant Tour: <ul style="list-style-type: none"> • Project implementation status cross checking • Project facilities and equipment check • Project design and technology used • Cross checking management & operation system maintenance in relation to monitoring plan. Document Check: <ul style="list-style-type: none"> • Manuals, procedures, records, certificates, calibration reports, and other relevant documents 	UIE Palm Oil Mill	16/04/2015	1) Nelly Yong Tau Lan (Team Leader) 2) Carol Ng Siew Theng (Auditor)

D.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Tanggaraju	Yogaa-nandh	Danish Energy Management (CDM Consultant)	15/04/2015 - 16/04/2015	<ul style="list-style-type: none"> • Original data check and data trail till the reported values • Data sources and assumptions • GHG emission reductions calculation • Reporting & data integrity check • QA/QC procedures • Follow-up FARs identified in validation • Project facilities and equipment check • Project design and technology used • Cross checking management & operation system maintenance in relation to monitoring plan • Manuals, procedures, records, certificates, calibration reports, and other relevant documents 	1) Nelly Yong Tau Lan (Team Leader) 2) Carol Ng Siew Theng (Auditor)
2.	Rengana-than	Ir. V.	UIE Palm Oil Mill (Sr. Resident Engineer)	15/04/2015 - 16/04/2015	<ul style="list-style-type: none"> • Overall performance of project activity • Compliance to regulatory requirements • Environmental and social issues • Projects contribution to sustainable development • Issues with local stakeholders 	
3.	Jazrikel	Nik	UIE Palm Oil Mill (Assistant Engineer)	15/04/2015 - 16/04/2015	<ul style="list-style-type: none"> • Data management and reporting, QA/QC systems of project participant • Record keeping – manual logbooks • Staff competency & training • Project implementation status cross checking 	
4.	Ghaneshan	S.	UIE Palm Oil Mill (Chief Clerk)	15/04/2015 - 16/04/2015		
5.	Arishanggar an	M.	UIE Palm Oil Mill (Assistant Engineer)	15/04/2015 - 16/04/2015		
6.	Islam	Aminul	UIE Palm Oil Mill (Biogas Operator)	15/04/2015 - 16/04/2015		
7.	K.	Abhilash	UIE Palm Oil Mill (Lab Assistant)	15/04/2015 - 16/04/2015		
8.	Dass	V. Raymond	UIE Palm Oil Mill (Weighbridge supervisor)	15/04/2015 - 16/04/2015		

D.4. Sampling approach

No sampling plan is required in the monitoring plan

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	0	1	0
Compliance of the project implementation with the registered PDD	0	0	0
Post-registration changes	0	0	0
Compliance of the monitoring plan with the monitoring methodology including applicable tool and standardized baseline	0	0	0
Compliance of monitoring activities with the registered monitoring plan	0	1	0
Compliance with the calibration frequency requirements for measuring instruments	6	2	0
Assessment of data and calculation of emission reductions or net removals	1	2	0
Others (please specify): Incorrect guideline version number & further description of sampling procedure	1	0	0
Total	8	6	0

SECTION E. Verification findings**E.1. Compliance of the monitoring report with the monitoring report form**

Means of verification	Through document review - Form and guidelines for completing the monitoring report form, Version 05.1 - Published monitoring report (Version 01, dated 27 March 2015)
Findings	MR template is not the latest one (CAR 01)
Conclusion	The monitoring report was updated using the latest MR template and was consistently filled with respect to all sections as required by its guideline of filling the MR in the final monitoring report (Version 05, dated 28/11/2015 /2/).

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

During the previous monitoring period, there were two FARs raised. These were assessed during this monitoring period and the verification team determined that there was sufficient evidence to close both FARs. The details of the FARs and the verification team conclusions during monitoring period 1 and subsequent PP response and verification team conclusions during monitoring period 2 are as follows:

FAR number	Observation	Summary of project participants' response	Verification team conclusion
FAR 1	The monitored parameter, COD _{ww,discharge} was not listed in the monitoring plan of the validated PDD.	Response from PP during monitoring period 1: Although COD _{ww,discharge} is not a part of the monitoring plan in the registered PDD, it has been monitored internally using international standard (HACH – COD method 8000) and the analysis kit is calibrated annually. The values are then included in order to calculate PE _{ww,discharge} in line with the methodology. As the MCF _{ww,discharge} is zero it does not affect the overall emission reductions. The COD _{ww,discharge} will continue to be monitored in future monitoring periods.	Comment from DOE to response 1: In this case, the parameter was monitored by the PP in accordance with the methodology requirement. It does not have any impact to the calculation of the project emissions and emission reduction. As on why the parameter was not listed in the PDD, it is beyond the control of the verification team. In view of that, PP shall go for the revision of the monitoring plan of the PDD. FAR 1 : OPEN

		<p>Response from PP during monitoring period 2:</p> <p>COD_{ww,discharge} is not a part of the monitoring plan in the registered PDD, it has been continuously monitored internally using international standard (HACH – COD method 8000) and the analysis kit is calibrated annually. MCF_{ww,discharge} is zero, it does not affect the overall emission reductions.</p> <p>In our view, this parameter need not be included into the monitoring plan, as the PDD was registered not to include the parameter (page 26).</p> <p>The PDD states...” Treated waste water is discharged to aerobic treatment and subsequently used for soil application in a well-managed system and this project emission is therefore zero (MCF_{ww,PJ,discharge}) = 0.0).</p> <p>Hence, as far as the waste treatment system remains well-managed aerobic, no revision is need to the monitoring plan of the PDD; which is the case for this project.</p>	<p>Comment from DOE to response 2:</p> <p>As stated in the methodology AMS III.H applied for the project, COD_{ww,discharge} parameter is only required for calculation of BE_{ww,discharge,y}. However, it was clearly stated in the PDD Section B.6.1, page 23 that treated wastewater is used for soil application in aerobic conditions and this baseline emission is therefore negligible. This has been confirmed by the verification team that there is no final effluent discharge from the mill into any sea, river or lake. Treatment effluent is diverted for land application in the field, as seen on-site and confirmed through the mill's environmental license no. 001825 from the Department of Environment, valid from 1 July 2013 until 30 June 2014 which permits use of effluent for land application with maximum BOD of 5000ppm. Therefore parameter COD_{ww,discharge} is not required to be included in the monitoring report.</p> <p>FAR 1 is resolved and closed.</p>
FAR 2	<p>A calibration certificate for all electricity meters shall provide certain information as follows. This is in accordance with the standard requirement of DIN EN ISO/IEC 17025.</p> <ul style="list-style-type: none"> Assurance of expertise and competence Quality management according at least to DIN EN ISO 9001 Transparency of measurement results Measurement results that are expertly based Indication of measurement uncertainties Traceability of 	<p>Response from PP during monitoring period 1:</p> <p>The m.p.e applied to the PE_{power,y} calculations (PE from electricity) has been applied to the entire monitoring period, even though the delayed calibration period was only a few months. This was done due to the calculations format. Nevertheless, this method is extremely conservatively in results in a higher PE. For future, calibration exercise, the practice mentioned beside will be taken into practice.</p> <p>Response from PP during monitoring period 2:</p> <p>Please refer to folder “Calibration Validity>ST Authorization”. The calibration company, E-POWER ENGINEERING SDN BHD has been authorized by the electricity regulation body in Malaysia, Suruhanjaya Tenaga/ Energy Commission, to carry out electrical related services in Malaysia. In addition, the person carrying out the calibration has also been certified by ST to carry out calibration exercise (IR. Ismail Omar).</p>	<p>Comment from DOE to response 2:</p> <p>This practice will be verified during next audit.</p> <p>FAR 2 : OPEN</p> <p>Comment from DOE to response 2:</p> <p>The requirements for calibration certificate as listed in FAR 2 by the previous verification team are applicable for the PP but for the calibrator of the electricity metres while compliance to ISO17025 requirements are not stipulated as a requirement for CDM projects. It was confirmed that calibration of all electricity metres used in this project during this monitoring period was carried out by IR. Ismail Omar who is appointed by the Malaysian Energy Commission as seen in his certificate</p>

	used measurement devices to national / international standard	<p>Further, the calibration certificates do carry test/measurement results, for 'before' and 'after' comparison. Please refer to any kWh meter related subfolder under the folder "Calibration Certificates".</p> <p>The above 3 criteria should be sufficient for a calibration exercise for a relatively simple Class II kWh meter.</p> <p>Also, since only 2 values are used for each meter for the entire monitoring period, all Kwh meters have been added with max permissible error as a conservative measure.</p>	<p>of registration as an electrical contractor services issued 13 September 2013 and valid until 12 September 2014. Mr. Ismail had carried out calibrations of the electricity metres within the validity period of his registration certificate. The Energy Commission is the statutory body responsible for regulating the energy sector including electricity supply throughout Malaysia. Therefore, their appointment of Mr. Ismail is accepted as adequate evidence that he is a competent contractor to carry out calibration of electricity metres.</p> <p>FAR 2 is resolved and closed</p>
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E.3. Compliance of the project implementation with the registered project design document

Means of verification	<p>1) Through document review (e.g. webhosted monitoring report /1/)</p> <p>2) On-site observation and interviews with the CDM consultant company and management representatives</p> <p>The verification team has conducted desk review of the registered PDD /4/ & cross checked the actual physical features implemented at the project site during on site visit. The following are the summary of the observed implemented physical features which were implemented as proposed in the registered PDD during the on-site visit:</p> <ol style="list-style-type: none"> 1) Continuous-flow Stirred Tank Reactor (CSTR) system 2) Closed tank anaerobic digester 3) Biogas burner retrofitted to the biomass boiler 4) Closed flare system <p>It was verified through interviews with the monitoring personnel and review of on-site equipment that the utilization and process flow of the equipment was still being carried out in accordance with the description in Section A.4.2 and Figure 3 (Layout of POME treatment facility after implementation of Project Activity) of the registered PDD /4/. All planned monitoring equipment's as indicated in the registered PDD /4/ have been installed & operated, as observed during on site visit.</p>
Findings	<p>It was informed by the Project Participant and described in Section B.2.1 of the Monitoring Report that there was a temporary deviation due to the malfunction of the data logger (Daqstation S/N: S5K202141) located at the biogas plant. This further described in Section E.4.1 below.</p>
Conclusion	<p>As part of the site visit the verification team was able to confirm that the project implementation (other than during the period of temporary deviation) is in accordance with the project description contained in the registered PDD dated 13-01-2011 /4/. The verification took cognizance of § 89, 90 & 91 of CDM Project Standard (09.0) /10/.</p>

E.4. Post-registration changes

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

During this 2nd monitoring period, there were no changes made to the monitoring plan as approved by the UNFCCC. There was, however, a temporary deviation from the registered monitoring plan as discussed in Section B.2.1 of the final monitoring report /2/ which was due to malfunction of the data logger (Daqstation S/N: S5K202141) located at the biogas plant from the period of 01/03/2014 – 13/06/2014. This resulted in inability to monitor the following 2 parameters:

FV_{digester,h}: “volumetric flow rate of the residual gas in dry basis at normal conditions NTP (273.15K, 101.325 kPa) in the hour h.

FV_{flare,h}: “volumetric flow rate of the residual gas flared in dry basis at normal conditions NTP (273.15K, 101.325 kPa) in the hour h.

The project participant has accounted for this deviation by using the opening and closing values of actual flow readings taken at the flowmeter’s display which were recorded manually by the biogas plant operator once in 4 hours (6 records a day). The actual flow recordings were then normalized by dividing the manual recordings for both parameters by plant operational hours (24 hrs/day, 365 days/year; gas plant operations are continuous), then multiplied with gas temperature of “0” degrees Celsius and 101.325 kPa (1atm).

The results of this calculation for this deviation above can be traced back to the file ‘Manual Flow Estimations’ spreadsheet /15/. The opening and closing values of the actual flow readings for March to June 2014 were verified to be consistent with the with the completed daily forms for Daily Monitoring of POME Input and Biogas Supply /17/. The method of calculation for converting actual flow readings to normalized readings was derived from a website reference source for ‘[Actual Flow to Normal Flow, Normal Flow to Actual Flow and Important Useful Calculations](#)’ /18/. The method of calculation was verified to be correct based on input from an engineering local expert and from Engineering Design Encyclopedia on “Calculation of NM3/hr and SM3/hr gas flow” /19/. As the default pressure (P) and temperature (T) values were applied, the calculated normalized flow rate was the same as the actual flow rate. This was considered the most conservative approach and hence is accepted by the verification team.

The failure of the data logger had also resulted in inability to measure the value of parameter fv_{CH₄,h} (“fraction of methane in the biogas”) during the period of data logger breakdown between 01/03/2014 to 13/06/2014. This was accounted for by the project participant using data for the months where fvCH₄ records are captured through the data logger (August 2013 – February 2014, July 2014 – December 2014), where the values are subjected to 2 conservative options;

- a) Mean value (58.65), deducted with standard deviation (2.67); resulting in 55.98%
- b) Lowest value from August 2013 – February 2014, 14 June 2014 – December 2014, 54.64%, deducted with 90% Confidence Interval test (1.40%); resulting in a value of 53.24%.

The lowest value from the 2 options above, which is 53.24%, has been applied for the period 01/03/2014 – 13/06/2014. This method was also accepted by the verification team as the most conservative.

E.4.2. Corrections

Not applicable

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

Not applicable

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

Not applicable

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

Not applicable

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

Not applicable

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

Not applicable

E.5. Compliance of monitoring plan with the monitoring methodology including applicable tool and standardized baseline

Means of verification	<p>The verification team conducted check of all sites of monitored parameter to determine if all the information provided in MR, are in-line with the applied monitoring methodology. The verification results are as follows:</p> <ul style="list-style-type: none"> - The monitoring plan is established in accordance with the monitoring methodology AMS-III.H.: Methane recovery in wastewater treatment - Version 13.0 /6/ (§ 386 of CDM VVS) - The baseline emissions are calculated as the sum of baseline emissions wastewater treatment systems ($BE_{ww,treatment,y}$), of which implementation was observed by the Verification Team during on site physical inspection. It was also confirmed that the assumption of zero baseline emissions from electricity or fuel consumption ($BE_{power,y}$) is correct, while zero baseline emissions from sludge treatment systems ($BE_{s,treatment,y}$), degradable organic carbon in treated wastewater discharged into sea/river/lake ($BE_{ww,discharge,y}$) and from anaerobic decay of the final sludge ($BE_{s,final,y}$) is correct as sludge is used for soil application in aerobic conditions, and not discharged to any sea, river or lake. - The project emissions are calculated as the sum of emissions from electricity or fuel consumption ($PE_{power,y}$), biogas releases in capture systems ($PE_{fugitive,y}$, from anaerobic wastewater treatment systems only), and methane emissions due to incomplete flaring ($PE_{flaring,y}$), of which implementation was observed by the Verification Team during on site physical inspection. It was also confirmed that the assumption of zero project emissions from wastewater treatment systems affected by the project activity ($PE_{ww,treatment,y}$), sludge treatment systems ($PE_{s,treatment,y}$), degradable organic carbon in treated wastewater ($PE_{ww,discharge,y}$), anaerobic decay of final sludge ($PE_{s,final,y}$) and biomass stored under anaerobic conditions ($PE_{biomass,y}$) is correct. The conditions as described in Section B.6.1 of the registered PDD /4/ for these parameters were checked on-site and found to be still applicable at the time of this 2nd monitoring period and hence project emissions for these parameters were confirmed to be zero. - The monitoring equipment for baseline emission parameters is in accordance with QA&QC procedures described in the revised registered monitoring plan. - All project emission parameters are monitored and updated in accordance with monitoring plan, monitoring methodology and relevant CDM EB decisions - The monitoring equipment for project emission parameters are controlled and monitoring results recorded as per approved frequency - The monitoring equipment for project emission parameters are calibrated in accordance with QA&QC procedures described in the registered monitoring plan - Leakage emission parameters are monitored and updated in accordance with monitoring plan, monitoring methodology and relevant CDM EB decisions
Findings	No findings. Although there was a temporary deviation from the monitoring plan due to the breakdown of the datalogger, this was accounted for with conservative assumptions as explained under Section E.4.1 above.
Conclusion	The DOE verification team is able to confirm that the monitoring plan contained in the revised registered PDD /4/ is in accordance with the approved methodology applied by the project activity, i.e. AMS III.H "Methane Recovery in Wastewater Treatment" version 13 /6/.

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	Parameter: Anaerobic lagoon treatment system depth Value: 3m Source verified: Layout Drawings
Findings	No findings
Conclusion	The verification team had checked the source and concluded that the value applied is valid

Means of verification	Parameter: B_{o,ww} Value: 0.21 kg CH ₄ per kg COD Source verified: AMS-III.H. ver. 13
Findings	No findings
Conclusion	The verification team had checked the source and concluded that the value applied is valid

Means of verification	Parameter: MCF_{ww,treatment} Value: 0.8 Source verified: AMS-III.H. ver. 13
Findings	No findings
Conclusion	The verification team had checked the source and concluded that the value applied is valid

Means of verification	Parameter: MCF_{ww,discharge} Value: 0 Source verified: AMS-III.H. ver. 13
Findings	No findings
Conclusion	The verification team had checked the source and concluded that the value applied is valid

Means of verification	Parameter: GWP_CH₄ Value: 21 for first commitment period (up to Dec 31st, 2012) 25 for second commitment period starting January 1st, 2013 Source verified: IPCC and change from GWP of 21 to 25 according to decision; 4/CMP7 and para 66, EB69
Findings	No findings
Conclusion	The verification team had checked the source and concluded that the value applied is valid

Means of verification	Parameter: EF_{TNB,y} Value: 0.684 t CO _{2e} /MWh Source: PTM, Study on Grid Connected Electricity Baselines in Malaysia (2007)
Findings	No findings
Conclusion	The verification team had checked the source and concluded that the value applied is valid

Means of verification	Parameter: EF_{genset,y} Value: 0.8 t CO _{2e} /MWh Source: UNFCCC conservative default value.
Findings	No findings
Conclusion	The verification team had checked the source and concluded that the value applied is valid

Means of verification	Parameter: $EF_{\text{biomass},y}$ Value: 0 t CO _{2e} /MWh Source: UNFCCC
Findings	No findings
Conclusion	The verification team had checked the source and concluded that the value applied is valid

Means of verification	Parameter: UF_{bl} Value: 0.94 Source: UNFCCC
Findings	No findings
Conclusion	The verification team had checked the source and concluded that the value applied is valid

Means of verification	Parameter: UF_{pj} Value: 1.06 Source: UNFCCC
Findings	No findings
Conclusion	The verification team had checked the source and concluded that the value applied is valid

Means of verification	Parameter: DOC_F Value: 0.5 Source: UNFCCC
Findings	No findings
Conclusion	The verification team had checked the source and concluded that the value applied is valid

Means of verification	Parameter: CFE_{ww} Value: 0.9 Source: UNFCCC
Findings	No findings
Conclusion	The verification team had checked the source and concluded that the value applied is valid

E.6.2. Data and parameters monitored

Means of verification	Monitoring Parameter Requirement	Assessment/ Observation by the DOE
	Data / Parameter: (as in monitoring plan of PDD):	$Q_{ww,y}$
	Measuring frequency/Time Interval:	Continuous
	Reporting frequency:	Daily
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes, the monitoring frequency is consistent with the PDD. It was verified that monitoring is done daily through recording of POME flow rate every 4 hours and recorded in forms for Daily Monitoring of POME Input and Biogas Supply /17/. The verification team was able to verify the results were reflected correctly in the ER spreadsheet /5/
	Type of monitoring equipment:	Type: Flowmeter Make/Model: Yokogawa/AXF080G Serial no: S5K202220
	Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring	Accuracy class: EMC Conformity Standards; EN61326-1 Class A, Table 2 (For use in industrial locations)

	equipment, does the monitoring equipment represent good monitoring practise?	The accuracy class was found to be consistent with the technical specifications of the flowmeter, i.e. General Specifications for AXF Magnetic Flowmeter Integral Flowmeter/Remote Flowtube (GS 01E20D01-01E) /20/
	Calibration frequency /interval: Is it Board guidance / local or national standards / manufacturers specification	Calibration frequency: Annual The calibration frequency is not specified in the equipment technical specifications. However it is consistent with the calibration frequency stated in the approved PDD /4/
	Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	Yes, the calibration interval in line with the revised monitoring plan of the PDD /4/ This complies with Clean Development Mechanism Validation and Verification Standard (version 09.0) paragraph 399 which states that: <i>"399. In cases where neither the applied monitoring methodology, where applicable, the applied standardized baseline nor the registered monitoring plan specify any requirements for calibration frequency for measuring equipment, the DOE shall determine whether the equipment is calibrated either in accordance with the specifications of the local/national standards, or as per the manufacturer's specification. If neither local/national standards nor the manufacturer's specification are available, international standards may be used."</i>
	Company performing the calibration:	The verification team verified the test certificates /21/ for flowmeter serial no: S5K202220 & it was confirmed that the factory calibration is carried out by the equipment manufacturer i.e. the original equipment manufacturer factory calibration. This laboratory under manufacturing company is also accredited, as seen from SAMM accreditation certificate for lab. no. 070, Yokogawa Electric (M) Sdn. Bhd. dated 17 September 2014 until 23 June 2017 /84/. This complies with Clean Development Mechanism Validation and Verification Standard (version 09.0) paragraph 242 which states that: <i>"399. In cases where neither the applied monitoring methodology, where applicable, the applied standardized baseline nor the registered monitoring plan specify any requirements for calibration frequency for measuring equipment, the DOE shall determine whether the equipment is calibrated either in accordance with the specifications of the local/national standards, or as per the manufacturer's specification. If neither local/national standards nor the manufacturer's specification are available, international standards may be used."</i>
	Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes
	Is (are) calibration(s) valid for the whole reporting period?	Based on the cross checking of the test certificates /21/ versus physical checking of the equipment calibration status and final

		<p>monitoring plan /2/, the verification team could confirm that the monitoring equipment used i.e Yokogawa/AXF080G Flow Meter is still valid within the specified calibration interval.</p> <p>Details of the calibration as below: Date of initial calibration: 31/05/2013 Date of second calibration: 09/05/2014</p>
	If applicable, has the reported data been cross-checked with other available data?	The value reported had been cross checked for its accuracy via review of the certificate of analysis reports from the equipment manufacturer /21/, ER spreadsheet /5/ & the verification team confirmed the data reported are consistent & correct
	How were the values in the monitoring report verified?	During the on site visit, the verification team utilized various auditing techniques such as conducting series of interviews with the monitoring personnel, verification of data on site & off site including the corresponding records such as logbook and daily records (obtained from the project activity location) & observation of the information flow process applicable for determination of $Q_{ww,y}$
	Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	The QA/QC procedures applied has been verified by the verification team during on site visit & interviews with the monitoring personnel. The QA / QC procedures implemented is in accordance with the defined documented manual i.e. Monitoring Manual – June 2012, Version 4.0 /16/
	In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	Not applicable
Findings	No finding	
Conclusion	This parameter was monitored and reported appropriately. It is in accordance with the monitoring plan in registered/ approved PDD /4/ and the monitoring methodology AMS III.H “Methane Recovery in Wastewater Treatment” version 13 /6/.	

Means of verification	Monitoring Parameter Requirement		Assessment/ Observation by the DOE	
	Data / Parameter: (as in monitoring plan of PDD):		COD _{ww,untreated,y}	
	Measuring frequency/Time Interval:		Monthly	
	Reporting frequency:		Monthly	
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)		<p>Yes, this is being carried out on a monthly basis as seen from the monthly test certificates from Union Laboratories Sdn. Bhd. /22/, which was verified to be an accredited lab from the lab accreditation certificates /23/ & the verification team was able to verify the results were reflected correctly in the ER spreadsheet /5/.</p> <p>To determine whether the COD results met the minimum number of samples for 90/10 confidence level, the results were tested using the method as described in Section 2.3.1 - Example 10 EB 75 Annex 8 of the Guidelines for Sampling and Surveys for CDM Project</p>	

		Activities and Programme of Activities v.3.0 /24/.
	Type of monitoring equipment:	Not applicable (analysis is conducted by external accredited laboratory)
	Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	Not applicable since analysis is conducted by external accredited laboratory. The accuracy of the testing equipment used by the lab is assured through the accreditation of the lab under the Malaysian Lab Accreditation Scheme /23/
	Calibration frequency /interval: Is it Board guidance / local or national standards / manufacturers specification	Not applicable
	Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	Not applicable
	Company performing the calibration:	Union Laboratories Sdn. Bhd. is required to perform the calibration of their own equipment. This is assured through the accreditation of the lab under the Malaysian Lab Accreditation Scheme /23/
	Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Not applicable
	Is (are) calibration(s) valid for the whole reporting period?	The accreditation certificates of Union Laboratories Sdn. Bhd. /23/ were valid throughout the entire monitoring period.
	If applicable, has the reported data been cross-checked with other available data?	The value reported had been cross checked for its accuracy via review of the certificate of analysis reports from the accredited laboratory /22/, ER spreadsheet /5/ & the verification team confirmed the data reported are consistent & correct
	How were the values in the monitoring report verified?	The verification team verified during on site visit that the waste water samples for COD_{ww,untreated,y} were taken at the entry to the digester. During the on site visit, the verification team utilized various auditing techniques such as conducting series of interviews with the monitoring personnel, verification of data on site & off site including the corresponding records such as logbook and daily records (obtained from the project activity location) & observation of the information flow process applicable for determination of COD_{ww,untreated,y}
	Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	The QA/QC procedures applied has been verified by the verification team during on site visit & interviews with the monitoring personnel. The QA / QC procedures implemented is in accordance with the defined documented manual i.e. Monitoring Manual – June 2012, Version 4.0 /16/
	In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	Not applicable
Findings	See CL 4 in Appendix 4	

Conclusion	This parameter was monitored and reported appropriately. The clarification raised was adequately addressed by the project participant as explained under Appendix 4. It is in accordance with the monitoring plan in registered/ approved PDD /4/ and the monitoring methodology AMS III.H "Methane Recovery in Wastewater Treatment" version 13 /6/.
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Means of verification	Monitoring Parameter Requirement	Assessment/ Observation by the DOE
	Data / Parameter: (as in monitoring plan of PDD):	COD_{ww,treated,y}
	Measuring frequency/Time Interval:	Monthly
	Reporting frequency:	Monthly
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes, this is being carried out on a monthly basis as seen from the monthly test certificates from Union Laboratories Sdn. Bhd. /22/, which was verified to be an accredited lab from the lab accreditation certificates /23/ & the verification team was able to verify the results were reflected correctly in the ER spreadsheet /5/. To determine whether the COD results met the minimum number of samples for 90/10 confidence level, the results were tested using the method as described in Section 2.3.1 - Example 10 EB 75 Annex 8 of the Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities v.3.0 /24/.
	Type of monitoring equipment:	Not applicable (analysis is conducted by external accredited laboratory)
	Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	Not applicable since analysis is conducted by external accredited laboratory. The accuracy of the testing equipment used by the lab is assured through the accreditation of the lab under the Malaysian Lab Accreditation Scheme /23/
	Calibration frequency /interval: Is it Board guidance / local or national standards / manufacturers specification	Not applicable
	Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	Not applicable
	Company performing the calibration:	Union Laboratories Sdn. Bhd. is required to perform the calibration of their own equipment. This is assured through the accreditation of the lab under the Malaysian Lab Accreditation Scheme /23/
	Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Not applicable
	Is (are) calibration(s) valid for the whole reporting period?	The accreditation certificates of Union Laboratories Sdn. Bhd. /23/ were valid throughout the entire monitoring period.
	If applicable, has the reported data been cross-checked with other available data?	The value reported had been cross checked for its accuracy via review of the certificate of analysis reports from the accredited laboratory /22/, ER spreadsheet /5/ & the verification team confirmed the data reported are consistent & correct
	How were the values in the monitoring report verified?	The verification team verified during on site visit that the waste water samples for COD_{ww,treated,y} were taken at the outlet of the digester.

		During the on site visit, the verification team utilized various auditing techniques such as conducting series of interviews with the monitoring personnel, verification of data on site & off site including the corresponding records such as logbook and daily records (obtained from the project activity location) & observation of the information flow process applicable for determination of COD_{ww,treated,y}
	Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	The QA/QC procedures applied has been verified by the verification team during on site visit & interviews with the monitoring personnel. The QA / QC procedures implemented is in accordance with the defined documented manual i.e. Monitoring Manual – June 2012, Version 4.0 /16/
	In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	Not applicable
Findings	See CL 4 in Appendix 4	
Conclusion	This parameter was monitored and reported appropriately. The clarification raised was adequately addressed by the project participant as explained under Appendix 4. It is in accordance with the monitoring plan in registered/ approved PDD /4/ and the monitoring methodology AMS III.H “Methane Recovery in Wastewater Treatment” version 13 /6/.	

Means of verification	Monitoring Parameter Requirement	Assessment/ Observation by the DOE
	Data / Parameter: (as in monitoring plan of PDD):	MCF_{s,PJ,final}
	Measuring frequency/Time Interval:	Not applicable
	Reporting frequency:	Not applicable
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Not applicable
	Type of monitoring equipment:	Not applicable
	Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	Not applicable
	Calibration frequency /interval: Is it Board guidance / local or national standards / manufacturers specification	Not applicable
	Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	Not applicable
	Company performing the calibration:	Not applicable
	Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Not applicable
	Is (are) calibration(s) valid for the whole reporting period?	Not applicable
	If applicable, has the reported data been cross-checked with other available data?	The applied value of 0 is confirmed to be consistent with the applied methodology /6/
	How were the values in the monitoring report verified?	The value was verified against the applied methodology /6/ and confirmed to be the correct value applied. The value is also

		consistent with the approved PDD /4/
	Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Not applicable
	In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	Not applicable
Findings	No finding	
Conclusion	This parameter was monitored and reported appropriately. It is in accordance with the monitoring plan in registered/ approved PDD /4/ and the monitoring methodology AMS III.H "Methane Recovery in Wastewater Treatment" version 13 /6/.	

Means of verification	Monitoring Parameter Requirement	Assessment/ Observation by the DOE
	Data / Parameter: (as in monitoring plan of PDD):	$S_{final,PJ,y}$
	Measuring frequency/Time Interval:	Monthly
	Reporting frequency:	Monthly
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Neither the monitoring plan nor the monitoring methodology specifically defines the measuring and reporting frequency for this parameter. The PDD specifies that for every disposal of sludge, date and amount (tonnes dry matter) will be recorded. The amount of sludge produced was verified to be recorded monthly in record sheets for Monthly Sludge Disposal from Biogas Plant Sedimentation Tank for Year 2013 & Year 2014 /25/. During the on site visit, the verification team utilized various auditing techniques such as conducting series of interviews with the monitoring personnel, verification of data on site & off site including the corresponding records in the monthly sludge disposal sheets & observation of the information flow process applicable for determination of $S_{final,PJ,y}$.
	Type of monitoring equipment:	Type: Weighbridge weight indicators Make/Model: Avery/E1110 Serial no: 074550124 (40 tonnes), 074550143 (60 tonnes), 074550157 (60 tonnes)
	Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	Accuracy class: EN45501:1994 and OIML R76-1:2006 (accuracy Class III for Non-Automatic Weighing Instrument) The PDD does not specify the accuracy of the monitoring equipment used. The stated accuracy was in accordance with the technical specification sheet of the Avery Weigh-Tonix Multi Function Weight Indicator /26/ and was accepted by the verification
	Calibration frequency /interval: Is it Board guidance / local or national standards / manufacturers specification	Calibration frequency: Annual The technical specifications for the Weight Indicator /26/ also does not specify the required calibration frequency. However, it was confirmed by the verification

		team that annual calibration frequency of weighbridges is in accordance with the common practice carried out by palm oil mills and in line with local legal requirements for weighbridge calibration as per the Weight and Measures Act 1972 of Malaysia /27/
	Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	<p>The PDD /4/ did not specify the calibration frequency of the monitoring equipment used, but states that calibration shall be carried out in accordance with manufacturer's recommendations. Since manufacturer specification also did not specify the calibration frequency, it was confirmed by the verification that the calibration frequency of one year for weighbridges is common practice carried out by palm oil mills and in line with local legal requirements for weighbridge calibration as per the Weight and Measures Act 1972 of Malaysia /27/.</p> <p>This complies with Clean Development Mechanism Validation and Verification Standard (version 09.0) paragraph 399 which states that:</p> <p><i>"399. In cases where neither the applied monitoring methodology, where applicable, the applied standardized baseline nor the registered monitoring plan specify any requirements for calibration frequency for measuring equipment, the DOE shall determine whether the equipment is calibrated either in accordance with the specifications of the local/national standards, or as per the manufacturer's specification. If neither local/national standards nor the manufacturer's specification are available, international standards may be used."</i></p>
	Company performing the calibration:	<p>Prime Silver Metrology Enterprise</p> <p>The verification team confirmed that this company has a license to fix and sell weighing or measurement equipment /28/ which is signed by the head inspection of weighing and measurements of the Domestic Trade, Cooperatives and Consumerism Ministry. The license was valid from 22 April 2010 until 21 April 2015.</p>
	Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes
	Is (are) calibration(s) valid for the whole reporting period?	<p>Date of initial calibration:</p> <ul style="list-style-type: none"> i) 29/03/2013 for Weighbridge S/N no. 074550124 (40 tonnes), ii) 24/03/2013 for Weighbridge S/N no. 074550143 (60 tonnes) iii) 24/03/2013 for Weighbridge S/N no. 074550157 (60 tonnes) <p>Date of second calibration:</p> <ul style="list-style-type: none"> iv) 24/03/2014 for Weighbridge S/N no. 074550124 (40 tonnes), v) 25/03/2014 for Weighbridge S/N no. 074550143 (60 tonnes) vi) 25/03/2014 for Weighbridge S/N no. 074550157 (60 tonnes)

		Based on the cross checking of the test certificates /23/ versus physical checking of the equipment calibration status and revised monitoring plan /2/, the verification team could confirm that the monitoring equipment used i.e Avery/E1110 Weighbridges were still valid within the specified calibration interval.
	If applicable, has the reported data been cross-checked with other available data?	The value reported had been cross checked for its accuracy via review of the Records for Monthly Sludge Disposal from Biogas Plant Sedimentation Tank for Year 2013 & Year 2014 /25/, ER spreadsheet /5/ & the verification team confirmed the data reported are consistent & correct
	How were the values in the monitoring report verified?	During the on site visit, the verification team utilized various auditing techniques such as conducting series of interviews with the monitoring personnel, verification of data on site & off site including the corresponding records such as logbook and daily records (obtained from the project activity location) & observation of the information flow process applicable for determination of $S_{final,PJ,y}$.
	Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	The QA/QC procedures applied has been verified by the verification team during on site visit & interviews with the monitoring personnel. The QA / QC procedures implemented is in accordance with the defined documented manual i.e. Monitoring Manual – June 2012, Version 4.0 /16/
	In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	Not applicable
Findings	See CAR 3 and CAR 5.4 in Appendix 4	
Conclusion	This parameter was monitored and reported appropriately. The clarification and CAR raised was adequately addressed by the project participant as explained under Appendix 4. It is in accordance with the monitoring plan in registered/ approved PDD /4/ and the monitoring methodology AMS III.H "Methane Recovery in Wastewater Treatment" version 13 /6/.	

Means of verification	Monitoring Parameter Requirement	Assessment/ Observation by the DOE
	Data / Parameter: (as in monitoring plan of PDD):	$S_{PJ,y}$
	Measuring frequency/Time Interval:	Monthly
	Reporting frequency:	Monthly
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes, the measuring and reporting frequency is in accordance to the revised monitoring plan as per the registered PDD /4/ and the verification team was able to verify the results were reflected correctly in the ER spreadsheet /5/.
	Type of monitoring equipment:	Not applicable (analysis is conducted by external accredited laboratory)
	Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	Not applicable since analysis is conducted by external accredited laboratory. The accuracy of the testing equipment used by the lab is assured through the accreditation of the lab under the Malaysian Lab Accreditation

		Scheme /23/
	Calibration frequency /interval: Is it Board guidance / local or national standards / manufacturers specification	Not applicable
	Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	Not applicable
	Company performing the calibration:	Union Laboratories Sdn. Bhd. is required to perform the calibration of their own equipment. This is assured through the accreditation of the lab under the Malaysian Lab Accreditation Scheme /23/
	Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Not applicable
	Is (are) calibration(s) valid for the whole reporting period?	The accreditation certificates of Union Laboratories Sdn. Bhd. /23/ were valid throughout the entire monitoring period.
	If applicable, has the reported data been cross-checked with other available data?	The value reported had been cross checked for its accuracy via review of the certificate of analysis reports from the accredited laboratory /22/, ER spreadsheet /5/ & the verification team confirmed the data reported are consistent & correct
	How were the values in the monitoring report verified?	The verification team verified during on site visit that the samples of dry matter were taken from the desludger. During the on site visit, the verification team utilized various auditing techniques such as conducting series of interviews with the monitoring personnel, verification of data on site & off site including the corresponding records such as logbook and daily records (obtained from the project activity location) & observation of the information flow process applicable for determination of $S_{PJ,y}$
	Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	The QA/QC procedures applied has been verified by the verification team during on site visit & interviews with the monitoring personnel. The QA / QC procedures implemented is in accordance with the defined documented manual i.e. Monitoring Manual – June 2012, Version 4.0 /16/
	In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	Not applicable
Findings	See CL 1 of Appendix 4	
Conclusion	This parameter was monitored and reported appropriately. The clarification raised was adequately addressed by the project participant as explained under Appendix 4. It is in accordance with the monitoring plan in registered/ approved PDD /4/ and the monitoring methodology AMS III.H “Methane Recovery in Wastewater Treatment” version 13 /6/.	

Means of verification	Monitoring Parameter Requirement		Assessment/ Observation by the DOE	
	Data / Parameter: (as in monitoring plan of PDD):		$EC_{PJ,y}$	
	Measuring frequency/Time Interval:		Continuously	

	Reporting frequency:	Daily
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes, the measuring and reporting frequency is in accordance to the revised monitoring plan as per the registered PDD /4/ and the verification team was able to verify the results were reflected correctly in the ER spreadsheet /5/.
	Type of monitoring equipment:	Type: Electricity meter Make/Model: Holley TMS/DT862 Serial no: 10-05-0946
	Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	Accuracy class: Class II of IEC 60521 The accuracy class was not specified in the approved revised registered PDD /4/ Nevertheless, the verification team considered the accuracy class applied in the monitoring plan is consistent with the manufacturer's specifications as see in the Technical Description for Three Phase Electromechanical Watt Hour Meter HLT01 (DT862) by Holley Metering Ltd. /29/
	Calibration frequency /interval: Is it Board guidance / local or national standards / manufacturers specification	Calibration frequency: Annually The Technical Description for Three Phase Electromechanical Watt Hour Meter HLT01 (DT862) by Holley Metering Ltd. /29/ did not specify the calibration frequency. The calibration frequency was therefore confirmed to be annually based on the document "SC 1.4 – Specific Criteria for Accreditation in the Field of Electrical Testing; Issue 1, 17 July 2010" issued by the Department of Standards Malaysia which specifies that calibration of electricity meters shall be annually /30/. This was accepted as evidence of good monitoring practice.
	Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	The calibration frequency was not specified in the registered PDD /4/, which stated that calibration will be in accordance with the standard of Tenaga Nasional Berhad (TNB). However, there is no standard issued by TNB regarding calibration frequency of electricity meters. Hence the justification of the calibration frequency based on the document "SC 1.4 – Specific Criteria for Accreditation in the Field of Electrical Testing; Issue 1, 17 July 2010" issued by the Department of Standards Malaysia /30/ was accepted as justification for the annual calibration frequency. This complies with Clean Development Mechanism Validation and Verification Standard (version 09.0) paragraph 399 which states that: <i>"399. In cases where neither the applied monitoring methodology, where applicable, the applied standardized baseline nor the registered monitoring plan specify any requirements for calibration frequency for measuring equipment, the DOE shall determine whether the equipment is calibrated either in accordance with the specifications of the local/national standards, or as per the manufacturer's specification. If neither local/national standards nor the manufacturer's specification are available, international</i>

		<i>standards may be used."</i>
	Company performing the calibration:	The electricity meter was calibrated by E-Power Engineering Sdn Bhd (not accredited) but the Power Meter Calibration Result dated 2-10-2013 /31/ is endorsed by a competent electrical service engineer (certified engineer by Energy Commission) as seen in approval letter dated 18-09-2013 for registration of the service engineer, which was valid until 12-09-2014 /32/.
	Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes
	Is (are) calibration(s) valid for the whole reporting period?	Based on the cross checking of the Power Meter Calibration Result for KWH Meter Holley-TMS DT 862 S/N 10-05-0946 /31/ versus physical checking of the equipment calibration status and revised monitoring plan /2/, the verification team could confirm that the electricity meter is still valid within the specified calibration interval. The date of first calibration was 02/10/2013.
	If applicable, has the reported data been cross-checked with other available data?	The values reported had been cross checked for its accuracy via review of the daily electricity meter readings logbook, from which readings at every 4 hour interval are then transferred to form no. Biogas 007 for "Electrical & water Consumption by Biogas Plant" /33/. The readings were also checked against the ER spreadsheet /5/ & the verification team confirmed the data reported are consistent & correct.
	How were the values in the monitoring report verified?	During the on site visit, the verification team utilized various auditing techniques such as conducting series of interviews with the monitoring personnel, verification of data on site & off site including the corresponding records such as daily electricity meter readings logbook and the Biogas 007 forms for "Electrical & water Consumption by Biogas Plant" /33/ (obtained from the project activity location) & observation of the information flow process applicable for determination of EC_{PJ,y}
	Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	The QA/QC procedures applied has been verified by the verification team during on site visit & interviews with the monitoring personnel. The QA / QC procedures implemented is in accordance with the defined documented manual i.e. Monitoring Manual – June 2012, Version 4.0 /16/
	In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	Not applicable
Findings	No finding	
Conclusion	This parameter was monitored and reported appropriately. It is in accordance with the monitoring plan in registered/ approved PDD /4/ and the monitoring methodology AMS III.H "Methane Recovery in Wastewater Treatment" version 13 /6/.	

Means of verification	Monitoring Parameter Requirement	Assessment/ Observation by the DOE
	Data / Parameter: (as in monitoring plan of PDD):	FV _{digester,h}
	Measuring frequency/Time Interval:	Continuous
	Reporting frequency:	Once in 5 minutes
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes, the measuring frequency is in accordance to the revised monitoring plan as per the registered PDD /4/ and the verification team was able to verify the results were reflected correctly in the ER spreadsheet /5/. The reporting frequency is not specifically defined in the PDD, but was confirmed to be consistent with the time interval of data recorded by the data loggers, as seen from the Daqstation Data - UIE raw data and adjusted monthly datalogger sheets for August 2013 to December 2014 /14/
	Type of monitoring equipment:	Data logger in-line with: 1) Flow meter (Yokogawa/DY100; S/N S5L104769) 2) Pressure transmitter (differential) (Yokogawa/ EJA110A; S/N 91L125154) 3) Temperature transmitter (Yokogawa/YTA110; S/N C2L110793)
	Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	Accuracy range: EMC Conformity Standards (EN61326-1 Class A) for all equipment The accuracy class was not specified in the approved revised registered PDD /4/ Nevertheless, the verification team considered the accuracy class applied in the monitoring plan is consistent with the manufacturer specifications as seen from the general specifications sheets for each equipment /34,35,36/
	Calibration frequency /interval: Is it Board guidance / local or national standards / manufacturers specification	The general specification documents for the flow meter, pressure transmitter and temperature transmitter /34,35,36/ did not specify the calibration frequency of the equipment and there are no local standards for calibration of these types of equipment. The calibration frequency of every 3 years was therefore justified based on international guidelines, as seen in a document issued by an equipment manufacturer, Emerson, regarding recommended calibration practices for DP flowmeters, dated 3 January 2011 /38/. This document states that to comply with EPA stated accuracy specifications, Emerson recommends that calibration occur once every 3 years. A DP Flow Selection Guide produced by Emerson for their differential flowmeters /39/ showed that the highest error recorded among the 4 flowmeters produced by Emerson is 1.4%; the 3051 SFA ProBar (includes 485 Annubar). It is hence implied that equipment with an error of 1.4% must be calibrated at least once in 3 years in order to meet US EPA 40 CFR Part 98, Greenhouse Gas Mandatory Reporting Requirements. Since the accuracy of the equipment used in this project for the measurement of FV _{digester,h} readings were within 1.4%, i.e. DY100 flowmeters (accuracy

		of 1.0%), EJA110A and EJX610A pressure transmitters (accuracy of 0.2%), and YTA110 temperature transmitters (accuracy of 0.4%), the same calibration frequency of 3 years was assumed to be appropriate for these equipment.
	Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	<p>The calibration frequency was not specified in the registered PDD /4/, which states that flow meters will be calibrated in accordance with the manufacturer's recommendation. However, since the general specification documents for the flow meter, pressure transmitter and temperature transmitter /34,35,36/ did not specify the calibration frequency of the equipment and there are no local standards for calibration of these types of equipment. The calibration frequency of every 3 years was therefore justified based on international guidelines, as explained above.</p> <p>This complies with Clean Development Mechanism Validation and Verification Standard (version 09.0) paragraph 399 which states that: <i>"399. In cases where neither the applied monitoring methodology, where applicable, the applied standardized baseline nor the registered monitoring plan specify any requirements for calibration frequency for measuring equipment, the DOE shall determine whether the equipment is calibrated either in accordance with the specifications of the local/national standards, or as per the manufacturer's specification. If neither local/national standards nor the manufacturer's specification are available, international standards may be used."</i></p>
	Company performing the calibration:	<p>The verification team verified the calibration certificates for the flowmeter /40/, pressure transmitter /41/ and temperature transmitter /42/ & it was confirmed that the factory calibration is carried out by the equipment manufacturer i.e. the original equipment manufacturer factory calibration, i.e. Yokogawa.</p> <p>The Certificate of Accreditation no. SAMM 070 issued by the Department of Standards Malaysia for Yokogawa Electric (Malaysia) Sdn. Bhd. /84/ issued on 3 October 2011 and valid until 23 June 2014 was sighted. Although there is no accreditation certificate or evidence available for period of 24 June to 16 September 2014, it was confirmed that there was no calibration done during this period.</p>
	Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes
	Is (are) calibration(s) valid for the whole reporting period?	Based on the cross checking of the calibration certificates /40,41,42/ versus physical checking of the equipment calibration status and revised monitoring plan /2/, the verification team could confirm that the monitoring equipment used are still valid within the specified calibration

		interval. Details of the calibration as below: 1) Flow meter (Yokogawa/DY100; S/N S5L104769) Date of initial calibration: 07/02/2013 2) Pressure transmitter (differential) (Yokogawa/ EJA110A; S/N 91L125154) Date of initial calibration: 07/02/2013 3) Temperature transmitter (Yokogawa/YTA110; S/N C2L110793) Date of initial calibration: 07/02/2013
	If applicable, has the reported data been cross-checked with other available data?	The values reported for each equipment had been cross checked for its accuracy via review of the Daqstation Data - UIE raw data and adjusted monthly datalogger sheets for August 2013 to December 2014 /14/, ER spreadsheet /5/ & the verification team confirmed the data reported are consistent & correct
	How were the values in the monitoring report verified?	During the on site visit, the verification team utilized various auditing techniques such as conducting series of interviews with the monitoring personnel, verification of data on site & off site including the corresponding records such as the monthly datalogger records & observation of the information flow process applicable for determination of $FV_{\text{digester,h}}$.
	Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	The QA/QC procedures applied has been verified by the verification team during on site visit & interviews with the monitoring personnel. The QA / QC procedures implemented is in accordance with the defined documented manual i.e. Monitoring Manual – June 2012, Version 4.0 /16/
	In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	A temporary deviation from the registered monitoring plan as discussed in Section B.2.1 of the final monitoring report /2/ which was due to malfunction of the data logger (Daqstation S/N: S5K202141) located at the biogas plant from the period of 01/03/2014 – 13/06/2014. This resulted in inability to monitor input values for $FV_{\text{digester,h}}$ during this period. The project participant has accounted for this deviation while making conservative assumptions, as already explained under Section 3.1.1, “Consistency with PDD & Diversions from original plan”.
Findings	See CAR 5.3 in Appendix 4	
Conclusion	This parameter was monitored and reported appropriately. The CAR raised was adequately addressed by the project participant as explained under Appendix 4. It is in accordance with the monitoring plan in registered/ approved PDD /4/ and the monitoring methodology AMS III.H “Methane Recovery in Wastewater Treatment” version 13 /6/.	

Means of verification	Monitoring Parameter Requirement	Assessment/ Observation by the DOE
	Data / Parameter: (as in monitoring plan of PDD):	$f_{V_{CH_4,h}}$
	Measuring frequency/Time Interval:	Continuous
	Reporting frequency:	Once in 5 minutes
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes, the measuring frequency is in accordance to the revised monitoring plan as per the registered PDD /4/ and the verification

		team was able to verify the results were reflected correctly in the ER spreadsheet /5/. The reporting frequency is not specifically defined in the PDD, but was confirmed to be consistent with the time interval of data recorded by the data loggers, as seen from the Daqstation Data - UIE raw data and adjusted monthly datalogger sheets for August 2013 to December 2014 /14/
	Type of monitoring equipment:	Data logger in-line with gas analyser Make/Model: Guardian Plus Methane Analyser/97462 Serial no: 32809
	Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	Accuracy class: CE marked (meets conformity to be used within European Economic Area) The accuracy class was not specified in the approved revised registered PDD /4/ Nevertheless, the verification team considered the accuracy class applied in the monitoring plan is consistent with the manufacturer specifications as seen from the technical specifications sheet for the gas analyser /44/.
	Calibration frequency /interval: Is it Board guidance / local or national standards / manufacturers specification	Calibration frequency: Annual (12 months) This was confirmed by the verification team to consistent with technical specifications sheet for the gas analyser /44/ which states the gas analyser stability to be 12 months.
	Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	The calibration frequency was not specified in the registered PDD /4/, which states that flow meters will be calibrated in accordance with the manufacturer's recommendation. This was confirmed to be 12 months, as stated above. This complies with Clean Development Mechanism Validation and Verification Standard (version 09.0) paragraph 399 which states that: <i>"399. In cases where neither the applied monitoring methodology, where applicable, the applied standardized baseline nor the registered monitoring plan specify any requirements for calibration frequency for measuring equipment, the DOE shall determine whether the equipment is calibrated either in accordance with the specifications of the local/national standards, or as per the manufacturer's specification. If neither local/national standards nor the manufacturer's specification are available, international standards may be used."</i>
	Company performing the calibration:	The verification team sighted the Calibration Reports for Guardian Plus Methane Analyser (Serial #: I-32809) dated 26 May 2013 and 26 December 2014 by Enviro-LIFT Services Sdn. Bhd. /45/ This company is not accredited, however the calibration was conducted by Mr. Lee Ah Lek, the Senior Chemist at Enviro-LIFT Services Sdn. Bhd. who is also a Registered Chemist with the Malaysian Institute of Chemistry and Technical Assessor for the Department of Standards Malaysia. This was verified from a statement of competency issued by Mr. Lee

		Ah Lek dated 5 December 2013 /46/, the Annual Retention Certificate for Lee Ah Lek to be retained as a member of the Malaysian Institute of Chemistry, issued 15 January and valid until 31 December 2013 /47/. This was accepted by the verification team as sufficient evidence of the competency of lee Ah Lek to conduct the calibration of the gas analyser.
	Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes
	Is (are) calibration(s) valid for the whole reporting period?	Based on the cross checking of the calibration certificate /45/ versus physical checking of the equipment calibration status and revised monitoring plan /2/, the verification team could confirm that the monitoring equipment used are still valid within the specified calibration interval. Details of the calibration as below: Date of initial calibration: 26/05/2013 Date of second calibration: 26/12/2014
	If applicable, has the reported data been cross-checked with other available data?	The values reported for each equipment had been cross checked for its accuracy via review of the Daqstation Data - UIE raw data and adjusted monthly datalogger sheets for August 2013 to December 2014 /14/, ER spreadsheet /5/ & the verification team confirmed the data reported are consistent & correct
	How were the values in the monitoring report verified?	During the on site visit, the verification team utilized various auditing techniques such as conducting series of interviews with the monitoring personnel, verification of data on site & off site including the corresponding records such as the monthly datalogger records & observation of the information flow process applicable for determination of $fv_{CH_4,h}$.
	Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	The QA/QC procedures applied has been verified by the verification team during on site visit & interviews with the monitoring personnel. The QA / QC procedures implemented is in accordance with the defined documented manual i.e. Monitoring Manual – June 2012, Version 4.0 /16/
	In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	A temporary deviation from the registered monitoring plan as discussed in Section B.2.1 of the final monitoring report /2/ which was due to malfunction of the data logger (Daqstation S/N: S5K202141) located at the biogas plant from the period of 01/03/2014 – 13/06/2014. This resulted in inability to monitor input values for $fv_{CH_4,h}$ during this period. The project participant has accounted for this deviation while making conservative assumptions, as already explained under Section 3.1.1, “Consistency with PDD & Diversions from original plan”.
Findings	See CAR 5 and 6 in Appendix 4	
Conclusion	This parameter was monitored and reported appropriately. The CARs raised were adequately addressed by the project participant as explained under Appendix 4. It is in accordance with the monitoring plan in registered/ approved PDD /4/ and the monitoring methodology AMS III.H “Methane Recovery in Wastewater Treatment” version 13 /6/.	

Means of verification	Monitoring Parameter Requirement	Assessment/ Observation by the DOE
	Data / Parameter: (as in monitoring plan of PDD):	FV _{boiler,h}
	Measuring frequency/Time Interval:	Continuous
	Reporting frequency:	Once in 5 minutes
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes, the measuring frequency is in accordance to the revised monitoring plan as per the registered PDD /4/ and the verification team was able to verify the results were reflected correctly in the ER spreadsheet /5/. The reporting frequency is not specifically defined in the PDD, but was confirmed to be consistent with the time interval of data recorded by the data loggers, as seen from the Daqstation Data - UIE raw data and adjusted monthly datalogger sheets for August 2013 to December 2014 /14/
	Type of monitoring equipment:	Data logger in-line with: 1) Flow meter (Yokogawa/DY100; S/N S5L104767) 2) Pressure transmitter (differential) (Yokogawa/EJA110A; S/N 91L125158) 3) Temperature transmitter (Yokogawa/YTA110; S/N C2L110792) 4) Pressure transmitter (Atmospheric) (Yokogawa/ EJJ610A; S/N 91L122098)
	Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	Accuracy range: EMC Conformity Standards (EN61326-1 Class A) for all equipment The accuracy class was not specified in the approved revised registered PDD /4/ Nevertheless, the verification team considered the accuracy class applied in the monitoring plan is consistent with the manufacturer specifications as seen from the general specifications sheets for each equipment /34,35,36, 37/
	Calibration frequency /interval: Is it Board guidance / local or national standards / manufacturers specification	The general specification documents for the flow meter, pressure transmitter and temperature transmitter /34,35,36,37/ did not specify the calibration frequency of the equipment and there are no local standards for calibration of these types of equipment. The calibration frequency of every 3 years was therefore justified based on international guidelines, as seen in a document issued by an equipment manufacturer, Emerson, regarding recommended calibration practices for DP flowmeters, dated 3 January 2011 /37/. This document states that to comply with EPA stated accuracy specifications, Emerson recommends that calibration occur once every 3 years. A DP Flow Selection Guide produced by Emerson for their differential flowmeters /39/ showed that the highest error recorded among the 4 flowmeters produced by Emerson is 1.4%; the 3051 SFA ProBar (includes 485 Annubar). It is hence implied that equipment with an error of 1.4% must be calibrated at least once in 3 years in order to meet US EPA 40 CFR Part 98, Greenhouse Gas Mandatory Reporting Requirements. Since the accuracy of the equipment used in this project for the

		measurement of FV _{digester,h} readings were within 1.4%, i.e. DY100 flowmeters (accuracy of 1.0%), EJA110A and EJX610A pressure transmitters (accuracy of 0.2%), and YTA110 temperature transmitters (accuracy of 0.4%), the same calibration frequency of 3 years was assumed to be appropriate for these equipment.
	Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	<p>The calibration frequency was not specified in the registered PDD /4/, which states that flow meters will be calibrated in accordance with the manufacturer's recommendation. However, since the general specification documents for the flow meter, pressure transmitters and temperature transmitter /34,35,36,37/ did not specify the calibration frequency of the equipment and there are no local standards for calibration of these types of equipment. The calibration frequency of every 3 years was therefore justified based on international guidelines, as explained above.</p> <p>This complies with Clean Development Mechanism Validation and Verification Standard (version 09.0) paragraph 399 which states that:</p> <p><i>"399. In cases where neither the applied monitoring methodology, where applicable, the applied standardized baseline nor the registered monitoring plan specify any requirements for calibration frequency for measuring equipment, the DOE shall determine whether the equipment is calibrated either in accordance with the specifications of the local/national standards, or as per the manufacturer's specification. If neither local/national standards nor the manufacturer's specification are available, international standards may be used."</i></p>
	Company performing the calibration:	<p>The verification team verified the calibration certificates for the flowmeter /48/, differential pressure transmitter /49/, temperature transmitter /50/, and atmospheric pressure transmitter /51/ & it was confirmed that the factory calibration is carried out by the equipment manufacturer i.e. the original equipment manufacturer factory calibration, i.e. Yokogawa.</p> <p>The Certificate of Accreditation no. SAMM 070 issued by the Department of Standards Malaysia for Yokogawa Electric (Malaysia) Sdn. Bhd. issued on 3 October 2011 and valid until 23 June 2014 /84/ was sighted. Although there is no accreditation certificate or evidence available for period of 24 June to 16 September 2014, it was confirmed that there was no calibration done during this period.</p>
	Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes
	Is (are) calibration(s) valid for the whole reporting period?	Based on the cross checking of the calibration certificates /48,49,50,51/ versus physical checking of the equipment calibration status

		<p>and revised monitoring plan /2/, the verification team could confirm that the monitoring equipment used are still valid within the specified calibration interval.</p> <p>Details of the calibration as below:</p> <ol style="list-style-type: none"> 1) Flow meter (Yokogawa/DY100; S/N S5L104767) Date of initial calibration: 07/02/2013 2) Pressure transmitter (differential) (Yokogawa/ EJA110A; S/N 91L125158) Date of initial calibration: 07/02/2013 3) Temperature transmitter (Yokogawa/YTA110; S/N C2L110792) Date of initial calibration: 07/02/2013 4) Pressure transmitter (atmospheric) (Yokogawa/ EJA110A; S/N 91L122098) Date of initial calibration: 07/02/2013
	If applicable, has the reported data been cross-checked with other available data?	The values reported for each equipment had been cross checked for its accuracy via review of the Daqstation Data - UIE raw data and adjusted monthly datalogger sheets for August 2013 to December 2014 /14/, ER spreadsheet /5/ & the verification team confirmed the data reported are consistent & correct
	How were the values in the monitoring report verified?	During the on site visit, the verification team utilized various auditing techniques such as conducting series of interviews with the monitoring personnel, verification of data on site & off site including the corresponding records such as the monthly datalogger records & observation of the information flow process applicable for determination of $FV_{\text{boiler,h}}$.
	Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	The QA/QC procedures applied has been verified by the verification team during on site visit & interviews with the monitoring personnel. The QA / QC procedures implemented is in accordance with the defined documented manual i.e. Monitoring Manual – June 2012, Version 4.0 /16/
	In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	Not applicable
Findings	No finding	
Conclusion	This parameter was monitored and reported appropriately. It is in accordance with the monitoring plan in registered/ approved PDD /4/ and the monitoring methodology AMS III.H “Methane Recovery in Wastewater Treatment” version 13 /6/.	

Means of verification	Monitoring Parameter Requirement	Assessment/ Observation by the DOE
	Data / Parameter: (as in monitoring plan of PDD):	$FV_{\text{flare,h}}$
	Measuring frequency/Time Interval:	Continuous
	Reporting frequency:	Once in 5 minutes
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes, the measuring frequency is in accordance to the revised monitoring plan as per the registered PDD /4/ and the verification team

		<p>was able to verify the results were reflected correctly in the ER spreadsheet /5/.</p> <p>The reporting frequency is not specifically defined in the PDD, but was confirmed to be consistent with the time interval of data recorded by the data loggers, as seen from the Daqstation Data - UIE raw data and adjusted monthly datalogger sheets for August 2013 to December 2014 /14/</p>
	Type of monitoring equipment:	<p>Data logger in-line with:</p> <ol style="list-style-type: none"> 1) Flow meter (Yokogawa/DY100; S/N S5L104768) 2) Pressure transmitter (differential) (Yokogawa/EJA110A; S/N 91L125155) 3) Temperature transmitter (Yokogawa/YTA110; S/N C2L110790) 4) Pressure transmitter (Atmospheric) (Yokogawa/ EJX610A; S/N 91L122101)
	Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	<p>Accuracy range: EMC Conformity Standards (EN61326-1 Class A) for all equipment</p> <p>The accuracy class was not specified in the approved revised registered PDD /4/</p> <p>Nevertheless, the verification team considered the accuracy class applied in the monitoring plan is consistent with the manufacturer specifications as seen from the general specifications sheets for each equipment /34,35,36, 37/</p>
	Calibration frequency /interval: Is it Board guidance / local or national standards / manufacturers specification	<p>The general specification documents for the flow meter, pressure transmitter and temperature transmitter /34,35,36,37/ did not specify the calibration frequency of the equipment and there are no local standards for calibration of these types of equipment. The calibration frequency of every 3 years was therefore justified based on international guidelines, as seen in a document issued by an equipment manufacturer, Emerson, regarding recommended calibration practices for DP flowmeters, dated 3 January 2011 /37/. This document states that to comply with EPA stated accuracy specifications, Emerson recommends that calibration occur once every 3 years. A DP Flow Selection Guide produced by Emerson for their differential flowmeters /39/ showed that the highest error recorded among the 4 flowmeters produced by Emerson is 1.4%; the 3051 SFA ProBar (includes 485 Annubar). It is hence implied that equipment with an error of 1.4% must be calibrated at least once in 3 years in order to meet US EPA 40 CFR Part 98, Greenhouse Gas Mandatory Reporting Requirements. Since the accuracy of the equipment used in this project for the measurement of FV_{digester,h} readings were within 1.4%, i.e. DY100 flowmeters (accuracy of 1.0%), EJA110A and EJX610A pressure transmitters (accuracy of 0.2%), and YTA110 temperature transmitters (accuracy of 0.4%), the same calibration frequency of 3 years was assumed to be appropriate for these equipment.</p>
	Is the calibration interval in line with the	The calibration frequency was not specified in

	<p>monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?</p>	<p>the registered PDD /4/, which states that flow meters will be calibrated in accordance with the manufacturer's recommendation. However, since the general specification documents for the flow meter, pressure transmitters and temperature transmitter /34,35,36,37/ did not specify the calibration frequency of the equipment and there are no local standards for calibration of these types of equipment. The calibration frequency of every 3 years was therefore justified based on international guidelines, as explained above.</p> <p>This complies with Clean Development Mechanism Validation and Verification Standard (version 09.0) paragraph 399 which states that:</p> <p><i>"399. In cases where neither the applied monitoring methodology, where applicable, the applied standardized baseline nor the registered monitoring plan specify any requirements for calibration frequency for measuring equipment, the DOE shall determine whether the equipment is calibrated either in accordance with the specifications of the local/national standards, or as per the manufacturer's specification. If neither local/national standards nor the manufacturer's specification are available, international standards may be used."</i></p>
	<p>Company performing the calibration:</p>	<p>The verification team verified the calibration certificates for the flowmeter /52/, differential pressure transmitter /53/, temperature transmitter /54/, and atmospheric pressure transmitter /55/ & it was confirmed that the factory calibration is carried out by the equipment manufacturer i.e. the original equipment manufacturer factory calibration, i.e. Yokogawa.</p> <p>The Certificate of Accreditation no. SAMM 070 issued by the Department of Standards Malaysia for Yokogawa Electric (Malaysia) Sdn. Bhd. issued on 3 October 2011 and valid until 23 June 2014 /84/ was sighted. Although there is no accreditation certificate or evidence available for period of 24 June to 16 September 2014, it was confirmed that there was no calibration done during this period.</p>
	<p>Did calibration confirm proper functioning of monitoring equipment? (Yes / No):</p>	<p>Yes</p>
	<p>Is (are) calibration(s) valid for the whole reporting period?</p>	<p>Based on the cross checking of the calibration certificates /52,53,54,55/ versus physical checking of the equipment calibration status and revised monitoring plan /2/, the verification team could confirm that the monitoring equipment used are still valid within the specified calibration interval.</p> <p>Details of the calibration as below:</p> <p>1) Flow meter (Yokogawa/DY100; S/N S5L104767) Date of initial calibration: 07/02/2013</p>

		<p>2) Pressure transmitter (differential) (Yokogawa/ EJA110A; S/N 91L125158) Date of initial calibration: 07/02/2013</p> <p>3) Temperature transmitter (Yokogawa/YTA110; S/N C2L110792) Date of initial calibration: 07/02/2013</p> <p>4) Pressure transmitter (atmospheric) (Yokogawa/ EJA110A; S/N 91L122098) Date of initial calibration: 07/02/2013</p>
	If applicable, has the reported data been cross-checked with other available data?	The values reported for each equipment had been cross checked for its accuracy via review of the Daqstation Data - UIE raw data and adjusted monthly datalogger sheets for August 2013 to December 2014 /14/, ER spreadsheet /5/ & the verification team confirmed the data reported are consistent & correct
	How were the values in the monitoring report verified?	During the on site visit, the verification team utilized various auditing techniques such as conducting series of interviews with the monitoring personnel, verification of data on site & off site including the corresponding records such as the monthly datalogger records & observation of the information flow process applicable for determination of $FV_{flare,h}$.
	Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	The QA/QC procedures applied has been verified by the verification team during on site visit & interviews with the monitoring personnel. The QA / QC procedures implemented is in accordance with the defined documented manual i.e. Monitoring Manual – June 2012, Version 4.0 /16/
	In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	A temporary deviation from the registered monitoring plan as discussed in Section B.2.1 of the final monitoring report /2/ which was due to malfunction of the data logger (Daqstation S/N: S5K202141) located at the biogas plant from the period of 01/03/2014 – 13/06/2014. This resulted in inability to monitor input values for $FV_{flare,h}$ during this period. The project participant has accounted for this deviation while making conservative assumptions, as already explained under Section 3.1.1, “Consistency with PDD & Diversions from original plan”.
Findings	No finding	
Conclusion	This parameter was monitored and reported appropriately. It is in accordance with the monitoring plan in registered/ approved PDD /4/ and the monitoring methodology AMS III.H “Methane Recovery in Wastewater Treatment” version 13 /6/.	

Means of verification	Monitoring Parameter Requirement		Assessment/ Observation by the DOE	
	Data / Parameter: (as in monitoring plan of PDD):		T_{Flare}	
	Measuring frequency/Time Interval:		Continuous	
	Reporting frequency:		Once in 5 minutes	
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)		<p>Yes, the measuring frequency is in accordance to the revised monitoring plan as per the registered PDD /4/ and the verification team was able to verify the results were reflected correctly in the ER spreadsheet /5/.</p> <p>The reporting frequency is not specifically defined in the PDD, but was confirmed to be consistent with the time interval of data</p>	

		recorded by the data loggers, as seen from the Daqstation Data - UIE raw data and adjusted monthly datalogger sheets for August 2013 to December 2014 /14/
	Type of monitoring equipment:	Data logger in-line with thermocouple Make/Model: Tempsens Instruments/Type-N Serial no: 29529,29530 (TC1) 29528 (TC2)
	Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	Accuracy range: ANSI The accuracy class was not specified in the approved revised registered PDD /4/ Nevertheless, the verification team considered the accuracy class applied in the monitoring plan is acceptable for thermocouples as stated in the CAM Technical Guidance Document: Technical Reference for Monitoring Equipment & Instruments /56/
	Calibration frequency /interval: Is it Board guidance / local or national standards / manufacturers specification	It was confirmed from the Technical Guidance Document: Technical Reference for Monitoring Equipment & Instruments /56/ that the default calibration interval for thermocouples will be 12 months
	Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	Yes, the calibration interval in line with the revised monitoring plan of the PDD /4/ This complies with Clean Development Mechanism Validation and Verification Standard (version 09.0) paragraph 399 which states that: <i>"399. In cases where neither the applied monitoring methodology, where applicable, the applied standardized baseline nor the registered monitoring plan specify any requirements for calibration frequency for measuring equipment, the DOE shall determine whether the equipment is calibrated either in accordance with the specifications of the local/national standards, or as per the manufacturer's specification. If neither local/national standards nor the manufacturer's specification are available, international standards may be used."</i>
	Company performing the calibration:	Calibration was done by Pyrometro, as seen from the calibration certificates for the thermocouples /57,58,59,60/. Accreditation documents no. SAMM 011 for Pyrometro Services (M) Sdn. Bhd. /61/ was sighted. The 1st document validity is from 1 February 2013 to 16 July 2014 and 2nd document validity is from 10 July 2014 to 16 July 2017, which covers the entire monitoring period. List of scopes for which this lab is accredited for covers Type-N temperature recorders, which is relevant to thermocouple used for monitoring of T _{flare} .
	Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes
	Is (are) calibration(s) valid for the whole reporting period?	Based on the cross checking of the calibration certificates /57,58, 59, 60/ versus physical checking of the equipment calibration status and revised monitoring plan /2/, the verification team could confirm that the monitoring equipment used are still valid within the specified calibration interval. The replacement

		<p>of equipment is recorded on the calibration certificate for thermocouple S/N 29530.</p> <p>Due to delayed calibration for thermocouple s/n 29528 from January to February 2014, the 0.75% maximum permissible error for N-type thermocouple (more conservative than the calibration error) has been applied to the monthly CER calculation sheets, under tab 'Adjusted', for the months January – February 2014 /14/. The verification team has accepted this method as being the most conservative.</p> <p>Details of the calibration as below: Type: Thermology Type N Date of initial calibration: 22/02/2013 (S/N 29529), 23/01/2013 (S/N 29528), 07/01/2014 (S/N 29530) Date of second calibration: 26/02/2014 (S/N 29528) Validity of all calibrations: 1 year</p>
	If applicable, has the reported data been cross-checked with other available data?	The values reported for each equipment had been cross checked for its accuracy via review of the Daqstation Data - UIE raw data and adjusted monthly datalogger sheets for August 2013 to December 2014 /14/, ER spreadsheet /5/ & the verification team confirmed the data reported are consistent & correct
	How were the values in the monitoring report verified?	During the on site visit, the verification team utilized various auditing techniques such as conducting series of interviews with the monitoring personnel, verification of data on site & off site including the corresponding records such as the monthly datalogger records & observation of the information flow process applicable for determination of T_{flare} .
	Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	The QA/QC procedures applied has been verified by the verification team during on site visit & interviews with the monitoring personnel. The QA / QC procedures implemented is in accordance with the defined documented manual i.e. Monitoring Manual – June 2012, Version 4.0 /16/
	In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	Not applicable
Findings	See CAR 4 and CL2 of Appendix 4	
Conclusion	This parameter was monitored and reported appropriately. The CAR and clarification raised was adequately addressed by the project participant as explained under Appendix 4. It is in accordance with the monitoring plan in registered/ approved PDD /4/ and the monitoring methodology AMS III.H "Methane Recovery in Wastewater Treatment" version 13 /6/.	

Means of verification	Monitoring Parameter Requirement	Assessment/ Observation by the DOE
	Data / Parameter: (as in monitoring plan of PDD):	D_{Boiler}
	Measuring frequency/Time Interval:	Continuous
	Reporting frequency:	Once in 5 minutes
	Is measuring and reporting frequency in accordance with the monitoring plan and	Yes, the measuring frequency is in accordance to the revised monitoring plan as per the

	monitoring methodology? (Yes / No)	registered PDD /4/ and the verification team was able to verify the results were reflected correctly in the ER spreadsheet /5/. The reporting frequency is not specifically defined in the PDD, but was confirmed to be consistent with the time interval of data recorded by the data loggers, as seen from the Daqstation Data - UIE raw data and adjusted monthly datalogger sheets for August 2013 to December 2014 /14/
	Type of monitoring equipment:	Data logger in-line with thermocouple Make/Model: Tempsens Instruments/Type-N Serial no: 43703, 43702
	Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	Accuracy range: ANSI The accuracy class was not specified in the approved revised registered PDD /4/ Nevertheless, the verification team considered the accuracy class applied in the monitoring plan is acceptable for thermocouples as stated in the CAM Technical Guidance Document: Technical Reference for Monitoring Equipment & Instruments /56/
	Calibration frequency /interval: Is it Board guidance / local or national standards / manufacturers specification	It was confirmed from the Technical Guidance Document: Technical Reference for Monitoring Equipment & Instruments /56/ that the default calibration interval for thermocouples will be 12 months
	Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	Yes, the calibration interval in line with the revised monitoring plan of the PDD /4/ This complies with Clean Development Mechanism Validation and Verification Standard (version 09.0) paragraph 399 which states that: <i>"399. In cases where neither the applied monitoring methodology, where applicable, the applied standardized baseline nor the registered monitoring plan specify any requirements for calibration frequency for measuring equipment, the DOE shall determine whether the equipment is calibrated either in accordance with the specifications of the local/national standards, or as per the manufacturer's specification. If neither local/national standards nor the manufacturer's specification are available, international standards may be used."</i>
	Company performing the calibration:	Calibration was done by Pyrometro, as seen from the calibration certificates for thermocouples /62,63,64,65/ Accreditation documents no. SAMM 011 for Pyrometro Services (M) Sdn. Bhd. /61/ was sighted. The 1st document validity is from 1 February 2013 to 16 July 2014 and 2nd document validity is from 10 July 2014 to 16 July 2017, which covers the entire monitoring period. List of scopes for which this lab is accredited for covers Type-N temperature recorders, which is relevant to thermocouple used for monitoring of D _{boiler} .
	Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes
	Is (are) calibration(s) valid for the whole	Based on the cross checking of the calibration

	reporting period?	<p>certificates /62,63,64,65/ versus physical checking of the equipment calibration status and revised monitoring plan /2/, the verification team could confirm that the monitoring equipment used are still valid within the specified calibration interval.</p> <p>Due to delayed calibration for both thermocouples between December 2013 to February 2014, the 0.75% maximum permissible error for N-type thermocouple (more conservative than the calibration error) has been applied to the monthly CER calculation sheets, under tab 'MDboiler', for the months of December 2013 – February 2014 /14/. The verification team has accepted this method as being the most conservative.</p> <p>Details of the calibration as below: Type: Thermology Type N Date of initial calibration: 24/12/2012 (S/N 43703), 23/01/2013 (S/N 43702) Date of second calibration: 03/02/2014 (S/N 43703), 26/02/2014 (S/N 43702) Validity of all calibrations: 1 year</p>
	If applicable, has the reported data been cross-checked with other available data?	The values reported for each equipment had been cross checked for its accuracy via review of the Daqstation Data - UIE raw data and adjusted monthly datalogger sheets for August 2013 to December 2014 /14/, ER spreadsheet /5/ & the verification team confirmed the data reported are consistent & correct
	How were the values in the monitoring report verified?	During the on site visit, the verification team utilized various auditing techniques such as conducting series of interviews with the monitoring personnel, verification of data on site & off site including the corresponding records such as the monthly datalogger records & observation of the information flow process applicable for determination of D_{boiler} .
	Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	The QA/QC procedures applied has been verified by the verification team during on site visit & interviews with the monitoring personnel. The QA / QC procedures implemented is in accordance with the defined documented manual i.e. Monitoring Manual – June 2012, Version 4.0 /16/
	In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	Not applicable
Findings	No finding	
Conclusion	This parameter was monitored and reported appropriately. It is in accordance with the monitoring plan in registered/ approved PDD /4/ and the monitoring methodology AMS III.H "Methane Recovery in Wastewater Treatment" version 13 /6/.	

Means of verification	Monitoring Parameter Requirement	Assessment/ Observation by the DOE
	Data / Parameter: (as in monitoring plan of PDD):	Other _{flare}
	Measuring frequency/Time Interval:	Continuous

Reporting frequency:	Once in 5 minutes
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes, the measuring frequency is in accordance to the revised monitoring plan as per the registered PDD /4/ and the verification team was able to verify the results were reflected correctly in the ER spreadsheet /5/. The reporting frequency is not specifically defined in the PDD, but was confirmed to be consistent with the time interval of data recorded by the data loggers, as seen from the Daqstation Data - UIE raw data and adjusted monthly datalogger sheets for August 2013 to December 2014 /14/
Type of monitoring equipment:	Data logger in-line with: 1) Flow meter (Yokogawa/DY100; S/N S5L104768) 2) Pressure transmitter (differential) (Yokogawa/EJA110A; S/N 91L125155) 3) Temperature transmitter (Yokogawa/YTA110; S/N C2L110790) 4) Pressure transmitter (Atmospheric) (Yokogawa/ EJX610A; S/N 91L122101) 5) Gas Analyser (Guardian Plus/Methane Analyser; S/N 32809)
Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	For equipment 1-4, see $FV_{flare,h}$. For gas analyser, see $fv_{CH4,h}$.
Calibration frequency /interval: Is it Board guidance / local or national standards / manufacturers specification	For equipment 1-4, see $FV_{flare,h}$. For gas analyser, see $fv_{CH4,h}$.
Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	For equipment 1-4, see $FV_{flare,h}$. For gas analyser, see $fv_{CH4,h}$.
Company performing the calibration:	For equipment 1-4, see $FV_{flare,h}$. For gas analyser, see $fv_{CH4,h}$.
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	For equipment 1-4, see $FV_{flare,h}$. For gas analyser, see $fv_{CH4,h}$.
Is (are) calibration(s) valid for the whole reporting period?	For equipment 1-4, see $FV_{flare,h}$. For gas analyser, see $fv_{CH4,h}$.
If applicable, has the reported data been cross-checked with other available data?	The values reported for each equipment had been cross checked for its accuracy via review of the Daqstation Data - UIE raw data and adjusted monthly datalogger sheets for August 2013 to December 2014 /14/, ER spreadsheet /5/ & the verification team confirmed the data reported are consistent & correct
How were the values in the monitoring report verified?	During the on site visit, the verification team utilized various auditing techniques such as conducting series of interviews with the monitoring personnel, verification of data on site & off site including the corresponding records such as the monthly datalogger records & observation of the information flow process applicable for determination of Other _{flare} .
Does the data management (from	The QA/QC procedures applied has been

	<p>monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?</p> <p>In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?</p>	<p>verified by the verification team during on site visit & interviews with the monitoring personnel. The QA / QC procedures implemented is in accordance with the defined documented manual i.e. Monitoring Manual – June 2012, Version 4.0 /16/</p> <p>A temporary deviation from the registered monitoring plan as discussed in Section B.2.1 of the final monitoring report /2/ which was due to malfunction of the data logger (Daqstation S/N: S5K202141) located at the biogas plant from the period of 01/03/2014 – 13/06/2014. This resulted in inability to monitor input values for Other_{flare} during this period. The project participant has accounted for this deviation while making conservative assumptions, as already explained under Section 3.1.1, “Consistency with PDD & Diversions from original plan”.</p>
Findings	No finding	
Conclusion	This parameter was monitored and reported appropriately. It is in accordance with the monitoring plan in registered/ approved PDD /4/ and the monitoring methodology AMS III.H “Methane Recovery in Wastewater Treatment” version 13 /6/.	

Means of verification	Monitoring Parameter Requirement	Assessment/ Observation by the DOE
	Data / Parameter: (as in monitoring plan of PDD):	$\eta_{\text{flare},h}$
	Measuring frequency/Time Interval:	Not applicable (calculated value)
	Reporting frequency:	Not applicable
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Not applicable
	Type of monitoring equipment:	Not applicable
	Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	Not applicable
	Calibration frequency /interval: Is it Board guidance / local or national standards / manufacturers specification	Not applicable
	Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	Not applicable
	Company performing the calibration:	Not applicable
	Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Not applicable
	Is (are) calibration(s) valid for the whole reporting period?	Not applicable
	If applicable, has the reported data been cross-checked with other available data?	The values reported for each equipment had been cross checked for its accuracy via review of the Daqstation Data - UIE raw data and adjusted monthly datalogger sheets for August 2013 to December 2014 /14/, ER spreadsheet /5/ & the verification team confirmed the data reported are consistent & correct
	How were the values in the monitoring report verified?	During the on site visit, the verification team utilized various auditing techniques such as conducting series of interviews with the monitoring personnel, verification of data on

		site & off site including the corresponding records such as the monthly datalogger records & observation of the information flow process applicable for determination of $\eta_{\text{flare,h}}$.
	Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	The QA/QC procedures applied has been verified by the verification team during on site visit & interviews with the monitoring personnel. The QA / QC procedures implemented is in accordance with the defined documented manual i.e. Monitoring Manual – June 2012, Version 4.0 /16/
	In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	Not applicable
Findings	No finding	
Conclusion	This parameter was monitored and reported appropriately. It is in accordance with the monitoring plan in registered/ approved PDD /4/ and the monitoring methodology AMS III.H “Methane Recovery in Wastewater Treatment” version 13 /6/.	

Means of verification	Monitoring Parameter Requirement		Assessment/ Observation by the DOE	
	Data / Parameter: (as in monitoring plan of PDD):		Leakage	
	Measuring frequency/Time Interval:		Monthly	
	Reporting frequency:		Monthly	
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)		The PDD /4/ stated that the upper gas-containing sections of the tank will be monitored quarterly, while monitoring report /2/ stated that monitoring is done monthly. Since the measuring frequency actually done is more frequent than stated in the PDD, this was accepted by the verification team	
	Type of monitoring equipment:		Type: 4 probe Gas detector Make/Model: Dräger X-am 2000 Serial no: ARBD 1148	
	Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?		Accuracy range: ATEX II 2G EEx The accuracy class was not specified in the approved revised registered PDD /4/ Nevertheless, the verification team considered the accuracy class applied in the monitoring plan is consistent with the manufacturer specifications as seen from the technical specifications sheet for the gas detector /66/	
	Calibration frequency /interval: Is it Board guidance / local or national standards / manufacturers specification		Calibration frequency: Once in 6 months The technical specifications sheet for the gas detector does not specify a recommended calibration frequency. However, based on check of the Dräger service website /67/, it was confirmed that for portable gas detectors, the electrochemical and catalytic sensors need to be adjusted every 6 months.	
	Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?		The PDD /4/ did not specify the calibration frequency of the monitoring equipment used, however it was confirmed that the frequency represents good monitoring practise, as it is in accordance with the requirement on the Dräger service website /67/.	

		<p>This complies with Clean Development Mechanism Validation and Verification Standard (version 09.0) paragraph 399 which states that:</p> <p><i>"399. In cases where neither the applied monitoring methodology, where applicable, the applied standardized baseline nor the registered monitoring plan specify any requirements for calibration frequency for measuring equipment, the DOE shall determine whether the equipment is calibrated either in accordance with the specifications of the local/national standards, or as per the manufacturer's specification. If neither local/national standards nor the manufacturer's specification are available, international standards may be used."</i></p>
	<p>Company performing the calibration:</p>	<p>The verification team verified the test certificates /68/ for the gas detector & it was confirmed that the factory calibration is carried out by the equipment manufacturer i.e. Dräger service centre.</p> <p>This complies with Clean Development Mechanism Validation and Verification Standard (version 09.0) paragraph 399 which states that:</p> <p><i>"399. In cases where neither the applied monitoring methodology, where applicable, the applied standardized baseline nor the registered monitoring plan specify any requirements for calibration frequency for measuring equipment, the DOE shall determine whether the equipment is calibrated either in accordance with the specifications of the local/national standards, or as per the manufacturer's specification. If neither local/national standards nor the manufacturer's specification are available, international standards may be used."</i></p>
	<p>Did calibration confirm proper functioning of monitoring equipment? (Yes / No):</p>	<p>Yes</p>
	<p>Is (are) calibration(s) valid for the whole reporting period?</p>	<p>Based on the cross checking of the calibration test certificates /68/ versus physical checking of the equipment calibration status and revised monitoring plan /2/, it was confirmed as stated in the monitoring report that the calibration of the monitoring equipment has been delayed for 6 months. As explained in the monitoring report, this would not have any effect on the ER values as the assessment of leakage is merely a safety practice. Also, the results of the test are limited to methane detection or non-detection to limits of 25ppm or 50ppm. This explanation was confirmed and accepted by the audit team as having no effect on the ER calculations.</p> <p>Details of the calibration as below: Date of initial calibration: 08/07/2013 Date of second calibration: 08/07/2014</p>
	<p>If applicable, has the reported data been cross-checked with other available data?</p>	<p>The monitoring report no leakage detected, which was confirmed from on-site leakage monitoring records that /69/ no leakage had</p>

		been detected during monitoring with the gas detector.
	How were the values in the monitoring report verified?	During the on site visit, the verification team utilized various auditing techniques such as conducting series of interviews with the monitoring personnel, verification of data on site & off site including the corresponding records such as the gas detector leakage monitoring records /69/ & observation of the information flow process applicable for determination of leakage.
	Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	The QA/QC procedures applied has been verified by the verification team during on site visit & interviews with the monitoring personnel. The QA / QC procedures implemented is in accordance with the defined documented manual i.e. Monitoring Manual – June 2012, Version 4.0 /16/
	In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	Not applicable
Findings	See CAR 2 of Appendix 4	
Conclusion	This parameter was monitored and reported appropriately. The CAR raised was adequately addressed by the project participant as explained under Appendix 4. It is in accordance with the monitoring plan in registered/ approved PDD /4/ and the monitoring methodology AMS III.H “Methane Recovery in Wastewater Treatment” version 13 /6/.	

Means of verification	Monitoring Parameter Requirement	Assessment/ Observation by the DOE
	Data / Parameter: (as in monitoring plan of PDD):	EG _{TNB,y}
	Measuring frequency/Time Interval:	Continuous
	Reporting frequency:	Once in 5 minutes
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes, the measuring frequency is in accordance to the revised monitoring plan as per the registered PDD /4/ and the verification team was able to verify the results were reflected correctly in the ER spreadsheet /5/. The reporting frequency is not specifically defined in the PDD, but was confirmed to be consistent with the time interval of data recorded by the data loggers, as seen from the Daqstation Data - UIE raw data and adjusted monthly datalogger sheets for August 2013 to December 2014 /14/
	Type of monitoring equipment:	Type: Electricity meter Make/Model: Holley TMS/DT862 Serial no: G2000086
	Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	Accuracy class: Class II of IEC 60521 The accuracy class was not specified in the approved revised registered PDD /4/ Nevertheless, the verification team considered the accuracy class applied in the monitoring plan is consistent with the manufacturer's specifications as see in the Technical Description for Three Phase Electromechanical Watt Hour Meter HLT01 (DT862) by Holley Metering Ltd. /29/

	<p>Calibration frequency /interval: Is it Board guidance / local or national standards / manufacturers specification</p>	<p>Calibration frequency: Annually The Technical Description for Three Phase Electromechanical Watt Hour Meter HLT01 (DT862) by Holley Metering Ltd. /29/ did not specify the calibration frequency. The calibration frequency was therefore confirmed to be annually based on the document "SC 1.4 – Specific Criteria for Accreditation in the Field of Electrical Testing; Issue 1, 17 July 2010" /30/ issued by the Department of Standards Malaysia which specifies that calibration of electricity meters shall be annually /30/. This was accepted as evidence of good monitoring practice.</p>
	<p>Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?</p>	<p>The calibration frequency was not specified in the registered PDD /4/, which stated that calibration will be in accordance with the standard of Tenaga Nasional Berhad (TNB). However, there is no standard issued by TNB regarding calibration frequency of electricity meters. Hence the justification of the calibration frequency based on the document "SC 1.4 – Specific Criteria for Accreditation in the Field of Electrical Testing; Issue 1, 17 July 2010" issued by the Department of Standards Malaysia /30/ was accepted as justification for the annual calibration frequency. This complies with Clean Development Mechanism Validation and Verification Standard (version 09.0) paragraph 399 which states that: <i>"399. In cases where neither the applied monitoring methodology, where applicable, the applied standardized baseline nor the registered monitoring plan specify any requirements for calibration frequency for measuring equipment, the DOE shall determine whether the equipment is calibrated either in accordance with the specifications of the local/national standards, or as per the manufacturer's specification. If neither local/national standards nor the manufacturer's specification are available, international standards may be used."</i></p>
	<p>Company performing the calibration:</p>	<p>The electricity meter was calibrated by E-Power Engineering Sdn Bhd (not accredited) but the Power Meter Calibration Result dated 25-03-2012 /70/ and 23-03-2014 /71/ is endorsed by a competent electrical service engineer (certified engineer by Energy Commission) as seen in approval letter dated 18-09-2013 for registration of the service engineer, which was valid until 12-09-2014 /32/.</p>
	<p>Did calibration confirm proper functioning of monitoring equipment? (Yes / No):</p>	<p>Yes</p>
	<p>Is (are) calibration(s) valid for the whole reporting period?</p>	<p>Based on the cross checking of the Power Meter Calibration Result for KWH Meter Holley-TMS DT 862 S/N G2000086 /70,71/ versus physical checking of the equipment calibration status and revised monitoring plan /2/, the verification team could confirm that the electricity meter is still valid within the specified</p>

		calibration interval. Details of calibrations done are as follows: Date of initial calibration: 25/03/2012 Date of second calibration: 23/03/2014
	If applicable, has the reported data been cross-checked with other available data?	The values reported had been cross checked for its accuracy via review of the daily electricity meter readings logbook, from which readings at every 4 hour interval are then transferred to form no. Biogas 008 forms for "Electrical Power Generation & Power Consumption by Biogas Plant"/72/. The readings were also checked against the ER spreadsheet /5/ & the verification team confirmed the data reported are consistent & correct.
	How were the values in the monitoring report verified?	During the on site visit, the verification team utilized various auditing techniques such as conducting series of interviews with the monitoring personnel, verification of data on site & off site including the corresponding records such as daily electricity meter readings logbook and the Biogas 008 forms for "Electrical Power Generation & Power Consumption by Biogas Plant"/72/ (obtained from the project activity location) & observation of the information flow process applicable for determination of EG_{TNB,y}
	Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	The QA/QC procedures applied has been verified by the verification team during on site visit & interviews with the monitoring personnel. The QA / QC procedures implemented is in accordance with the defined documented manual i.e. Monitoring Manual – June 2012, Version 4.0 /16/
	In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	Not applicable
Findings	No finding	
Conclusion	This parameter was monitored and reported appropriately. It is in accordance with the monitoring plan in registered/ approved PDD /4/ and the monitoring methodology AMS III.H "Methane Recovery in Wastewater Treatment" version 13 /6/.	

Means of verification	Monitoring Parameter Requirement	Assessment/ Observation by the DOE
	Data / Parameter: (as in monitoring plan of PDD):	EG_{genset,y}
	Measuring frequency/Time Interval:	Continuous
	Reporting frequency:	Once in 5 minutes
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes, the measuring frequency is in accordance to the revised monitoring plan as per the registered PDD /4/ and the verification team was able to verify the results were reflected correctly in the ER spreadsheet /5/. The reporting frequency is not specifically defined in the PDD, but was confirmed to be consistent with the time interval of data recorded by the data loggers, as seen from the

		Daqstation Data - UIE raw data and adjusted monthly datalogger sheets for August 2013 to December 2014 /14/
	Type of monitoring equipment:	Type: Electricity meter Make/Model: Holley TMS/DT862 Serial no: G2000081, G2000084
	Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	Accuracy class: Class II of IEC 60521 The accuracy class was not specified in the approved revised registered PDD /4/ Nevertheless, the verification team considered the accuracy class applied in the monitoring plan is consistent with the manufacturer's specifications as see in the Technical Description for Three Phase Electromechanical Watt Hour Meter HLT01 (DT862) by Holley Metering Ltd. /29/
	Calibration frequency /interval: Is it Board guidance / local or national standards / manufacturers specification	Calibration frequency: Annually The Technical Description for Three Phase Electromechanical Watt Hour Meter HLT01 (DT862) by Holley Metering Ltd. /29/ did not specify the calibration frequency. The calibration frequency was therefore confirmed to be annually based on the document "SC 1.4 – Specific Criteria for Accreditation in the Field of Electrical Testing; Issue 1, 17 July 2010" /30/ issued by the Department of Standards Malaysia which specifies that calibration of electricity meters shall be annually /30/. This was accepted as evidence of good monitoring practice.
	Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	The calibration frequency was not specified in the registered PDD /4/, which stated that calibration will be in accordance with the standard of Tenaga Nasional Berhad (TNB). However, there is no standard issued by TNB regarding calibration frequency of electricity meters. Hence the justification of the calibration frequency based on the document "SC 1.4 – Specific Criteria for Accreditation in the Field of Electrical Testing; Issue 1, 17 July 2010" issued by the Department of Standards Malaysia /30/ was accepted as justification for the annual calibration frequency. This complies with Clean Development Mechanism Validation and Verification Standard (version 09.0) paragraph 399 which states that: <i>"399. In cases where neither the applied monitoring methodology, where applicable, the applied standardized baseline nor the registered monitoring plan specify any requirements for calibration frequency for measuring equipment, the DOE shall determine whether the equipment is calibrated either in accordance with the specifications of the local/national standards, or as per the manufacturer's specification. If neither local/national standards nor the manufacturer's specification are available, international standards may be used."</i>
	Company performing the calibration:	The electricity meters were calibrated by E-Power Engineering Sdn Bhd (not accredited) but the Power Meter Calibration Results dated

		25-03-2012 for both meters /73, 74/, 23-03-2014 for meter with serial no. G2000081/75/ and 25-03-2014 for meter with serial no. G2000084/76/ are endorsed by a competent electrical service engineer (certified engineer by Energy Commission) as seen in approval letter dated 18-09-2013 for registration of the service engineer, which was valid until 12-09-2014 /32/.
	Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes
	Is (are) calibration(s) valid for the whole reporting period?	Based on the cross checking of the Power Meter Calibration Results for KWH Meter Holley-TMS DT 862 S/N G2000081 and S/N G2000084 /73,74,75,76/ versus physical checking of the equipment calibration status and revised monitoring plan /2/, the verification team could confirm that the electricity meters were still valid within the specified calibration interval. Details of calibrations done are as follows: Date of initial calibration: 25/03/2012 Date of second calibration: 23/03/2014 (G2000081) , 25/03/2014 (G2000084)
	If applicable, has the reported data been cross-checked with other available data?	The values reported had been cross checked for its accuracy via review of the daily electricity meter readings logbook, from which readings at every 4 hour interval are then transferred to form no. Biogas 008 forms for "Electrical Power Generation & Power Consumption by Biogas Plant"/72/. The readings were also checked against the ER spreadsheet /5/ & the verification team confirmed the data reported are consistent & correct.
	How were the values in the monitoring report verified?	During the on site visit, the verification team utilized various auditing techniques such as conducting series of interviews with the monitoring personnel, verification of data on site & off site including the corresponding records such as daily electricity meter readings logbook and the Biogas 008 forms for "Electrical Power Generation & Power Consumption by Biogas Plant"/72/ (obtained from the project activity location) & observation of the information flow process applicable for determination of EG_{genset,v}
	Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	The QA/QC procedures applied has been verified by the verification team during on site visit & interviews with the monitoring personnel. The QA / QC procedures implemented is in accordance with the defined documented manual i.e. Monitoring Manual – June 2012, Version 4.0 /16/
	In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	Not applicable
Findings	See CL 3 and CL 8.1 of Appendix 4	

Conclusion	This parameter was monitored and reported appropriately. The clarifications raised were adequately addressed by the project participant as explained under Appendix 4. It is in accordance with the monitoring plan in registered/ approved PDD /4/ and the monitoring methodology AMS III.H "Methane Recovery in Wastewater Treatment" version 13 /6/.
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Means of verification	Monitoring Parameter Requirement	Assessment/ Observation by the DOE
	Data / Parameter: (as in monitoring plan of PDD):	EG _{biomass,y}
	Measuring frequency/Time Interval:	Continuous
	Reporting frequency:	Monthly
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes, the measuring frequency is in accordance to the revised monitoring plan as per the registered PDD /4/ and the verification team was able to verify the results were reflected correctly in the ER spreadsheet /5/. The reporting frequency is not specifically defined in the PDD, but was confirmed to be consistent with the time interval of data recorded by the data loggers, as seen from the Daqstation Data - UIE raw data and adjusted monthly datalogger sheets for August 2013 to December 2014 /14/
	Type of monitoring equipment:	Type: Electricity meter Make/Model: Holley TMS/DT862 Serial no: G2000083, G2000085
	Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	Accuracy class: Class II of IEC 60521 The accuracy class was not specified in the approved revised registered PDD /4/ Nevertheless, the verification team considered the accuracy class applied in the monitoring plan is consistent with the manufacturer's specifications as see in the Technical Description for Three Phase Electromechanical Watt Hour Meter HLT01 (DT862) by Holley Metering Ltd. /29/
	Calibration frequency /interval: Is it Board guidance / local or national standards / manufacturers specification	Calibration frequency: Annually The Technical Description for Three Phase Electromechanical Watt Hour Meter HLT01 (DT862) by Holley Metering Ltd. /29/ did not specify the calibration frequency. The calibration frequency was therefore confirmed to be annually based on the document "SC 1.4 – Specific Criteria for Accreditation in the Field of Electrical Testing; Issue 1, 17 July 2010" /30/ issued by the Department of Standards Malaysia which specifies that calibration of electricity meters shall be annually /30/. This was accepted as evidence of good monitoring practice.
	Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	The calibration frequency was not specified in the registered PDD /4/, which stated that calibration will be in accordance with the standard of Tenaga Nasional Berhad (TNB). However, there is no standard issued by TNB regarding calibration frequency of electricity meters. Hence the justification of the calibration frequency based on the document "SC 1.4 – Specific Criteria for Accreditation in the Field of Electrical Testing; Issue 1, 17 July 2010" issued by the Department of Standards Malaysia /30/ was accepted as justification for the annual calibration frequency. This complies

		with Clean Development Mechanism Validation and Verification Standard (version 09.0) paragraph 399 which states that: “399. In cases where neither the applied monitoring methodology, where applicable, the applied standardized baseline nor the registered monitoring plan specify any requirements for calibration frequency for measuring equipment, the DOE shall determine whether the equipment is calibrated either in accordance with the specifications of the local/national standards, or as per the manufacturer’s specification. If neither local/national standards nor the manufacturer’s specification are available, international standards may be used.”
	Company performing the calibration:	The electricity meters were calibrated by E-Power Engineering Sdn Bhd (not accredited) but the Power Meter Calibration Results for both meters dated 25-03-2012 /77, 78/ and 23-03-2014 /79,80/ are endorsed by a competent electrical service engineer (certified engineer by Energy Commission) as seen in approval letter dated 18-09-2013 for registration of the service engineer, which was valid until 12-09-2014 /32/.
	Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes
	Is (are) calibration(s) valid for the whole reporting period?	Based on the cross checking of the Power Meter Calibration Results for KWH Meter Holley-TMS DT 862 S/N G2000081 and S/N G2000084 /73,74,75,76/ versus physical checking of the equipment calibration status and revised monitoring plan /2/, the verification team could confirm that the electricity meters were still valid within the specified calibration interval. Details of calibrations done are as follows: Date of initial calibration: 25/03/2012 Date of second calibration: 23/03/2014 (G2000081) , 25/03/2014 (G2000084)
	If applicable, has the reported data been cross-checked with other available data?	The values reported had been cross checked for its accuracy via review of the daily electricity meter readings logbook, from which readings at every 4 hour interval are then transferred to form no. Biogas 008 forms for “Electrical Power Generation & Power Consumption by Biogas Plant”/72/. The readings were also checked against the ER spreadsheet /5/ & the verification team confirmed the data reported are consistent & correct.
	How were the values in the monitoring report verified?	During the on site visit, the verification team utilized various auditing techniques such as conducting series of interviews with the monitoring personnel, verification of data on site & off site including the corresponding records such as daily electricity meter readings logbook and the Biogas 008 forms for “Electrical Power Generation & Power Consumption by Biogas Plant”/72/ (obtained from the project activity location) & observation of the information flow process applicable for

	Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	determination of $EG_{biomass,y}$ The QA/QC procedures applied has been verified by the verification team during on site visit & interviews with the monitoring personnel. The QA / QC procedures implemented is in accordance with the defined documented manual i.e. Monitoring Manual – June 2012, Version 4.0 /16/
	In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	Not applicable
Findings	See CL 8.1 of Appendix 4	
Conclusion	This parameter was monitored and reported appropriately. The clarification raised was adequately addressed by the project participant as explained under Appendix 4. It is in accordance with the monitoring plan in registered/ approved PDD /4/ and the monitoring methodology AMS III.H “Methane Recovery in Wastewater Treatment” version 13 /6/.	

E.6.3. Implementation of sampling plan

No sampling plan is required in the monitoring plan

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

Refer to Section E.6.2 for details on compliance with calibration frequency requirements for measuring instruments

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	Baseline emissions are calculated using the formula: $BE_y = \{BE_{power,y} + BE_{ww,treatment,y} + BE_{s,treatment,y} + BE_{ww,discharge,y} + BE_{s,final,y}\}$
Findings	No finding
Conclusion	Reference sources for all values used for the calculation of baseline emissions in the BE tab of the emission reductions spreadsheet /5/ and Section E.1 of the final monitoring report /2/ were verified against actual data on-site and confirmed to be consistent with actual data. Parameters that were listed as having zero or negligible value were evaluated against actual on-site practice to confirm the zero values assigned to these parameters were adequately justified. The calculation method in the spreadsheet was also checked and confirmed to be consistent with the registered PDD with no calculation errors found. It is the Verification Team's opinion that the monitored data of Baseline emissions for this monitoring period is complete, the formulas and default values are applied correctly and all results are verifiable and transparent. In conclusion $BE_y = 34,093 \text{ tCO}_2\text{e}$

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

Means of verification	Project emissions are calculated using the formula:
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	$PE_y = \left\{ \begin{array}{l} PE_{power,y} + PE_{ww,treatment,y} + PE_{s,treatment,y} + PE_{ww,discharge,y} + PE_{s,final,y} + \\ PE_{fugitive,y} + PE_{biomass,y} + PE_{flaring,y} \end{array} \right\}$
Findings	See CAR 5.2 and CL 8.1 of Appendix 4
Conclusion	<p>Reference sources for all values used for the calculation of project emissions in the PE tab of the emission reductions spreadsheet /5/ and Section E.2 of the final monitoring report /2/ were verified against actual data on-site to confirm consistency and accuracy. Parameters that were listed as having zero or negligible value were evaluated against actual on-site practice to confirm that the zero values assigned to these parameters were adequately justified. The calculation method in the spreadsheet was also checked for consistent against the registered PDD.</p> <p>Several inconsistencies were found as raised under the CAR and CL above. These were adequately addressed by the project participant as described under Appendix 4 below.</p> <p>It is the Verification Team's opinion that the monitored data of project emissions for this monitoring period is complete, the formulas and default values are applied correctly and all results are verifiable and transparent.</p> <p>In conclusion, $PE_y = 14,279 \text{ tCO}_2\text{e}$</p>

E.8.3. Calculation of leakage GHG emissions

Not applicable. The technology and machinery for the project activity is not transferred from another activity and thus no leakage is considered to take place.

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

Means of verification	<p>According to AMS-III.H Version 13 methodology /6/, the emission reduction achieved by the project activity will be lowest of either the difference between the baseline emission and the sum of the project emission and leakage, or the difference between methane captured and destroyed/gainfully used by the project activity with power and fuel used by the project activity facilities plus methane emissions from biomass stored under anaerobic conditions</p> <p>Hence, the emission reductions calculated for this 2nd monitoring period (01-08-2013 to 31-12-2014) is as follows:</p> $ER_{y,ex\ post} = \min ((BE_{y,ex\ post} - PE_{y,ex\ post} + LE_{y,ex\ post}), (MD_y - PE_{power,y} - PE_{biomass,y} - LE_{y,ex\ post}))$ <p>MD_y will be measured using the conditions of the flaring process:</p> $MD_y = BG_{burnt,y} * w_{CH4,y} * D_{CH4} * FE * GWP_{CH4}$ <p>Based on the formulae above, the emission reductions estimated using the 2 options had been calculated as follows:</p> <p>Option (i)</p> $\begin{aligned} ER_{y,ex\ post} &= MD_y - PE_{power,y} - PE_{biomass,y} - LE_{y,ex\ post} \\ &= 33,869 - 227 - 0 - 0 \\ &= 33,642 \text{ tCO}_2\text{e} \end{aligned}$ <p>Option (ii)</p> $\begin{aligned} ER_{y,ex\ post} &= BE_{y,ex\ post} - PE_{y,ex\ post} + LE_{y,ex\ post} \\ &= 34,093 - 14,279 - 0 = 19,814 \\ &= 19,814 \text{ tCO}_2\text{e} \end{aligned}$
Findings	See Section E.8.2

Conclusion	<p>Reference sources for all values used for the calculation of emission reductions in the ER tab of the emission reductions spreadsheet /5/ and Section E.4 of the final monitoring report /2/ were verified against actual data on-site. Some inconsistencies were found in the values applied for the calculation of project emissions, which were addressed as explained under Section E.8.2 above. The calculation method in the spreadsheet was also checked and confirmed to be consistent with the registered PDD with no calculation errors found.</p> <p>Since the total estimated emissions reductions are lower for Option (ii), this was selected as the total emission reductions claimed for the 2nd monitoring period i.e. from 01/08/2013 – 31/12/2014 is 19,814 tCO₂e.</p>
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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 actual GHG emission reduction compared against the estimated values as per the registered PDD are as follows:		
	Item	Values estimated in ex ante calculation of registered PDD	Actual values achieved during this monitoring period
	Emission reductions or GHG removals by sinks (tCO ₂ e)	20,274	19,814
	The estimated value is confirmed to be pro-rated correctly as per the registered PDD /4/.		
Findings	No finding		
Conclusion	The ex-ante estimated value was found to be higher than the ex-post determined value. The project participant had also provided remarks regarding this difference between the estimated value and the actual value under Section E.6 of the PDD. This justification has been accepted as feasible by the verification team and since the ex-post value is lower than the estimated value, the actual values are accepted as conservative.		

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

Means of verification	<p>Actual emission reductions achieved during the current monitoring period were 2.27% lower than the estimated value in registered/ approved PDD. This small difference results from the increase in actual project emissions of 14,279 tCO₂e compared to the estimated project emissions of only 3,345 tCO₂e.</p> <p>The cause for the differences of CER's than the actual for the current monitoring period is been justified by the PP and the same is been verified and accepted by the Verification team.</p>
Findings	No finding
Conclusion	<p>The verification team confirms that actual emission reduction is lower than the estimate of the registered/approved PDD for the current monitoring period.</p> <p>The verification took cognizance of § 257 & 258 of CDM Project Standard /10/.</p>

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 monitoring period is after 1 January 2013. Therefore all of GHG emission reduction during this monitoring report is from 1 January 2013 onwards.
Findings	No finding
Conclusion	All of GHG emission reduction during this monitoring report is from 1 January 2013 onwards

SECTION F. Internal quality control

The final verification report underwent a technical review by a qualified independent reviewer before requesting issuance of the project activity. The technical review was performed by a technical reviewer qualified in accordance with TÜV Rheinland's qualification scheme for CDM validation and verification that meets the criteria of EB guidelines for qualification.

SECTION G. Verification opinion

The verification team assigned by the DOE (TÜV Rheinland (China) Ltd.) concludes that the CDM Project Activity "Biogas Plant at United Plantations Berhad, UIE Palm Oil Mill" in Malaysia, as described in the registered PDD (version 6, 13-01-2011) /4/ and monitoring report (version 05, dated 28-11-2015) /2/, meets all relevant requirements of the UNFCCC for CDM project activities including article 12 of the Kyoto Protocol, the modalities and procedures for CDM (Marrakesh Accords) and the subsequent decisions by the COP/MOP and CDM Executive Board. The verification is conducted in-line with the VVS requirements.

Verification methodology and process

The verification has been performed as described in the VVS version 09.0 and constitutes the following steps:

- Publication of the MR on the UNFCCC website (27-03-2015)
- Desk review of the MR and the relevant documents
- On-site assessment (15/04/2015 – 16/04/2015)
- Issuance of Verification Report

The project activity was correctly implemented according to selected monitoring methodology and monitoring plan. The monitoring equipment was installed, calibrated and maintained in a proper manner, while collected monitoring data allowed to verify the amount of achieved GHG emission reductions. The DOE therefore is pleased to issue a positive verification opinion expressed in the attached Certification statement.

SECTION H. Certification statement

TUV Rheinland (China) Ltd., the DOE, has performed the verification of the registered CDM project activity "UNFCCC Registration No. 3622", "Biogas Plant at United Plantations Berhad, UIE Palm Oil Mill" in Malaysia. The project activity is designed to generate emission reductions by capturing biogas generated from the mill's palm oil mill effluent ponds using closed tank anaerobic digestion technology and utilize the biogas for steam generation in the existing biomass waste fired boiler at the mill.

The project participants are responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions from the project. It is DOE's responsibility to express an independent verification statement on the reported GHG emission reductions from the project. The DOE does not express any opinion on the selected baseline scenario or on the validated and registered PDD. The verification is carried out in-line with the VVS requirements.

The verification was performed to identify the compliance of the project activity with implementation and monitoring requirements, and to verify the actual amount of achieved emission reductions, through obtaining evidence and information on-site that included i) checking whether the provisions of the monitoring methodology and the monitoring plan were consistently and appropriately applied, ii) the collection of evidence supporting the reported data and iii) emission reductions that are claimed is free from material errors, omissions or misstatements.

The verification is based on:

- PDD version 06, registered with the CDM Executive Board on 26-01-2011 and its monitoring plan;
- Approved monitoring methodology, AMS III.H "Methane Recovery in Wastewater Treatment" version 13
- Approved validation report, revision no. 04 dated 26-01-2011;
- Previous verification report, version 03, 14-08-2014
- Final Monitoring report, version 05, 25-11-2015

This statement covers verification period of 518 days between 01/08/2013 to 31/12/2014.

The DOE has raised 8 clarifications and 6 corrective action requests, all of which have been successfully resolved by PPs. No new forward action requests were raised in this 2nd monitoring period.

CDM-VCR-FORM

The DOE considers necessary to give reasonable assurance that reported GHG emission reductions were calculated correctly on the basis of the approved baseline and monitoring methodology and the monitoring plan contained in the registered PDD are fairly stated.

The breakdown of the emission reductions for the monitoring period has also been clearly demonstrated, with emission reduction for second commitment period calculated using the latest GWPs and the following is verified to be correct :


Actual emission reduction for the monitoring period up to (and including) 31 December 2012	0
Actual emission reduction for the monitoring period from (and including) 1 January 2013	19,814 tCO ₂ e

The DOE , hereby certifies that the project activity, achieved emission reductions by sources of GHG equal to 19,814 tCO₂ equivalent and all monitoring requirements have been fulfilled.

The DOE states that the Claimed emission reductions are free from material errors, omissions and misstatements with a reasonable level of assurance.

Date: 15/02/2016

Mr. Henri Phan
DOE Manager



Date: 15/02/2016

Mr. Tang Zhiang
Technical Reviewer



Date: 14/02/2016

Mrs Nelly Yong
Team Leader



Abbreviations

Abbreviations	Full texts
BE	Baseline Emissions
CAR	Corrective Action Request
CCS	Carbon Capture and Storage
CDM	Clean Development Mechanism
CDM EB	CDM Executive Board
CDM PCP	Clean Development Mechanism Project Cycle Procedure
CDM PS	Clean Development Mechanism Project Standard
CDM VVS	CDM Validation and Verification Standard
COD	Chemical Oxygen Demand
CEF	Carbon Emission Factor
CER	Certified Emission Reduction(s)
CH ₄	Methane
CL	Clarification request
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
CP	Commitment Period
CSTR	Continuous-flow Stirred Tanks Reactors
DNA	Designated National Authority
DOE	Designated Operational Entity
ER	Emissions Reductions
FAR	Forward Action Request
GHG	Greenhouse Gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
KPDNKK	Kementerian Perdagangan Dalam Negeri, Koperasi & Kepenggunaan (Ministry of Domestic Trade, Co-operatives & Consumerism)
LE	Leakage Emissions
MP	Monitoring Plan
MPE	Maximum Permissible Error
MR	Monitoring Report
N ₂ O	Nitrous oxide
NTP	Normal Temperature & Pressure
PDD	Project Design Document
PE	Project Emissions
POME	Palm Oil Mill Effluent
PP	Project Participant
QA/QC	Quality Assurance/ Quality Control
SAMM	Skim Akreditasi Makmal Malaysia (Malaysian Lab Accreditation Scheme)
TUV R	TUV Rheinland (China) Ltd
TNB	Tenaga Nasional Berhad (National Energy Commission)
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation And Verification Standard

Appendix 1. Competence of team members and technical reviewers

Qualification

Yong, Tau Lan (Nelly) /

Emission Trading

United Nations Framework Convention on Climate Change

Auditor No.:
(AuditorenRegNr)

Appointed:
(Zugelassen)

☒ ja

Qualification Level:
(Qualifikationsstufe)

Lead Auditor

External:
(Externer)

☐ ja

Add. reviewer:
(Zusätzlicher Prüfer)

☐ yes

EAC Scopes:
(EAC Branchen)

CDM 01 - Energy industries (renewable - / non-renewable sources)
CDM 05 - Chemical industry
CDM 11 - Fugitive emissions from production and consumption of halocarbons and sulphur hexafluoride
CDM 12 - Solvents use
CDM 13 - Waste handling and disposal

Add. qualification:
(zus. Qualifikation)

First Appointment:
(Erstberufung)

10/28/2010

Valid to:
(Gültig bis)

10/27/2016

Remarks:

TA 1.2 - renewable energies
TA 5.1 / 11.1 / 12.1 - Chemical Industries
TA 13.1 - Waste handling and disposal

Languages:

English
malay
Indonesian
Mandarin

Experience Exchange

Date

Location

Remarks

Accreditation(s)

Monitoring

Latest Monitoring:
(letzte Beurteilung)

Next Monitoring:
(nächste Beurteilung)

Remarks:

History of scope allocation

Date:
Change:
By:
Reason:

Date:
Change:
By:
Reason:

Date: 2010-10-31
Change: EAC CDM, CDM, CDM, CDM added
By: Manfred Brinkmann
Reason: TA 1.2 - renewable energies

History

Created:	10/26/2007 10:43:44 PM	Nelly Yong/MY/TUV
Modified:	12/03/2013 03:29:12 PM	Raveenthiran Lingappan/MY/TUV
	12/03/2013 03:28:38 PM	Nelly Yong/MY/TUV
	04/27/2011 11:52:48 AM	Manfred Brinkmann/Jpn/TUV
	11/23/2010 03:40:13 PM ZE9	
	11/16/2010 02:20:46 PM ZE9	
	11/04/2010 08:57:58 AM ZE9	
	10/31/2010 09:23:50 PM ZE9	
	10/31/2010 09:23:41 PM ZE9	
	10/26/2007 10:44:04 PM	

Export to ICMS

Last Export:

Qualification

Ng, Siew Theng /

Emission Trading

United Nations Framework Convention on Climate Change

Auditor No.:
(AuditorenRegNr)

Appointed:
(Zugelassen)

☒ ja

Qualification Level:
(Qualifikationsstufe)

Lead Auditor

External:
(Externer)

☐ ja

Add. reviewer:
(Zusätzlicher Prüfer)

☐ yes

EAC Scopes:
(EAC Branchen)

CDM 01 - Energy industries (renewable - / non-renewable sources)
CDM 13 - Waste handling and disposal
CDM 15 - Agriculture

Add. qualification:
(zus. Qualifikation)

First Appointment:
(Erstberufung)

10/28/2014

Valid to:
(Gültig bis)

10/27/2017

Remarks:

Languages:

English
malay
Indonesian

Experience Exchange

Date

Location

Remarks

Accreditation(s)

Monitoring

Latest Monitoring:
(letzte Beurteilung)

Next Monitoring:
(nächste Beurteilung)

Remarks:

[View / Edit Monitoring](#)

History of scope allocation

Date (Datum)	Change (Änderung)	By (durch)	Reason (Begründung)
2015-04-20	EAC CDM, CDM, CDM added	Henri Phan	Valid for TA 1.2, TA 13.1 and TA 15.1

History

Created:	08/05/2014 11:05:28 AM	Carol Ng/MY/TUV
Modified:	04/20/2015 10:31:51 AM	Henri Phan/Chn/TUV
	10/28/2014 03:28:12 PM	Henri Phan/Chn/TUV
	08/05/2014 11:05:36 AM	Carol Ng/MY/TUV

Export to ICMS

Last Export:

Qualification

Tang, Walter /

Emission Trading

United Nations Framework Convention on Climate Change

Auditor No.:
(AuditorenRegNr)

Appointed:
(Zugelassen)

☒ ja

Qualification Level:
(Qualifikationsstufe)

Lead Auditor

External:
(Externer)

☐ ja

Add. reviewer:
(Zusätzlicher Prüfer)

☒ yes

EAC Scopes:
(EAC Branchen)

CDM 01 - Energy industries (renewable - / non-renewable sources)
CDM 02 - Energy distribution
CDM 03 - Energy demand
CDM 13 - Waste handling and disposal
CDM 04 - Manufacturing industries

Add. qualification:
(zus. Qualifikation)

First Appointment:
(Erstberufung)

09/12/2015

Valid to:
(Gültig bis)

09/11/2018

Remarks:

Appointed for TA 1.1, 1.2, 2.1, 3.1, 4.1 TA 13.1 based on EB 75-A03
Transitional Provisions

Languages:

Chinese simplified
English

Experience Exchange

Date

Location

Remarks

Accreditation(s)

Monitoring

Latest Monitoring:
(letzte Beurteilung)

Next Monitoring:
(nächste Beurteilung)

Remarks:

History of scope allocation

Date: 2012-02-13
 Change: EAC CDM added
 By: Praveen Urs
 Reason:

Date: 2012-02-13
 Change: EAC CDM, CDM, CDM, CDM added
 By: Praveen Urs
 Reason:

History

Created:	12/06/2011 05:00:51 PM	Walter Tang/Chn/TUV
Modified:	09/14/2015 10:22:39 AM	Henri Phan/Chn/TUV
	09/14/2015 09:57:51 AM	Henri Phan/Chn/TUV
	09/14/2015 09:57:11 AM	Henri Phan/Chn/TUV
	09/14/2015 09:55:43 AM	
	09/02/2015 09:44:54 AM	
	08/31/2015 02:18:33 PM	
	04/10/2015 05:49:40 PM	
	04/09/2015 03:05:33 PM	
	04/09/2015 02:57:28 PM	
	04/01/2015 11:06:02 AM	
	04/01/2015 11:04:55 AM	
	04/01/2015 11:02:57 AM	
	08/01/2014 11:43:45 AM	
	07/03/2014 04:09:13 PM	
	11/01/2013 02:50:03 PM	
	07/06/2012 04:47:48 PM	
	07/02/2012 03:08:57 PM	
	07/02/2012 03:08:48 PM	
	05/15/2012 03:30:46 PM	
	02/13/2012 08:00:10 PM	
	12/06/2011 05:01:30 PM	

Export to ICMS

Last Export:

Appendix 2. Documents reviewed or referenced

No	Author	Title	References to the document	Provider
/1/	Danish Energy Management	Webhosted Monitoring report, version 01, 11-10-2013	https://cdm.unfccc.int/Projects/DB/DNV-CUK1270640666.51/iProcess/TUEV-RHEIN1427447996.4/view	Project Participant
/2/	Danish Energy Management	Final Monitoring report, version 05, 28-11-2015		Project Participant
/3/	SIRIM QAS International	1st Verification report, version 03, 14-08-2014	https://cdm.unfccc.int/Projects/DB/DNV-CUK1270640666.51/iProcess/SIRIM1381979597.26/view	From website
/4/	Danish Energy Management	Registered PDD, registration no. 3622, version 6, 13-01-2011	https://cdm.unfccc.int/Projects/DB/DNV-CUK1270640666.51/view	From website
/5/	Danish Energy Management	Emission reduction calculation spread sheet, "20150908_3622_MAIN-ER_MR02 (draft monitoring) Prior Appr ver04"		Project Participant
/6/	UNFCCC	Approved monitoring methodology: AMS III.H "Methane Recovery in Wastewater Treatment" version 13	https://cdm.unfccc.int/methodologies/SSCmethodologies/approved	From website
/7/	UNFCCC	Standard monitoring report format issued by EB (EB 54 report, annex 34)	https://cdm.unfccc.int/Reference/PDDs_Forms/index.html	From website
/8/	UNFCCC	Clean Development Mechanism Validation and Verification Standard (version 09.0)	https://cdm.unfccc.int/Reference/Standards/index.html	From website
/9/	UNFCCC	Clean Development Mechanism Project Cycle Procedure (version 09.0)	https://cdm.unfccc.int/Reference/Standards/index.html	From website
/10/	UNFCCC	Clean Development Mechanism Project Standard (version 09.0)	https://cdm.unfccc.int/Reference/Standards/index.html	From website
/11/	UNFCCC	Guidelines on the application of Materiality in Verifications (version 02.0)	https://cdm.unfccc.int/Reference/Guidclarif/index.html	From website
/12/	UNFCCC	Glossary CDM terms version 08	https://cdm.unfccc.int/Reference/Guidclarif/gloss_CDM.pdf	From website
/13/	UNFCCC	UNFCCC project upload page	http://cdm.unfccc.int/Projects/DB/DNV-CUK1270640666.51/view	From website
/14/	UIE Palm Oil Mill	Daqstation Data - UIE raw data and adjusted monthly datalogger sheets for August 2013 to December 2014		Project Participant
/15/	Danish Energy Management	20150226_Manual Flow Estimations spreadsheet		Project Participant
/16/	Danish	Monitoring Manual – June 2012, Version 4.0,		Project

	Energy Management	prepared by Danish Energy Management A/S		Participant
/17/	UIE Palm Oil Mill	Biogas 005 form_Daily Monitoring of POME Input and Biogas Supply		Project Participant
/18/	Website	Actual Flow to Normal Flow ,Normal Flow to Actual Flow and Important Useful Calculations:	http://massflowpune.blogspot.my/2012/08/actual-volume-to-normal-volume-and-vice.html	Verification team
/19/	Website: Engineering Design Encyclopedia	"Calculation of NM3/hr and SM3/hr gas flow", Engineering Design Encyclopedia	http://www.enggcyclopedia.com/2012/01/calculation-nm3hr-sm3hr-gas-flow/	Verification team
/20/	Yokogawa	General Specifications for AXF Magnetic Flowmeter Integral Flowmeter /Remote Flowtube (GS 01E20D01-01E)	http://cdn2.us.yokogawa.com/GS01E20D01-01E.pdf	Project Participant
/21/	Yokogawa	Annual calibration certificates for flowmeter Yokogawa/AXF080G, serial no: S5K202220: dated 09-05-2014 and 31-05-2013		Project Participant
/22/	Union Laboratories Sdn Bhd	Monthly test certificates for parameters COD _{ww, untreated, v} , COD _{ww, treated, v} and S _{PJ, v} analysed by external accredited lab, Union Laboratories Sdn Bhd		Project Participant
/23/	Department of Standards Malaysia	Malaysian Lab Accreditation Scheme, or 'Skim Akreditasi Makmal Malaysia' (SAMM) certificate no. 178 for Union Laboratories valid for 12 March 2013 until 28 October 2014 and from 3 October 2014 until 28 October 2017	http://www.jsm.gov.my/cab-directories	Project Participant
/24/	UNFCCC	Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities v.3.0	https://cdm.unfccc.int/Reference/Guidclarif/index.html	Project Participant
/25/	UIE Palm Oil Mill	Records for Monthly Sludge Disposal from Biogas Plant Sedimentation Tank for Year 2013 & Year 2014		Project Participant
/26/	UIE Palm Oil Mill	E1110 multi-function weight indicator; Avery Weigh-Tonix Multi Function Weight Indicator technical specification sheet		Project Participant
/27/	Metrology.com	Laws of Malaysia: Weight and Measures Act 1972 (Incorporating all amendments up to 1 January 2006)	http://www.metrology.com.my/english/akta.pdf	Project Participant
/28/	Ministry of Domestic Trade, Co-operatives & Consumerism	License to fix and sell weighing or measurement equipment for Prime Silver Metrology Enterprise: PSM KPDNKK License_2010-2015		Project Participant
/29/	Holley Metering Ltd.	Technical Description for Three Phase Electromechanical Watt Hour Meter HLT01 (DT862) by Holley Metering Ltd.		Project Participant
/30/	Department of Standards Malaysia	SC 1.4 – Specific Criteria for Accreditation in the Field of Electrical Testing; Issue 1, 17 July 2010		Project Participant
/31/	E-Power Engineering Sdn. Bhd.	Power Meter Calibration Result for KWH Meter Holley-TMS DT 862 S/N 10-05-0946 performed by E-Power Engineering Sdn. Bhd. on 2-10-2013; certified by Ir. Ismail Omar.		Project Participant
/32/	Energy Commission of Malaysia	Approval letter from Energy Commission for Registration of Ir. Ismail Omar as the competent person for E-Power Engineering Sdn. Bhd., issued 18-09-2013 and valid until 12-09-2014		Project Participant
/33/	UIE Palm Oil Mill	Biogas 007 form: Electrical & water Consumption by Biogas Plant		Project Participant
/34/	Yokogawa	GS 01F06A00-01E: General specifications for Model DY / Model DYA Vortex Flowmeter;		Project Participant

		Yokogawa Electric Corporation		
/35/	Yokogawa	GS 01C21B01-00E: General specifications for Model EJA110A Differential Pressure Transmitter; Yokogawa Electric Corporation		Project Participant
/36/	Yokogawa	GS 01C50B01-00EN: General specifications for Model YTA110 Temperature Transmitter; Yokogawa Electric Corporation		Project Participant
/37/	Yokogawa	GS 01C25F05-01EN: General specifications for Model EJX610A and EJX630A Absolute and Gauge Pressure Transmitter; Yokogawa Electric Corporation		Project Participant
/38/	Emerson	"Rosemount Recommended Calibration Practices for DP Flowmeters used to comply with EPA 40 CFR Part 98, Greenhouse Gas Mandatory Reporting Requirements", 3 January 2011, Emerson Process Management		Project Participant
/39/	Emerson	Emerson DP Flow Selection Guide		Project Participant
/40/	Yokogawa	Calibration Certificate no. BB1-13037 for Vortex Flowmeter S/N S5L104769, performed by Yokogawa and dated 07-02-2013		Project Participant
/41/	Yokogawa	Calibration Certificate no. BB1-13037 for DP Transmitter S/N 91L125154, performed by Yokogawa and dated 07-02-2013		Project Participant
/42/	Yokogawa	Calibration Certificate no. BB1-13037 for Temperature Transmitter S/N C2L110793, performed by Yokogawa and dated 07-02-2013		Project Participant
/43/	Department of Standards Malaysia	Certificate of Accreditation no. SAMM 070 issued by the Department of Standards Malaysia for Yokogawa Electric (Malaysia) Sdn. Bhd. issued on 3 October 2011 and valid until 23 June 2014	http://www.jsm.gov.my/cab-directories	Project Participant
/44/	Edinburgh Instruments	Guardian Plus for CO ₂ or CH ₄ ; technical specification sheet by Edinburgh Instruments		Project Participant
/45/	Enviro-LIFT Services Sdn. Bhd.	Calibration Reports for Guardian Plus Methane Analyser (Serial #: I-32809) dated 26 May 2013 and 26 December 2014 by Enviro-LIFT Services Sdn. Bhd., signed by Mr. Lee Ah Lek (Senior Chemist)		Project Participant
/46/	Enviro-LIFT Services Sdn. Bhd.	Statement of Competency issued by Lee Ah Lek (Senior Chemist at Enviro-LIFT Services Sdn. Bhd.) dated 5 December 2013		Project Participant
/47/	Malaysian Institute of Chemistry	Annual Retention Certificate for Lee Ah Lek of Enviro-LIFT Services Sdn. Bhd. to be retained as a member of the Malaysian Institute of Chemistry, issued 15 January and valid until 31 December 2013		Project Participant
/48/	Yokogawa	Calibration Certificate no. BB1-13037 for Vortex Flowmeter S/N S5L104767, performed by Yokogawa and dated 07-02-2013		Project Participant
/49/	Yokogawa	Calibration Certificate no. BB1-13037 for DP Transmitter S/N 91L125158, performed by Yokogawa and dated 07-02-2013		Project Participant
/50/	Yokogawa	Calibration Certificate no. BB1-13037 for Temperature Transmitter S/N C2L110792, performed by Yokogawa and dated 07-02-2013		Project Participant
/51/	Yokogawa	Calibration Certificate no. BB1-13037 for Atmospheric Pressure Transmitter S/N 91L122098, performed by Yokogawa and dated 07-02-2013		Project Participant
/52/	Yokogawa	Calibration Certificate no. BB1-13037 for Vortex Flowmeter S/N S5L104768, performed by Yokogawa and dated 07-02-2013		Project Participant

/53/	Yokogawa	Calibration Certificate no. BB1-13037 for DP Transmitter S/N 91L125155, performed by Yokogawa and dated 07-02-2013		Project Participant
/54/	Yokogawa	Calibration Certificate no. BB1-13037 for Temperature Transmitter S/N C2L110790, performed by Yokogawa and dated 07-02-2013		Project Participant
/55/	Yokogawa	Calibration Certificate no. BB1-13037 for Atmospheric Pressure Transmitter S/N 91L122101, performed by Yokogawa and dated 07-02-2013		Project Participant
/56/	-	CAM Technical Guidance Document: Technical Reference for Monitoring Equipment & Instruments		Project Participant
/57/	Pyrometro	Calibration certificate no. PSYP-1303182 for calibration of TEMPSENS Thermocouple S/N 29528 done on 23 January 2013 (with one year validity) by Pyrometro		Project Participant
/58/	Pyrometro	Calibration certificate no. PSYP-1306621 for calibration of TEMPSENS Thermocouple S/N 29529 done on 22 February 2013 (with one year validity) by Pyrometro		Project Participant
/59/	Pyrometro	Calibration certificate no. PSYP-1400233 for calibration of TEMPSENS Thermocouple S/N 29530 done on 7 January 2014 (with one year validity) by Pyrometro		Project Participant
/60/	Pyrometro	Calibration certificate no. PSYP-1407211 for calibration of TEMPSENS Thermocouple S/N 29528 done on 26 February 2014 (with one year validity) by Pyrometro		Project Participant
/61/	Department of Standards Malaysia	Accreditation documents no. SAMM 011 for Pyrometro Services (M) Sdn. Bhd., valid from 1 February 2013 to 16 July 2014 and from 10 July 2014 to 16 July 2017	http://www.jsm.gov.my/cab-directories	Project Participant
/62/	Pyrometro	Calibration certificate no. PSYP-1250702 for calibration of TEMPSENS Thermocouple S/N 43703 done on 24 December 2012 (with one year validity) by Pyrometro		Project Participant
/63/	Pyrometro	Calibration certificate no. PSYP-1303181 for calibration of TEMPSENS Thermocouple S/N 43702 done on 23 January 2013 (with one year validity) by Pyrometro		Project Participant
/64/	Pyrometro	Calibration certificate no. PSYP-1400232 for calibration of TEMPSENS Thermocouple S/N 43703 done on 3 February 2014 (with one year validity) by Pyrometro		Project Participant
/65/	Pyrometro	Calibration certificate no. PSYP-1407212 for calibration of TEMPSENS Thermocouple S/N 43703 done on 26 February 2014 (with one year validity) by Pyrometro		Project Participant
/66/	Dräger	Technical specification sheet for Dräger X-am 2000	http://www.draeger.com/sites/assets/PublishingImages/Products/cin_x-am_2000/US/x-am-2000-pi-9046944-us.pdf	Project Participant
/67/	Dräger	Dräger Service website:	http://www.draeger.com/sites/en_sea/Pages/Campaigns/Rental%20and%20Onsite%20Services/Rental-and-Onsite-services.aspx?cid=sm-std-sea-my-on-siteservice-gas-detector-calibration	Project Participant

/68/	Dräger	Test Certificates no. DSA_testcertificate_GT-Xam2000-0009_0410 for Dräger X-am 2000 gas detector serial no. ARBD 1148, dated 8 July 2014 and 8 July 2013 (both valid for one year)		Project Participant
/69/	UIE Palm Oil Mill	Gas detector leakage monitoring record book		Project Participant
/70/	E-Power Engineering Sdn. Bhd.	Power Meter Calibration Result for KWH Meter Holley-TMS DT 862 S/N G2000086 performed by E-Power Engineering Sdn. Bhd. on 25-03-2012; certified by Ir. Ismail Omar.		Project Participant
/71/	E-Power Engineering Sdn. Bhd.	Power Meter Calibration Result for KWH Meter Holley-TMS DT 862 S/N G2000086 performed by E-Power Engineering Sdn. Bhd. on 23-03-2014; certified by Ir. Ismail Omar.		Project Participant
/72/	UIE Palm Oil Mill	Biogas 008 form_Electrical Power Generation & Power Consumption by Biogas Plant		Project Participant
/73/	E-Power Engineering Sdn. Bhd.	Power Meter Calibration Result for KWH Meter Holley-TMS DT 862 S/N G2000081 performed by E-Power Engineering Sdn. Bhd. on 25-03-2012; certified by Ir. Ismail Omar.		Project Participant
/74/	E-Power Engineering Sdn. Bhd.	Power Meter Calibration Result for KWH Meter Holley-TMS DT 862 S/N G2000084 performed by E-Power Engineering Sdn. Bhd. on 25-03-2012; certified by Ir. Ismail Omar.		Project Participant
/75/	E-Power Engineering Sdn. Bhd.	Power Meter Calibration Result for KWH Meter Holley-TMS DT 862 S/N G2000081 performed by E-Power Engineering Sdn. Bhd. on 23-03-2014; certified by Ir. Ismail Omar.		Project Participant
/76/	E-Power Engineering Sdn. Bhd.	Power Meter Calibration Result for KWH Meter Holley-TMS DT 862 S/N G2000084 performed by E-Power Engineering Sdn. Bhd. on 25-03-2014; certified by Ir. Ismail Omar.		Project Participant
/77/	E-Power Engineering Sdn. Bhd.	Power Meter Calibration Result for KWH Meter Holley-TMS DT 862 S/N G2000083 performed by E-Power Engineering Sdn. Bhd. on 25-03-2012; certified by Ir. Ismail Omar.		Project Participant
/78/	E-Power Engineering Sdn. Bhd.	Power Meter Calibration Result for KWH Meter Holley-TMS DT 862 S/N G2000085 performed by E-Power Engineering Sdn. Bhd. on 25-03-2012; certified by Ir. Ismail Omar.		Project Participant
/79/	E-Power Engineering Sdn. Bhd.	Power Meter Calibration Result for KWH Meter Holley-TMS DT 862 S/N G2000083 performed by E-Power Engineering Sdn. Bhd. on 23-03-2014; certified by Ir. Ismail Omar.		Project Participant
/80/	E-Power Engineering Sdn. Bhd.	Power Meter Calibration Result for KWH Meter Holley-TMS DT 862 S/N G2000085 performed by E-Power Engineering Sdn. Bhd. on 23-03-2014; certified by Ir. Ismail Omar.		Project Participant
/81/	Department of Environment	Mill's environmental license no. 001825 from the Department of Environment, valid from 1 July 2013 until 30 June 2014		Project Participant
/82/	Hach	Letter from Hach Company dated 27 January 2011 regarding authorization of Arachem (M) Sdn. Bhd. to perform calibrations		Project Participant
/83/	Yokogawa	Calibration certificates for data logger S/N: S5K202141 (SCADA station 1 at biogas plant) & S5K202142 (SCADA station 2 at mill, genset / biomass plant)		Project Participant
/84/	Department of Standards Malaysia	SAMM accreditation certificate for lab. no. 070, Yokogawa Electric (M) Sdn. Bhd. dated 17 September 2014 until 23 June 2017	http://www.jsm.gov.my/cab-directories	Project Participant
/85/	Department of Standards	SAMM accreditation document no. 365 for Metrology Corporation Malaysia Sdn. Bhd.	http://www.jsm.gov.my/cab-directories	Project Participant

	Malaysia	(MCMBSB), issued 6 June 2013 and valid until 19 April 2016		
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Appendix 3. Clarification requests, corrective action requests and forward action requests

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

FAR ID	1	Section no.	E.4.4	Date: 14/08/2014
Description of FAR				
The monitored parameter, $COD_{ww,discharge}$ was not listed in the monitoring plan of the validated PDD.				
Project participant response				Date: 02/06/2015
<p>$COD_{ww,discharge}$ is not a part of the monitoring plan in the registered PDD, it has been continuously monitored internally using international standard (HACH – COD method 8000) and the analysis kit is calibrated annually. $MCF_{ww,discharge}$ is zero, it does not affect the overall emission reductions.</p> <p>In our view, this parameter need not be included into the monitoring plan, as the PDD was registered not to include the parameter (page 26).</p> <p>The PDD states...” Treated waste water is discharged to aerobic treatment and subsequently used for soil application in a well-managed system and this project emission is therefore zero ($MCF_{ww,PJ,discharge}$) = 0.0).</p> <p>Hence, as far as the waste treatment system remains well-managed aerobic, no revision is need to the monitoring plan of the PDD; which is the case for this project.</p>				
Documentation provided by project participant				
Mill's environmental license no. 001825 from the Department of Environment, valid from 1 July 2013 until 30 June 2014 /81/				
DOE assessment				Date: 10/07/2015
<p>As stated in the methodology AMS III.H applied for the project, $COD_{ww,discharge}$ parameter is only required for calculation of $BE_{ww,discharge,y}$. However, it was clearly stated in the PDD Section B.6.1, page 23 that treated wastewater is used for soil application in aerobic conditions and this baseline emission is therefore negligible. This has been confirmed by the verification team that there is no final effluent discharge from the mill into any sea, river or lake. Treatment effluent is diverted for land application in the field, as seen on-site and confirmed through the mill's environmental license no. 001825 from the Department of Environment, valid from 1 July 2013 until 30 June 2014 which permits use of effluent for land application with maximum BOD of 5000ppm.</p> <p>Therefore parameter $COD_{ww,discharge}$ is not required to be included in the monitoring report.</p> <p>FAR 1 is resolved and closed</p>				

FAR ID	2	Section no.	E.7	Date: 14/08/2014
Description of FAR				

A calibration certificate for all electricity meters shall provide certain information as follows. This is in accordance with the standard requirement of DIN EN ISO/IEC 17025.

- Assurance of expertise and competence
- Quality management according at least to DIN EN ISO 9001
- Transparency of measurement results
- Measurement results that are expertly based indication of measurement uncertainties
- Traceability of used measurement devices to national / international standard

Project participant response
Date: 02/06/2015

Please refer to folder "Calibration Validity>ST Authorization". The calibration company, E-POWER ENGINEERING SDN BHD has been authorized by the electricity regulation body in Malaysia, Suruhanjaya Tenaga/Energy Commission, to carry out electrical related services in Malaysia. In addition, the person carrying out the calibration has also been certified by ST to carry out calibration exercise (IR. Ismail Omar).

Further, the calibration certificates do carry test/measurement results, for 'before' and 'after' comparison. Please refer to any kWh meter related subfolder under the folder "Calibration Certificates".

The above 3 criteria should be sufficient for a calibration exercise for a relatively simple Class II kWh meter.

Also, since only 2 values are used for each meter for the entire monitoring period, all Kwh meters have been added with max permissible error as a conservative measure.

Documentation provided by project participant

- 1) Power Meter Calibration Results for all electricity meters used for the project activity, certified by Ir. Ismail Omar /31, 70, 71, 73, 74, 75, 76, 77, 78, 79, 80/
- 2) Approval letter from Energy Commission for Registration of Ir. Ismail Omar as the competent person for E-Power Engineering Sdn. Bhd., issued 18-09-2013 and valid until 12-09-2014 /32/

DOE assessment
Date: 10/07/2015

The requirements for calibration certificate as listed in FAR 2 by the previous verification team are not applicable for the PP but for the calibrator of the electricity metres while compliance to ISO17025 requirements are not stipulated as a requirement for CDM projects.

It was confirmed that calibration of all electricity metres used in this project during this monitoring period was carried out by IR. Ismail Omar who is appointed by the Malaysian Energy Commission as seen in his certificate of registration as an electrical contractor services issued 13 September 2013 and valid until 12 September 2014. Mr. Ismail had carried out calibrations of the electricity metres within the validity period of his registration certificate.

The Energy Commission is the statutory body responsible for regulating the energy sector including electricity supply throughout Malaysia. Therefore, their appointment of Mr. Ismail is accepted as adequate evidence that he is a competent contractor to carry out calibration of electricity metres.

FAR 2 is resolved and closed.

Table 2. CL from this verification

CL ID	1	Section no.	E.7	Date: 05/05/2015
Description of CL				
<p>MR Section D.2 Page 15:</p> <p>Parameter $S_{PJ,y}$</p> <p>This parameter is analysed by external accredited lab, Union Laboratories Sdn Bhd – lab accreditation certificate, lab scope master list has been received (SAMM no. 178) & valid until 28-10-2014 to verify that COD is included in the lab accreditation scope, and also the corresponding equipment calibration certificates for total solids for the MP 01-08-2013 till 31-12-2014</p> <p>Please submit the lab accreditation certificate with validity period cover the monitoring period (request the latest one, starting from 29-10-2014 onwards)</p>				
Project participant response				Date: 02/06/2015
<p>PP Response no. 1 (02/06/2015):</p> <p>Please refer to folder titled 'Calibration Validity>SAMM Accreditation'. Union Lab's scope masterlist accreditation for the monitoring period is attached. The scope master list is the only available document online (through the website of Dept of Standards Malaysia) to confirm the accreditation of the laboratory and this should be considered as the certificate, since it contains the SAMM no.</p> <p>Since the laboratory is certified under SAMM (No 178), International Union of Independent Laboratories and ISO/IEC 17025, there is no further need to assess whether the instruments/apparatus utilised by this laboratory is calibrated or not. Without proper standards and practice on-site, this laboratory would not have been certified under the standards in bold above. Also, the on-site chemist is certified under the Associate Malaysian Institute of Chemistry (AMIC).</p> <p>PP Response No. 2 (21/07/2015):</p> <p>The $S_{PJ,y}$ values are a part of the '14. Analysis Certificates' folder.</p>				
Documentation provided by project participant				
<ol style="list-style-type: none"> 1) Malaysian Lab Accreditation Scheme, or 'Skim Akreditasi Makmal Malaysia' (SAMM) certificate no. 178 for Union Laboratories valid for 12 March 2013 until 28 October 2014 and from 3 October 2014 until 28 October 2017 /23/ 2) Monthly test certificates for parameter $S_{PJ,y}$ analysed by external accredited lab, Union Laboratories Sdn Bhd. /22/ 				
DOE assessment				Date: 10/07/2015
<p>DOE Response No. 1 (10/07/2015):</p> <p>Accreditation documents no. SAMM 178 for Union Laboratories Sdn. Bhd. was sighted and confirmed available on the Department of Standards Malaysian website. 1st accreditation document validity is from 12 March 2013 to 28 October 2014 and 2nd document is from 3 October 2014 to 28 October 2017, which covers this monitoring period. The list of approved materials/products that can be tested by this lab includes total solid for effluent & industrial waste using standard APHA 2540 B, which is relevant to parameter $S_{PJ,y}$. Equipment calibration certificates were not sighted, but PP's explanation is accepted since the laboratory is already accredited by the Malaysian Department of Standards.</p> <p>However, for our records, please provide soft copies of dry matter analysis certificates from which value of $S_{PJ,y}$ stated in the MR was derived.</p> <p>DOE Response No. 2 (03/09/2015):</p> <p>Certificates of analysis for all monthly dry matter samples taken during the monitoring period were sighted. Analysis was carried out by accredited lab, Union Laboratories Sdn. Bhd.</p> <p>CL 1 is resolved and closed.</p>				

CL ID	2	Section no.	E.7	Date: 05/05/2015
Description of CL				
MR Section D.2 Page 20:				
Parameter T_{Flare}				
Calibration of thermocouple done by Pyrometro – to request lab accreditation certificate & lab scope master list valid during MP 01-08-2013 till 31-12-2014				
Project participant response				Date: 02/06/2015
The lab scope master list is attached under the folder 'Calibration Validity>SAMM accreditation'. The scope master list is the only available document online to confirm the accreditation of the laboratory and this should be considered as the certificate, since it contains the SAMM no.				
Documentation provided by project participant				
Accreditation documents no. SAMM 011 for Pyrometro Services (M) Sdn. Bhd., valid from 1 February 2013 to 16 July 2014 and from 10 July 2014 to 16 July 2017 /61/				
DOE assessment				Date: 10/07/2015
Accreditation documents no. SAMM 011 for Pyrometro Services (M) Sdn. Bhd. was sighted. The 1 st document validity is from 1 February 2013 to 16 July 2014 and 2 nd document validity is from 10 July 2014 to 16 July 2017, which covers the entire monitoring period. List of scopes for which this lab is accredited for covers Type-N temperature recorders, which is relevant to thermocouple used for monitoring of T_{flare} . CL 2 is resolved and closed.				

CL ID	3	Section no.	E.7	Date: 05/05/2015
Description of CL				
MR Section D.2 Page 24:				
Parameter $EG_{\text{genset},y}$				
S/N: G2000084 – certificate of calibration for 23-3-2014, wrongly dated as 25/3/2012. Noted PP already requested revised certificate with the corrected date, to be submitted to verification team for review				
Project participant response				Date: 02/06/2015
Calibration certificate for G2000084 is attached under the folder "Calibration certificates> $EG_{\text{genset},y}$ ".				
2012 Calibration: G2000081 – 25/03/2012 G2000084 – 25/03/2012				
2014 Calibration: G2000081 – 23/03/2014 G2000084 – 25/03/2014				
Documentation provided by project participant				
1) Revised monitoring report /2/ 2) Calibration certificates for electricity meter S/N G2000084 /74, 76/				
DOE assessment				Date: 10/07/2015
Ok, confirmed that the calibration date for electricity meter S/N: G2000084 has been corrected and the certificates for the most recent and previous calibration were sighted and correspond with the calibration dates in the MR. CL 3 is resolved and closed.				

CL ID	4	Section no.	E.7	Date: 05/05/2015
Description of CL				
<p>MR Section D.2 Page 13</p> <p>Parameters COD_{ww, untreated, y} & COD_{ww, treated, y} Both parameters are analysed by external accredited lab, Union Laboratories Sdn Bhd – to submit lab accreditation certificate, lab scope master list to verify that COD is included in the lab accreditation scope, and also the corresponding equipment calibration certificates depending on the analysis method (open reflux, manual titration method or colorimeter method)</p> <p>If open reflux, manual titration method – please submit for calibration certificates for pipettes, burettes, volumetric flasks, oven, analytical balance)</p> <p>If colorimeter method – please submit for calibration certificates for spectrophotometer, COD meter / reactor for the MP 01-08-2013 till 31-12-2014</p>				
Project participant response				Date: 02/06/2015
<p>Please refer to folder titled 'Calibration Validity>SAMM Accreditation'. Union Lab's scope masterlist accreditation for the monitoring period is attached. The scope master list is the only available document online (through the website of Dept of Standards Malaysia) to confirm the accreditation of the laboratory and this should be considered as the certificate, since it contains the SAMM no.</p> <p>Since the laboratory is certified under SAMM (No 178), International Union of Independent Laboratories and ISO/IEC 17025, there is no further need to assess whether the instruments/apparatus utilised by this laboratory is calibrated or not. Without proper standards and practice on-site, this laboratory would not have been certified under the standards in bold above. Also, the on-site chemist is certified under the Associate Malaysian Institute of Chemistry (AMIC).</p>				
Documentation provided by project participant				
<p>Malaysian Lab Accreditation Scheme, or 'Skim Akreditasi Makmal Malaysia' (SAMM) certificate no. 178 for Union Laboratories valid for 12 March 2013 until 28 October 2014 and from 3 October 2014 until 28 October 2017 /23/</p>				
DOE assessment				Date: 10/07/2015
<p>Accreditation documents no. SAMM 178 for Union Laboratories Sdn. Bhd. was sighted and confirmed available on the Department of Standards Malaysian website. 1st accreditation document validity is from 12 March 2013 to 28 October 2014 and 2nd document is from 3 October 2014 to 28 October 2017, which covers this monitoring period. The lab scopes listed in the accreditation document includes testing for COD of effluent and industrial waste using the APHA 5220B method (open reflux method).</p> <p>Equipment calibration certificates were not sighted, but PP's explanation is accepted since the laboratory is already accredited by the Malaysian Department of Standards.</p> <p>CL 4 is resolved and closed.</p>				

CL ID	5	Section no.	E.7	Date: 05/05/2015
Description of CL				
<p>MR Section D.2 Page 25</p> <p>Parameter COD_{ww, discharge, PJ, y} is analysed by internal lab using COD analysis kit, calibrated by Arachem (M) Sdn. Bhd. – to request for lab accreditation certificate, lab scope master list to verify that COD is included in the lab accreditation scope</p>				
Project participant response				Date: 02/06/2015
<p>Arachem is the only authorised agent/company to sell/calibrate/commission HACH equipment in Malaysia. This is supported by a letter from Hach HQ. Refer to folder 'Calibration Validity>OEM'.</p>				
Documentation provided by project participant				

Letter from Hach Company dated 27 January 2011 regarding authorization of Arachem (M) Sdn. Bhd. to perform calibrations /82/

DOE assessment	Date: 10/07/2015
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Letter from Hach Company dated 27 January 2011 stating that Arachem (M) Sdn. Bhd. is the only authorized company to service Hach Company instruments/equipment in Malaysia was sighted. This document is accepted by the verification team as evidence that Arachem (M) Sdn. Bhd. is competent to carry out calibration of the equipment.

CL 5 is resolved and closed.

CL ID	6	Section no.	E.7	Date: 05/05/2015
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Description of CL

Data logger calibration records

S/N: S5K202141 (SCADA station 1 at biogas plant) & S5K202142 (SCADA station 2 at mill, genset / biomass plant) to be submitted to the verification team for review

Project participant response	Date: 02/06/2015
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PP Response no. 1 (02/06/2015):

2013 and 2014 calibration certs for SCADA 1 and SCADA 2 are attached for reference under the folder 'Calibration Certificates>Daqstation'.

PP Response No. 2 (21/07/2015):

For monitoring period prior to September 2014, Yokogawa has provided an accreditation certificate issued by DSM, which also spells out the fields of calibration. This certificate was valid from Oct 2011 – June 2014.

The SAMM accreditation does not cover the period June – Sept 2014. Nevertheless, no calibration was done in this period.

Documentation provided by project participant

- 1) Calibration certificates for data logger S/N: S5K202141 (SCADA station 1 at biogas plant) & S5K202142 (SCADA station 2 at mill, genset / biomass plant) /83/
- 2) SAMM accreditation certificate for lab. no. 070, Yokogawa Electric (M) Sdn. Bhd. dated 17 September 2014 until 23 June 2017 /84/

DOE assessment	Date: 10/07/2015
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DOE Response No. 1 (10/07/2015):

Calibration certificates for data logger S/N: S5K202141 (SCADA station 1 at biogas plant) & S5K202142 (SCADA station 2 at mill, genset / biomass plant) were sighted. Both data loggers were calibrated on 31 May 2013 and 9 May 2014 by SAMM accredited lab. no. 070, Yokogawa Electric (M) Sdn. Bhd. The latest accreditation document for this lab sighted in the Dept. Of Standards Malaysia website was dated 17 September 2014 until 23 June 2017. Scope of accreditation covered includes DC indicating electrical equipment such as the DX2008 data loggers used at SCADA station 1 and 2.

However, SAMM accreditation document for Yokogawa covering the monitoring period before 17 September 2014 was not found. Please help locate and provide this document.

DOE Response No. 2 (03/09/2015):

Certificate of Accreditation issued by the Department of Standards Malaysia for Yokogawa Electric (Malaysia) Sdn. Bhd. issued on 3 October 2011 and valid until 23 June 2014 was sighted. Although there is no accreditation certificate or evidence available for period of 24 June to 16 September 2014, it was confirmed that there was no calibration done during this period.

CL 6 is resolved and closed.

CL ID	7	Section no.	D.1	Date: 05/05/2015
Description of CL				
<p>MR Section D3: Version of 'Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities' is not the latest version</p> <p>Please describe further which part of the CDM sampling procedure and type of sampling method was applied in this section</p>				
Project participant response				Date: 02/06/2015
<p>The guideline has been updated to the latest version, which is version 3. Nevertheless, the method for determining the sample size remains the same, since it's basically statistics.</p> <p>The section which describes COD sample size determination is section 2.3.1, Example 10. The guideline clearly mentions on the ways to calculate the minimum required number of samples for COD parameters. This has been reflected in the MR.</p>				
Documentation provided by project participant				
Revised Monitoring Report /2/				
DOE assessment				Date: 10/07/2015
<p>The version of 'Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities' stated in Section D.3 has been updated and further explanation on the relevant section of the document applied was included in this section as well.</p> <p>CL 7 is resolved and closed.</p>				

CL ID	8.1	Section no.	E.8	Date: 05/05/2015
Description of CL				
<p>8.1) ER Calculation sheet – PE sheet</p> <p>8.1.1) Informed during audit that comment in row 25 regarding maximum permissible error is no longer applicable. Please revise accordingly.</p> <p>8.1.2) Please put in a note under this table A5-T8 with explanation on the formula applied for calculation of D8, G8, L8 & Q8 & why MPE is applied.</p> <p>8.1.3) Kindly specify in the sheet the difference between the 2 opening and closing values for $EG_{\text{genset},y}$ and $EG_{\text{Biomass},y}$</p> <p>8.1.4) Please specify that the highlighted cells in A156 – A159 indicate the breakdown period of the data logger at the biodigester</p>				
Project participant response				Date: 02/06/2015

PP Response no. 1 (02/06/2015):

8.1.1 – row has been removed.

8.1.2 – the formula applied is consistent with the formula registered in the PDD, for calculation of all PEs. Specifically for PE_{elec} calculation, meter serial numbers and meter numbers have been added to make the calculation more transparent.

8.1.3 – The sheet has been updated to capture the 2 sets of meters for the parameters mentioned on the left. These meters are specified as meter 1 and meter 2. The kwh values from both meters will be totalled for each parameter.

8.1.4 – Cells highlighted in pink refers to the breakdown period of datalogger at bio-digester plant. The specific date is: 01/03/2014 - 13/06/2014

PP Response No. 2 (21/07/2015):

$COD_{removed,PJ}$ has been linked to the value/calculation in the assumptions tab.

Documentation provided by project participant

Revised Emission Reduction Calculation Spreadsheet /5/

DOE assessment

Date: 10/07/2015

DOE Response No. 1 (10/07/2015):

8.1.1) Ok, confirmed that the comment regarding maximum permissible error has been removed

8.1.2) Ok, explanation on calculations for cells D8, G8, L8 & Q8 and why MPE is applied was included.

8.1.3) Ok, the tables for 2 sets of opening and closing values for $EG_{genset,y}$ and $EG_{Biomass,y}$ are indicated as reading for the two sets of meters used for each parameter.

8.1.4) Ok, highlighted cells have been indicated as being the breakdown period of the data logger at the biodigester.

However, please clarify on the following:

Values of $COD_{removed,PJ,k,y}$ stated in cells F82 – F98 were calculated as difference between final values of $COD_{ww,treated,y}$ and $COD_{ww,discharge,PJ,y}$ in 'COD - TS' tab. This is inconsistent with value of $COD_{removed,PJ}$ stated in 'Assumptions' tab of the ER sheet which is calculated as difference between $COD_{ww,untreated,y}$ and $COD_{ww,treated,y}$. Based on AMS-III.H clause 29, page 12, calculation of COD removal efficiency is based on inflow COD and outflow COD (understood by audit team as referring to $COD_{ww,untreated,y}$ and $COD_{ww,treated,y}$), therefore it is the opinion of the audit team that the $COD_{removed,PJ}$ value in the 'Assumptions' tab should be applied in the $PE_{ww,treatment,y}$ calculation in the 'PE' tab.

In any case, the value of the $COD_{removed,PJ}$ parameter must be consistent in both tabs (with cells F82-F98 linking to the value in the 'Assumptions' tab).

DOE Response No. 2 (03/09/2015):

Ok, values of $COD_{removed,PJ,k,y}$ in PE tab of ER sheet have been revised to the corresponding value in the 'Assumptions' tab.

CL 8.1 is resolved and closed.

CL ID	8.2	Section no.	E.8	Date: 05/05/2015
Description of CL				
8.2) ER Calculation sheet – COD – TS 8.2.1) Please explain in the sheet which part of CDM sampling procedure was applied to determine all values in table A25 – D34 8.2.2) Please indicate general statistics table from which the t-values were derived from 8.2.3) Please state a brief explanation what is meant by pass 'yes' or 'no' and the impact if not passed				
Project participant response				Date: 02/06/2015

8.2.1 – Required explanation is added into the sheet. Also, the reference to the document (sampling guideline – EB 75, Annex 8) has been added.

8.2.2 – A t-table (image) has been added into the 'COD-TS' sheet, serving purpose as reference.

8.2.3 – Explanation has been added into row 41, column A.

Documentation provided by project participant

Revised Emission Reduction Calculation Spreadsheet /5/

DOE assessment

Date: 10/07/2015

8.2.1) Ok, an explanation on the CDM sampling procedure applied to determine all values in table A25 – D34 has been included

8.2.2) The general statistics t table has been included as well

8.2.3) The meaning of pass 'yes' and 'no' has been included for clarity.

CL 8.2 is resolved and closed.

CL ID	8.3	Section no.	E.8	Date: 05/05/2015
Description of CL				
8.3) ER Calculation Sheet – Assumptions: Please clarify the purpose of data in columns P, Q and Y, or remove these if not required				
Project participant response				Date: 02/06/2015
Data removed.				
Documentation provided by project participant				
Revised Emission Reduction Calculation Spreadsheet /5/				
DOE assessment				Date: 10/07/2015
Ok, confirmed that data in these columns have been removed.				
CL 8.3 is resolved and closed.				

CL ID	8.4	Section no.	E.8	Date: 05/05/2015
Description of CL				
8.4) ER Calculation Sheet - Instrument M.P.E: 8.4.1) Please include additional column on CT values and source of CT values for clarity 8.4.2) Please list the 2 additional weighbridges at the mill it was determine on-site that these may be used for sludge weighing in the project activity 8.4.3) Reference sources for 7& 8 should be more specific to the reference source document name.				
Project participant response				Date: 02/06/2015

PP Response no. 1 (02/06/2015):

8.4.1 – Additional table for CT has been added into the sheet. As mentioned during audit, CT values are available on the faceplate of each kwh meter.

8.4.2 – The 2 additional weighbridges have been added into the MR. No changes to excel sheet, as all weighbridges are of the same make. $S_{final,PJ,y}$ has been added with the highest M.P.E of 6 kg. The calibration certificates for all three weighbridges are available under 'Calibration certificates' $S_{final,PJ,y}$.

8.4.3 – All reference sources have been revised, to be more specific to the document referred and which folder they are from.

PP Response No. 2 (21/07/2015):

8.4.1 – Parameter's name has been corrected.

8.4.2 – Applying M.P.E of the 60 tonne weighbridge is more conservative. Hence, it is fine to apply an error of 6.00kg to the month of March 2014.

Documentation provided by project participant

Revised Emission Reduction Calculation Spreadsheet /5/

DOE assessment

Date: 10/07/2015

DOE Response No. 1 (10/07/2015):

8.4.1 – Additional CT Ratio table has been added and verified from photos of faceplates of each kwh meter that the CT values are correct. However, please make amendment to cells B18 and B19 as correct name of the parameter is $EG_{biomass,y}$ not $EG_{turbine,y}$.

8.4.2 – M.P.E for weighbridges was stated as 6kg (0.01% of 60,000kg), however this does not consider the 40,000kg weighbridge which would have a different M.P.E. In addition, please consider comment regarding accuracy stated in the weighbridge calibration report as stated under CAR 3 above.

8.4.3 – Revision is accepted

In addition, column G information does not seem relevant. If so, please delete.

DOE Response No. 2 (03/09/2015):

Ok, Instrument M.P.E tab of ER sheet has been corrected accordingly and responses are accepted.

CL 8.4 is resolved and closed.

Table 3. CAR from this verification

CAR ID	1	Section no.	E.1	Date: 05/05/2015
Description of CAR				
Monitoring report form Version 04.0 is no longer applicable, latest version 05.0 is applicable at the time of on site visit				
Project participant response				Date: 02/06/2015
<p>PP Response no. 1 (02/06/2015): The MR has been updated to ver 5.1.</p> <p>PP Response No. 2 (21/07/2015): 1) Names under section A.6 is not project participant. Added into section A.6. 2) "Purpose of Data" has been updated as per options listed on Page 10 of MR v5.1. 3) Both options are presented under section E4, with explanations. The same applied to the ER calculation sheet, under tab 'ER'. This should be sufficient.</p> <p>'ER Breakdown' tab should only cover the more conservative option, compared with the PDD targets.</p>				
Documentation provided by project participant				
Revised Monitoring Report /2/				
DOE assessment				Date: 10/07/2015
<p>DOE Response No. 1 (10/07/2015): Ok, confirmed that the MR form has been updated to the latest version and format is correct according to the form template Some sections require minor amendments in accordance with the MR form specific instructions: 1) Section A.6 - Please indicate whether the persons indicated in this section are also project participants in Appendix 1. 2) Section D – For "Purpose of data" in the tables in D.1 and D.2 please choose one of the options as listed on page 10 of the MR form v5.1 3) Section E.4 – The table in this summary of calculations here only states the values for the lowest of the 2 final ex-post ER reduction calculation options. To better summarize the results of Sections E.1, E.2 and E.3, please include second table showing results of the 2nd ER calculation option, including table titles to show the difference between the 2 tables and statement on which results were selected (due to lower ER calculation results). Please include the 2nd table and explanation similarly in the ER calculation sheet, 'ER Breakdown' sheet.</p> <p>DOE Response No. 2 (03/09/2015): Ok, confirmed that revisions have been made accordingly and all responses are accepted.</p> <p>CAR 1 is resolved and closed.</p>				

CAR ID	2	Section no.	E.6	Date: 05/05/2015
Description of CAR				
<p>MR Section D.2 Page 23 Parameter: Leakage Monitoring equipment – Gas detector was used to detect leakage. However, MR stated " Monitoring equipment = Not applicable (manual assessment / soap test)</p>				
Project participant response				Date: 02/06/2015
Table D.2 for Parameter – Leakage parameter has been updated accordingly, including explanation on delayed calibration and its effect on ER calculations. Refer to folder 'MR'.				
Documentation provided by project participant				

- 1) Revised Monitoring Report /2/
- 2) Gas detector specification on Dräger Service website:
http://www.draeger.com/sites/en_sea/Pages/Campaigns/Rental%20and%20Onsite%20Services/Rental-and-Onsite-services.aspx?cid=sm-std-sea-my-on-siteservice-gas-detector-calibration/67/

DOE assessment	Date: 10/07/2015
<p>Ok, confirmed that monitoring equipment for leakage parameter has been updated. Specification of gas detector were cross-checked against calibration certificate and found to be correct.</p> <p>CAR 2 is resolved and closed.</p>	

CAR ID	3	Section no.	E.6	Date: 05/05/2015
Description of CAR				
<p>MR Section D.2 Page 15</p> <p>Parameter $S_{final,PJ,y}$</p> <p>During on site visit, it was found that there are another 2 weighing bridges possibly used for measurements of the $S_{final,PJ,y}$ i.e. weighing bridge serial number 074550157 & 074550143, these are missing in the MR</p> <p>Checked Perakuan Penentuan Timbang dan Sukat (Akta Timbang dan Sukat 1972) – the weighing bridge serial number 074550157 & 074550143 has been inspected by the Metrology Corporation Malaysia Sdn Bhd on 21-03-2013 & 24-03-2014 (delayed of 3 days calibration) also calibrated by Prime Silver Metrology Enterprise → to request for evidence of calibration certificate & accreditation? Or appointment evidence by the Metrology Corporation Malaysia Sdn Bhd?</p>				
Project participant response				Date: 02/06/2015
<p>PP Response no. 1 (02/06/2015):</p> <p>All 3 weighbridges [074550124 (40 tonnes), 074550143 (60 tonnes), 074550157 (60 tonnes)] have been added to section D.2. of MR. The delayed calibration period of the weighbridges (March 2014) have been factored in; by adding 6kg to the $S_{final,PJ,y}$ reading in March 2014. As per page 5 of the tech spec, the weighbridge has a 0.01% error from full-scale (60,000 kg). All calibration certs reattached as evidence.</p> <p>Metrology Corporation Sdn Bhd is the appointed main contractor (by Weight and Measurement Act and Dept. Standards Malaysia – SAMM 365) to verify all weighbridge calibration in Malaysia. This should be considered as accreditation evidence.</p> <p>Metrology Corporation is the only organization which is authorized to issue the 'Borang D', which falls under the Weights and Measures Act 1971.</p> <p>Nevertheless, certain jobs are contracted out to companies with same capacity; i.e, Prime Silver Metrology (PSM) Ent. This can be traced back to the calibrated report which is issued by PSM; under Section D, traceability is referred back to the Metrology Corporation Sdn Bhd. This should be considered as appointment evidence.</p> <p>A sample 'Borang D' is attached to show that final verification of the weighbridge. Refer to folder 'Calibration Certificates' > '$S_{final,PJ,y}$'</p> <p>PP Response No. 2 (21/07/2015):</p> <p>Please refer to file titled 'PSM KPDNKK License_2010-2015'. The document proves that Prime Silver Metrology (PSM) has been appointed directly by the Ministry of Domestic Trade, Cooperatives and Consumerism. Once PSM completes the calibration job, it will pass the results to Metrology Corporation to issue Borang D.</p>				
Documentation provided by project participant				

- 1) Revised Monitoring Report /2/
- 2) SAMM accreditation document no. 365 for Metrology Corporation Malaysia Sdn. Bhd. (MCMSB), issued 6 June 2013 and valid until 19 April 2016 /85/
- 3) License to fix and sell weighing or measurement equipment for Prime Silver Metrology Enterprise: PSM KPDNKK License_2010-2015 /28/

DOE assessment	Date: 10/07/2015
<p>DOE Response No. 1 (10/07/2015):</p> <p>1) Confirmed that the details for the other 2 weighbridges have been added to the MR Section D.2 for parameter $S_{final,PJ,y}$ with correct specifications and dates of calibrations verified from calibration certificates. It was seen in the calibration certificate that there were no differences in reading before and after adjustment. PP has included the 6kg into the readings to be conservative and this is accepted.</p> <p>2) SAMM accreditation document no. 365 for Metrology Corporation Malaysia Sdn. Bhd. (MCMSB) was sighted and confirmed available on the Department of Standards Malaysia website, issued 6 June 2013 and valid until 19 April 2016.</p> <p>However, status of accreditation or appointment of Prime Silver Metrology is unconfirmed. Statement in calibration reports regarding traceability to MCSB is not sufficient evidence. Accreditation certificate or confirmation of appointment evidence from MCSB is required. Audit team had attempted to contact Metrology Corporation Sdn. Bhd. to seek clarification but unable to reach the relevant person in charge to confirm this.</p> <p>DOE Response No. 2 (03/09/2015):</p> <p>Ok, a license to fix and sell weighing or measurement equipment for Prime Silver Metrology Enterprise was sighted signed by the head inspection of weighing and measurements of the Domestic Trade, Cooperatives and Consumerism Ministry. The license was valid from 22 April 2010 until 21 April 2015.</p> <p>CAR 3 is resolved and closed.</p>	

CAR ID	4	Section no.	E.7	Date: 05/05/2015
Description of CAR				
<p>Incorrect calibration dates were stated in the MR as follows:</p> <p>MR Section D.2 Page 22:</p> <p>Parameter T_{Flare}</p> <p>Date of second calibration for thermocouple S/N 29528: 27-02-2014 is incorrect (correct date is 26-02-2014)</p>				
Project participant response				Date: 02/06/2015
<ol style="list-style-type: none"> 1) Revised Monitoring Report /2/ 2) Calibration certificates for TEMPSSENS Thermocouple S/N 29528 performed by Pyrometro /57,60/ 				
Documentation provided by project participant				
Date has been corrected. Refer to updated MR.				
DOE assessment				Date: 10/07/2015
<p>Ok, the date of second calibration for thermocouple S/N 29528 has been corrected.</p> <p>CAR 4 is resolved and closed.</p>				

CAR ID	5.1	Section no.	E.8	Date: 05/05/2015
Description of CAR				

5.1) ER Calculation sheet – General:

Please state reference sources for all single input values used

Project participant response	Date: 02/06/2015
<p>PP Response no. 1 (02/06/2015): Reference source for all single-input has been updated. Please refer to sheets BE, PE, COD-TS, Assumptions, Instrument M.P.E. Refer to updated CER calculation sheet.</p> <p>PP Response No. 2 (21/07/2015): 1) General note added to indicate source of data. 2) Cell B143 corrected to 518/24. Note added. 3) Note added. 4) Source corrected. 5) The 2.5% error is applied due to delay in calibration exercise for the Guardian Plus methane analyser. Since MD_{boiler} and MD_{flare} includes $w_{CH_4,y}$ the more conservative m.p.e is applied directly to the final MD_y values. Comments added under E2 for tables $PE_{flare,y}$ and MD_y.</p> <p>PP Response No. 3 (08/09/2015): Inconsistency has been corrected and deviation period has been applied as between 01/03/2014 – 13/06/2014. Hence, some values have been revised.</p>	
Documentation provided by project participant	
Revised Emission Reduction Spreadsheet /5/	
DOE assessment	Date: 10/07/2015
<p>DOE Response No. 1 (10/07/2015): 1) Reference source document for values of $FV_{RG,h}$, $TM_{RG,h}$ and $PE_{flare,y}$ in the 'PE' tab, as well as $FV_{digester,h}$ and $fv_{CH_4,h}$ of the 'FV_{digester} - fv_{CH₄}' tab of the link-free CER sheet still not stated. Please include a general note stating the relevant tab name in 'UIE raw data and adjusted' Daq station datalogger sheets from which these data was taken from. 2) Please include note why value in cell B143 of the 'PE' tab are divided by 670/24 3) Please include note why values in cells B26 and J26 of the 'MD_y (boiler + flare)' tab and cell B24 of 'FV_{digester} - fv_{CH₄}' tab are divided by 518/24 4) Please revise source for $COD_{ww,in}$ and $COD_{ww,out}$ in 'Assumptions' tab to 'Approved PDD'. 5) Please include clarification in the 'MD_y (boiler + flare)' tab of the ER sheet, on why cells Q16 - Q23 values are multiplied by (1-2.5%)? Same explanation to be included in Section E.2 of the MR as well.</p> <p>DOE Response No. 2 (03/09/2015): Ok, ER Calculation Sheet and MR is confirmed to be have been updated accordingly, and all responses are accepted. However, there is inconsistency between the value of cell Q16 of the MD_y (boiler + flare) tab of the ER sheet and the MR table page 40 for MD_y value of May-14. Please correct this.</p> <p>DOE Response No. 3 (30/10/2015): Ok, the the value of cell Q16 of the MD_y (boiler + flare) tab of the ER sheet and the MR table page 40 for MD_y value of May-14 has been revised to be consistent. The revised value has been verified and determined to correct due to the correction made in the deviation period.</p> <p>CAR 5.1 is resolved and closed.</p>	

CAR ID	5.2	Section no.	E.8	Date: 05/05/2015
Description of CAR				

5.2) ER Calculation sheet – PE sheet

5.2.1) Please ensure there are no hidden rows (rows 9-35 are currently hidden)

5.2.2) Actual values of H8, I8 and N8 are not in accordance with the values stated in the logbook.

5.2.3) Please remove all external links, i.e. those in table A146 - D166

Project participant response**Date:** 02/06/2015**PP Response no. 1 (02/06/2015):**

5.2.1 – Hidden rows have been deleted

5.2.2 – All values for kwh meters have been revised accordingly. These cells are highlighted in blue. Please refer to document titled 'All kWh meters opening values' and 'All kWh meters closing values' for the values applied. As explained during audit, conservative approach has been applied to the selection of which value to be used.

5.2.3 – External links have been removed.

PP Response No. 2 (21/07/2015):

5.2.2 – Values updated in CER calculation sheet and MR, based on the values provided.

5.2.4 – $FV_{RG,h}$ corrected to $FV_{flare,h}$; consistent with MR.

5.2.5 – CT values have been linked to the Instrument MPE tab

5.2.6 – Cell included in the overall PE calculation

Documentation provided by project participant

Revised Emission Reduction Spreadsheet /5/

DOE assessment**Date:** 10/07/2015**DOE Response No. 1 (10/07/2015):**

5.2.1 - Ok, confirmed that hidden rows have been deleted (Closed)

5.2.2 - The values were not corrected according to actual values in the logbooks, which should be 2088 for H9, 2216 for I9, and 283,950 for N9. Please update the same values in the relevant table in Section E.2, page 33 of the MR.

5.2.3 - Ok, external links were removed (Closed)

In addition, please revise the following:

5.2.4 - Name of cell J5 of 'MD_y (boiler + flare)' tab does not seem correct. Parameter name $FV_{RG,h}$ stated in this cell is to be changed to $FV_{flare,h}$ to be consistent with the MR page 22.

5.2.5 - PE tab: For formulas which include CT values of equipment (cells D9, G9, L9, and Q9), please include the link to the CT values from the 'Instrument M.P.E' tab in the formulas instead of stating the CT values as single input figures

5.2.6 - Please also include the value of cell K99 in the 'PE' tab in the formula for calculation of PE in the 'ER' tab cell C18.

DOE Response No. 2 (03/09/2015):

Ok, ER Calculation Sheet is confirmed to have been updated accordingly, and all responses are accepted.

CAR 5.2 is resolved and closed.

CAR ID	5.3	Section no.	E.8	Date: 05/05/2015
Description of CAR				
5.3) ER Calculation sheet – $FV_{digester}$ - fv_{CH4} Please remove all external links				
Project participant response				Date: 02/06/2015
External link have been removed.				

Documentation provided by project participant	
Revised Emission Reduction Spreadsheet /5/	
DOE assessment	Date: 10/07/2015
Ok, external links have been removed CAR 5.3 is resolved and closed.	

CAR ID	5.4	Section no.	E.8	Date: 05/05/2015
Description of CAR				
5.4) ER Calculation sheet - $S_{final,PJ}$: Values of cells C5 and D5 are not in accordance with the sludge disposal sheets				
Project participant response				Date: 02/06/2015
Values of these cells have been updated.				
Documentation provided by project participant				
Revised Emission Reduction Spreadsheet /5/				
DOE assessment				Date: 10/07/2015
Ok, confirmed that the values have been corrected. CAR 5.4 is resolved and closed.				

CAR ID	5.5	Section no.	E.8	Date: 05/05/2015
Description of CAR				
5.5) ER Calculation sheet - Comparison: There are empty cells, i.e. B32-C32				
Project participant response				Date: 02/06/2015
Revised Emission Reduction Spreadsheet /5/				
Documentation provided by project participant				
Empty cells deleted.				
DOE assessment				Date: 10/07/2015
OK, empty cells have been removed CAR 5.5 is resolved and closed.				

CAR ID	6	Section no.	E.8	Date: 05/05/2015
Description of CAR				
MR Section E.1: The final value of $COD_{removed,y}$ in Table on page 27-28 is not correct.				
Project participant response				Date: 02/06/2015

PP Response no. 1 (02/06/2015):

Table updated; value revised. Refer to updated MR.

PP Response No. 2 (21/07/2015):

6.1) Values for $fv_{CH_4,h}$ for the period 01/03 – 13/06 should be referred back to the MAIN-ER file, under tab 'FV_{digester}- fv_{CH_4} .' June 2014 row under this tab has been split into 2 periods; 01/06 – 13/06 and 13/06 – 30/06. The lowest value for the period with data is 54.64%. If this value is applied with the confidence interval of 1.45, the lowest value of 53.19 has been applied to the monthly 'Raw data and adjusted' files for the period 01/03/2014 to 13/06/2014.

i) Value corrected. MR and Main-ER spreadsheet has been revised.

ii) Description in MR has been revised to be more precise. Options are spelled out clearly.

iii) Adjusted value of 53.19% applied to the period 01/03 to 13/06. As per the main ER file, June 2014 has been split into 2 periods; deviation request and normal mon period. Deviation request period is highlighted in red. MR has been revised.

6.2) Value of fv_{CH_4} has been revised to 0.574 in the MR.

6.3) Value revised.

6.4) Value revised to 10,937 tCO₂e. Actual PE is at 14,282 tCO₂e.

PP Response No. 3 (08/09/2015):

6.1) Deviation period is applied for 01/03/2014 – 13/06/2014 (full day). Non-deviation period starts again from 14/06/2014 onwards. Values have been revised, as the raw data files were applied with values determined through manual estimations are applied throughout 13/06/2014.

Documentation provided by project participant

- 1) Revised Monitoring Report /2/
- 2) Revised Emission Reduction Spreadsheet /5/

DOE assessment

Date: 10/07/2015

DOE Response No. 1 (10/07/2015):

Ok, the value of COD_{removed,y} has been corrected.

However, there are some errors in the revised MR:

6.1) Section B.2.1 (b) $fv_{CH_4,h}$: Representation values for months of data logger malfunction were calculated using Confidence Interval test. Stated that **"The lowest value from these months is 54.64%"** and "In order to generate the most conservative value among the data lot, the lowest value is then subtracted with the Confidence Interval, resulting in a value of **53.14% - applied for the period 01/03/2014 – 13/06/2014**".

Both statements are not consistent with the data in 'FV_{digester} - fv_{CH_4} ' tab of the ER sheet, i.e.:

i) Lowest value during this monitoring period was 54.24%, not 54.64%

ii) Value applied for 01/03/2014 – 13/06/2014 as seen in the formulas in cells D11-D14 was the **minimum** of 3 values (\$G\$6-\$G\$5, \$G\$10, \$G\$10-\$G\$11). Description above in the MR does not correctly describe how this value was derived.

iii) Adjusted value of 52.71% applied for entire month of June 2014, not only up to 13/06/2014 as stated in the PDD.

6.2) Section D.2: Found that value of $fv_{CH_4,h}$ which is stated as 0.573 on the MR Section D.2 page 20 is not consistent with cell D21 of 'FV_{digester} - fv_{CH_4} ' of ER sheet.

6.3) Section E.4: The value of GHG emissions reductions or net GHG removals by sinks (tCO₂e) achieved in the monitoring period from 01/01/2013 is stated as 19,775. This value should be the same as the total amount.

6.4) Section E.6 states "If these values are pro-rated to 17 months (as per the monitoring period) the value should be 3,345 tCO₂e. Nevertheless, the actual project emission for this monitoring period is 14,283 tCO₂e; **higher by 11,922 tCO₂e**". The value of the difference between 14,283 tCO₂e and 3,345 tCO₂e is **10,938 tCO₂e**, not 11,922 tCO₂e.

DOE Response No. 2 (03/09/2015):

6.1) Explanation and revisions accepted, except for minor discrepancy where revised MR Section B.2.1 states that "Lowest value from August 2013 – February 2014, **July 2014** – December 2014....". In the FV_{digester} - fv_{CH_4} tab of the ER sheet, the period used to determine the lowest value is **13 June 2014** – December 2014, not July 2014 to December 2014. Also, kindly reconfirm if this date should be 14 June 2014 instead since the deviation period was until 13 June 2014, therefore the same date should not be used for non-deviation period.

6.2) MR and ER sheet have been revised to be consistent (Closed)

6.3) MR has been corrected accordingly (Closed)

6.4) MR has been corrected accordingly (Closed)

DOE Response No. 3 (30/10/2015):

Ok, Section B.2.1 of the MR has been revised to state the 2nd conservative option to be the "Lowest value from August 2013 – February 2014, **14 June 2014** – December 2014...". The FV_{digester} - fv_{CH_4} tab of the ER sheet has also been corrected to state the corrected non-deviation period for June 2014 and figures have been updated accordingly due to the minor change in date.

CAR 6 is resolved and closed.

Table 4. FAR from this verification

No FARs issued during this verification

Attachment: Instructions for filling out the verification and certification report form for CDM project activities

1. General instructions

1. When completing the CDM-VCR-FORM that applies to the verification of any type of registered CDM project activity except registered carbon dioxide capture and storage (CCS) CDM project activities, in addition to applying the relevant requirements in the valid version of the "[CDM validation and verification standard \(VVS\)](#)", consult the "[Rules and Reference](#)" section of the UNFCCC CDM website. This section contains all regulatory documents for the CDM, such as [standards](#) (including [methodologies](#), [tools](#) and [standardized baselines](#)), [procedures](#), [guidelines](#), [clarifications](#), [forms](#) and the "[Glossary: CDM terms](#)".
2. Include, if necessarily, additional information other than that indicated in this verification and certification report in order to support how the designated operational entity (DOE) has arrived at its verification conclusions. This information may include, but need not be limited to tables, graphs and annexes such as a verification protocol.
3. List all the abbreviations used in this verification and certification report in Appendix 1 below.
4. Complete the CDM-VCR-FORM and all attached documents in English, or attach a full translation of relevant sections in English.
5. Complete the CDM-VCR-FORM using the same format without modifying its font, headings or logo, and without any other alteration to the form.
6. Do not modify or delete the tables and their columns in the CDM-VCR-FORM. Add rows to the tables and appendices as needed.
7. If a section of the CDM-VCR-FORM is not applicable, explicitly state "N/A" to indicate that the section is left blank intentionally.
8. Use an internationally recognized format for the presentation of values in the CDM-VCR-FORM, for example use digits grouping in thousands and mark a decimal point with a dot (.), not with a comma (,).
9. Complete the CDM-VCR-FORM deleting this attachment "Instructions for filling out the verification and certification report form for CDM project activities".

2. Specific instructions

1. Indicate the following information on the cover page:
 - (a) Title of the project activity;
 - (b) Reference number of the project activity (UNFCCC reference number);
 - (c) Version number of the verification and certification report (version XX.X);
 - (d) Completion date of the verification and certification report (DD/MM/YYYY);
 - (e) Monitoring period number and duration of this monitoring period (for monitoring period number, the number given to the monitoring period indicates a chronological order (e.g. "first monitoring period"). For monitoring period dates, indicate first and last days (DD/MM/YYYY–DD/MM/YYYY));
 - (f) Version number of monitoring report to which this report applies (version XX.X);
 - (g) Crediting period of the project activity corresponding to this monitoring period (type, start date (DD/MM/YYYY), length);

- (h) Project participant(s);
- (i) Host Party;
- (j) Sectoral scope(s), selected methodology(ies) and, where applicable, selected standardized baseline(s);
- (k) Estimated GHG emission reductions or net anthropogenic GHG removals for this monitoring period in the registered PDD (tCO₂e);
- (l) Certified GHG emission reductions or net anthropogenic GHG removals for this monitoring period (tCO₂e);
- (m) Name of DOE;
- (n) Name, position and signature of the approver of the verification and certification report.

SECTION A. Executive summary

1. Provide a brief summary of the project activity (including the purpose and general description and location), scope of the verification, verification process and conclusion.
2. For a registered afforestation and reforestation (A/R) CDM project activity or a registered small-scale A/R CDM project activity, state whether the timing of the current verification and certification complies with applicable specific verification requirements for afforestation and reforestation project activities in the VVS.

SECTION B. Verification team, technical reviewer and approver

1. Provide details of the verification team, technical reviewer and approver in sections B.1 and B.2. If applicable, also identify any trainees.
2. For "Type of resource" in sections B.1 and B.2, indicate the type of resource of the personnel with the use of one of the following abbreviations referring to the "[CDM accreditation standard](#)":
 - (a) IR (Internal Resource);
 - (b) EI (External Individuals);
 - (c) OR (Outsourced Resource).
3. Demonstrate how the team meets the competence required for the verification in Appendix 2 below.

SECTION C. Application of materiality

1. If the concept of materiality has been applied in planning and conducting this verification, describe in section C.1 and C.2 how it has been applied in accordance with applicable verification requirements in the VVS. In doing so, refer to the "[Guideline: Application of materiality in verifications](#)" on the examples and flowchart related to planning and conducting verifications.

C.1. Consideration of materiality in planning the verification

1. Describe in the table risks that could lead to material errors, omissions or misstatements, assessment of the risk and response to the risk in the verification plan and/or sampling plan.
2. For "Assessment of the risk", rank the level of each risk with one of the following options and present the justification on the judgement of the risk level considering the elements of the risk such as its likelihood and impacts:
 - (a) High;
 - (b) Medium; or
 - (c) Low.

C.2. Consideration of materiality in conducting the verification

1. Describe how materiality was applied in determining whether detected errors, omissions or misstatements were material or immaterial either individually or in aggregate.
2. Describe whether and how the verification plan and/or sampling plan were revised to take into account the need for further audit procedures due to the nature/type of the errors, omissions or misstatements detected.

SECTION D. Means of verification

D.1. Desk review

1. List all documents reviewed or referenced during the verification in Appendix 3 below.

D.2. On-site inspection

1. Summarize any on-site inspection performed during the verification in the table.

D.3. Interviews

1. Summarize all the interviews (i.e. in-person interviews, web/teleconferences, etc.) conducted during the verification in the table.

D.4. Sampling approach

1. Where a sampling approach is used for the verification, summarize the sampling approach used during the verification (e.g. random sampling).
2. Where a sampling approach is used for the on-site inspection, include a description of how the sample size was determined and field check was carried out.

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

1. Indicate in the table the number of the clarification requests (CLs), corrective action requests (CARs), and forward action requests (FARs) raised in each area of verification findings in SECTION E below.

SECTION E. Verification findings

1. In sections E.1, E.3 and E.5 to 0, complete tables to verify the compliance in accordance with applicable verification requirements in the VVS by describing:
 - (a) Means of verification: describe how the compliance was verified;
 - (b) Findings: provide a brief description of the findings. Include in Appendix 4 below details of any CLs, CARs and FARs, if raised;
 - (c) Conclusion: provide a conclusion on the compliance based on the findings.

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

1. Confirm the compliance of the monitoring report with the valid version of the CDM-MR-FORM and the instructions therein for filling out the CDM-MR-FORM.

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

1. Indicate whether any remaining FARs from validation and/or previous verification(s) have been applied during this monitoring period.
2. If applicable, list the remaining FARs and explain how they have been addressed in Appendix 4 below.

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

1. Explain how the project implementation and operation complies with the registered project design document (PDD) in accordance with applicable verification requirements related to the compliance of the project implementation with the registered PDD in the VVS.
2. For a registered small-scale CDM project activity or a bundle of registered small-scale CDM project activities, confirm whether the project activity or each sub-bundle in the bundle remains within the limit of its type in accordance with applicable specific verification requirements for small-scale project activities in the VVS.
3. For the first verification of a registered A/R CDM project activity or a registered small-scale A/R CDM project activity, explain how the following were assessed in accordance with applicable specific verification requirements for afforestation and reforestation project activities in the VVS:
 - (a) Areas of land for which the control has been established;
 - (b) Geographical delineation of the project boundary.

E.4. Post-registration changes**E.4.1. Temporary deviations from the registered monitoring plan, monitoring methodology or standardized baseline**

1. Confirm whether any temporary deviations have been approved by the Board for this monitoring period or to be submitted with the request for issuance.
2. In cases where the deviations have been approved by the Board prior to the submission of the request for issuance, confirm the date of approval and reference number.
3. Otherwise, confirm the version number and completion date of the validation report for post-registration changes.

E.4.2. Corrections

1. Confirm whether any corrections have been approved by the Board during this monitoring period or to be submitted with the request for issuance.
2. In cases where the corrections have been approved by the Board prior to the submission of the request for issuance, confirm the date of approval and reference number.
3. Otherwise, confirm the version number and completion date of the validation report for post-registration changes.

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

1. Confirm whether any changes to the start date of the crediting period have been notified to the secretariat or approved by the Board during this monitoring period.
2. In cases where the Board approved the change prior to the submission of the request for issuance, confirm the date of approval and reference number.

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

1. Confirm whether the inclusion of a monitoring plan to the registered project activity has been approved by the Board during this monitoring period.
2. In cases where the inclusion has been approved by the Board prior to the submission of the request for issuance, confirm the date of approval and reference number.

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

1. Confirm whether any permanent changes from the registered monitoring plan, applied monitoring methodology and/or applied standardized baseline have been approved by the Board during this monitoring period or to be submitted with the request for issuance.
2. In cases where the changes have been approved by the Board prior to the submission of the request for issuance, confirm the date of approval and reference number.
3. Otherwise, confirm the version number and completion date of the validation report for post-registration changes.

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

1. Confirm whether any changes to the project design of a registered project activity have been approved by the Board during this monitoring period or to be submitted with the request for issuance.
2. In cases where the changes have been approved by the Board prior to the submission of the request for issuance, confirm the date of approval and reference number.
3. Otherwise, confirm the version number and completion date of the validation report for post-registration changes.

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

1. Confirm whether any changes specific to afforestation and reforestation project activities are to be submitted with the request for issuance.
2. In cases where the changes are to be submitted with the request for issuance, confirm the version number and completion date of the validation report for post-registration changes.

E.5. Compliance of monitoring plan with the monitoring methodology including applicable tool and standardized baseline

1. Explain how the monitoring plan complies with the applied methodology including the applicable tool(s) and, where applicable, the applied standardized baseline in accordance with applicable verification requirements related to the compliance of the monitoring plan with the monitoring methodology including the applicable tool and standardized baseline in the VVS.

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

1. In sections E.6.1 and 0, explain how the monitoring activities comply with the registered monitoring plan in accordance with applicable verification requirements related to the compliance of monitoring activities with the registered monitoring plan in the VVS.
2. Where the project participants applied a sampling approach for the determination of data and parameters monitored, explain in section 0 how the sampling efforts and surveys comply with the validated sampling plan in accordance with applicable verification requirements related to the compliance of monitoring activities with the registered monitoring plan in the VVS.

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

1. For each item of data and parameter monitored in section 0, explain how the calibration was conducted at the frequency as specified by the applied methodology, monitoring plan of the registered PDD, approved revised monitoring plan and/or applied standardized baseline in accordance with applicable verification requirements related to the compliance with the calibration frequency requirements for measuring instruments in the VVS.

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

1. In sections E.8.1 to E.8.5 and E.8.7, explain how the data and calculation of emission reductions or net removals were assessed in accordance with applicable verification requirements related to the assessment of data and calculation of emission reductions or net removals in the VVS.
2. In section E.8.6, if applicable, explain how the cause of any increase in the actual GHG emission reductions in this monitoring period was assessed in accordance with applicable verification requirements in the VVS.

SECTION F. Internal quality control

1. Describe the measures taken to ensure the quality of the verification activities.

SECTION G. Verification opinion

1. Provide an opinion on the amount of GHG emission reductions or net anthropogenic GHG removals achieved by the project activity during this monitoring period and whether it complies with all applicable CDM requirements.

SECTION H. Certification statement

1. Provide a certification statement in accordance with applicable requirements related to the verification and certification report in the VVS.

Appendix 1. Abbreviations

1. List all the abbreviations used in this report in the table.

Appendix 2. Competence of team members and technical reviewers

1. Provide documentation to substantiate the required competence of verification team members and technical reviewer(s).

Appendix 3. Documents reviewed or referenced

1. List all documents reviewed or referenced during the verification including CDM regulatory documents in the table.
2. For each document indicate the following:
 - (a) Title: provide the title of the document. Include the version number, if applicable;
 - (b) Author: provide the name(s) of the author(s). Where the author(s) belong(s) to the organization(s) that issue the document, provide only the name(s) of the organization(s);
 - (c) References to the document: where applicable, provide the relevant reference to the document such as the dates of completion/publication and URL;
 - (d) Provider: choose one of the following options to indicate who provided the document to the DOE for its desk review. Select 'Others' for documents that were provided by those other than the project participants:
 - (i) Project participants;
 - (ii) Others.

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

1. If needed, copy tables 1, 2, 3 and/or 4 for each CL, CAR, and/or FAR and copy the following rows until the finding is closed unless a FAR for future verifications is issued:
 - (a) Project participant response;
 - (b) Documentation provided by project participant;
 - (c) DOE assessment.
2. For tables 2, 3 and/or 4, indicate the section number of the verification and certification report to which each CL, CAR, and/or FAR corresponds.

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Document information

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