CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-SSC-PDD)
Version 03 - in effect as of: 22 December 2006

CONTENTS

Annexes

Revision history of this document

Version Number	Date	Description and reason of revision
01	21 January 2003	Initial adoption
02	8 July 2005	• The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document. • As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at <http://cdm.unfccc.int/Reference/Documents>.
03	22 December 2006	• The Board agreed to revise the CDM project design document for small-scale activities (CDM-SSC-PDD), taking into account CDM-PDD and CDM-NM.

SECTION A. General description of small-scale project activity

A.1 Title of the small-scale project activity:

>>

Methane recovery and utilization through organic wastewater treatment in Tawau, Malaysia
Version: 01
Date: xx^th^ xx 2008

A.2. Description of the small-scale project activity:

>>

Outline and purpose of the project activity

Dumpas Palm Oil Mill located in Tawau, in the State of Sabah, produces crude palm oil from Fresh Fruit Bunch (FFB) of palm oil. The installed capacity of the mill is 60 ton-FFB/hour. The process generates 240,000 m^3 of Palm Oil Mill Effluent (POME) per year on average, and POME is currently treated by conventional open-lagoon system as done at the mills generally in Malaysia. As a result, an enormous amount of methane gas is emitted from the anaerobic ponds to the atmosphere which promotes global warming.

The project activity aims to treat POME by installing an anaerobic bioreactor developed by Konzen Environment Sdn Bhd, which is used for high strength organic wastewaters. The biogas generated will be captured and used for internal heat use. Excess biogas will be flared.

The project will reduce methane emissions that would have otherwise emitted from the existing open lagoon system in the absence of the project activity, since there is no legislation/rule enacted in Malaysia which obligates the capture of methane recovered from POME.

Contribution to sustainable development

The project activity brings the following benefits:

Social benefit:
Since the project activity treats POME efficiently due to its high removal rate of pollutants, the project activity would develop an environmental consciousness of POME treatment. Thus, this type of POME treatment project will be promoted.

Economic benefit:
The carbon credit expected from the project activity encourages the similar projects to install closed POME treatment facility in other palm oil mills, which amounts 300 in Malaysia. Thus it would lead to the development of the regional economies and improve their socio-economic conditions.

Environmental benefit:
The project activity removes organic carbon contents from POME efficiently by collecting and combusting methane enriched biogas. The wastewater to be discharged by the project activity is far below the environmental standard.

A.3. Project participants:

>>

Name of Party involved ((host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participants (Yes/No)
Malaysia (host)	Regional Harvest Sdn Bhd (hereinafter referred to as "Regional Harvest") Konzen Environment Sdn Bhd (hereinafter referred to as "Konzen")	No
Japan	Japanese private company	No

A.4. Technical description of the small-scale project activity:

The project activity employs a closed anaerobic bioreactor, which is an advance technology for treatment of organic or biological wastewater. It has the capability to treat wastewater with very high organic content such as wastewater with high COD level.

The closed anaerobic bioreactor system developed by Konzen and its Technology Partner adopts a series of treatment processes consisting mainly of pretreatment, anaerobic degradation and aerobic polishing. The robust and versatile system can be incorporated into the existing pond treatment for system improvement/upgrading.

Salient features of the bioreactor include high loading capacity, high strength wastewater, short hydraulic retention time, high organics removal with a remarkably low sludge production, low energy requirement, and energy production in the form of biogas yield. The robust system can offer an efficient treatment for a wide range of industrial effluents including wastewater from chemical plants, food processing, pharmaceutical, pulp and paper industry, brewery, landfill leachate, POME and a number of high strength organic wastewaters.

Compact and completely enclosed designs are typical features of the tank resulting in a tall, slender reactor design with a very small footprint and acceptable odour emission control. The bioreactor is able to withstand corrosion as it is enclosed and operates internally in an oxygen free environment. The bioreactor does not contain any media or support matrix. The wastewater flows upward through a blanket of bioagents at the upper portions of the reactor where a unique 3-phase separator device is installed for excellent separation of biogas from sludge granules and treated effluent. A special feature of the bioreactor is the development of specially engineered granular bioagents. The granulation is capable of enhancing settleability of biological solids leading to effective bacterial retention in the bioreactor. It would also improve physiological conditions making them favourable for microbes and their associated interactions in the anaerobic environment.

A.4.1. Location of the small-scale project activity:

A.4.1.1. Host Party(ies):

Malaysia

A.4.1.2. Region/State/Province etc.:

Sabah

A.4.1.3. City/Town/Community etc:

Tawau

A.4.1.4. Details of physical location, including information allowing the unique identification of this small-scale project activity :

>>
Dumpas Palm Oil Mill
KM44, Jalan Umas Umas,
Kalabakan, W D T No. 82
91000 Tawau

http://www.lib.utexas.edu/maps/cia06/malaysia_sm_2006.gif

A.4.2. Type and category(ies) and technology/measure of the small-scale project activity:

>>

The project activity is categorized in Type III.H. “Methane Recovery in Wastewater Treatment”, since and total annual emission reductions is lower than 60,000 ton CO_2e.

The project activity employs environmentally safe technology, Konzen’s anaerobic bioreactor, which is a state-of-the–art technology for treatment of high organic or biological wastewater and will be transferred and applied to palm oil mill in Malaysia for the first time through this project activity.

A.4.3 Estimated amount of emission reductions over the chosen crediting period:

>>

Years	Annual estimation of emission reductions in tonnes of CO2e
2008	7,237
2009	43,420
2010	43,420
2011	43,420
2012	43,420
2013	43,420
2014	43,420
Total estimated reductions (tonnes of CO_2e)	267,757
Total number of crediting years	7
Annual average over the crediting period of estimated reductions (tonnes of CO_2e)	38,251

A.4.4. Public funding of the small-scale project activity:

>>

No public funding is used.

A.4.5. Confirmation that the small-scale project activity is not a debundled component of a large scale project activity:

There is no registered small-scale CDM project activity or a request for registration by another small-scale project activity by the same project participants. Therefore, the project activity is not a debundled component of a larger project activity.

SECTION B. Application of a baseline and monitoring methodology

B.1. Title and reference of the approved baseline and monitoring methodology applied to the small-scale project activity:

>>

Type III.H. Version 08 "Methane Recovery in Wastewater Treatment" (hereinafter "the methodology") (Appendix B of the simplified modality and procedure for small scale CDM project activities)

B.2 Justification of the choice of the project category:

>>

The project activity is categorized in Type III.H. "Methane Recovery in Wastewater Treatment", since and total annual emission reductions is lower than 60,000 ton CO_2e, and the Project will introduce "a sequential stage of wastewater treatment with methane recovery and combustion, with or without sludge treatment, to an existing wastewater treatment system without methane recovery (e.g. introduction of treatment in an anaerobic reactor with methane recovery as a sequential treatment step for the wastewater that is presently being treated in an anaerobic lagoon without methane recovery)", which is listed as an option to recover methane from biogenic organic matter in wastewaters in the methodology.

B.3. Description of the project boundary:

>>

According to the methodology, the project boundary is the physical, geographical site where the wastewater and sludge treatment takes place. Therefore, the project boundary includes POME treatment plant equipped with methane recovery and utilizing system, which is installed by the project activity.

B.4. Description of baseline and its development:

>>

Methane is currently released and is supposed to be released in baseline scenario, without this project activity, directly from the conventional anaerobic lagoon system in the mill, since there is no incentive to change the current practice of treating POME in an open anaerobic lagoon system. The existing anaerobic lagoon system meets current environmental standards and there is no regulation/rule on the methane emission to the atmosphere.

B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered small-scale CDM project activity:

The project activity captures methane from the POME generated by the onsite palm oil mill, and utilizes the biogas for internal heat use. Currently no legislation/rule is enacted in Malaysia, which obligates the capture of methane recovered from POME. As a result, the open lagoons for POME treatment emit methane into the atmosphere without any control.

The following barriers impede the project activity:

Financial barrier
Since the project activity requires over 3- 4 million RM for initial cost though the project activity generates no financial or economic benefits other than CDM related income. Therefore, the project activity is not financially feasible and would thus not occur without CDM.

Technological Barriers
The project activity employs Konzen's anaerobic bioreactor that is a state-of-the–art technology for treatment of organic or biological wastewater to treat wastewater with high COD level, which the commonly used conventional aerobic process normally has great difficulties to treat. In addition, the project activity would be actually one of the "first of its kind" in the palm oil industries in Malaysia.

Barriers due to prevailing practice
In palm oil mills of Malaysia, open digester tanks and/or lagoons are generally used for POME treatment. Their current systems are the most viable to meet the treatment requirement by the environmental authority in Malaysia. In addition, the project activity would be actually one of the "first of its kind" in the palm oil industries in Malaysia.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

>>
For the project activity emissions, the following formulae are applied:

$$\mathbf{PE_y = PE_{y,power} + PE_{y,ww,treated} + PE_{y,s,final} + PE_{y,fugitive} + PE_{y,dissolved}}$$

where:

PE_y	Project activity emissions in the year "y" (t-CO_2 e)
$PE_{y,power}$	Emissions through electricity or diesel consumption in the year "y"
$PE_{y,ww,treated}$	Emissions through degradable organic carbon in treated wastewater in year "y"
$PE_{y,s,final}$	Emissions through anaerobic decay of the final sludge produced in the year "y".
$PE_{y,fugitive}$	Emissions through methane release in capture and flare systems in year "y".
$PE_{y,dissolved}$	Emissions through dissolved methane in treated wastewater in year "y"

$$\mathbf{PE_{y,ww,treated} = Q_{y,ww} * COD_{y,ww,treated} * B_{o,ww} * MCF_{ww,final} * GWP\_CH_4}$$

where:

$Q_{y,ww}$	Volume of wastewater treated in the year "y" (m^3)
$COD_{y,ww,treated}$	Chemical oxygen demand of the treated wastewater in the year "y" (t/m^3)
$B_{o,ww}$	Methane generation capacity of the treated wastewater (kg CH_4/kg.COD)
$MCF_{ww,final}$	Methane correction factor based on type of treatment and discharge pathway of the wastewater (fraction)(MCF higher value in table III.H.1).
GWP_CH_4	Global Warming Potential for CH_4

$$\mathbf{PE_{y,fugitive} = PE_{y,fugitive,ww} + PE_{y,fugitive,s}}$$

where:

$PE_{y,fugitive,ww}$	Fugitive emissions through capture and flare inefficiencies in the anaerobic wastewater treatment in the year "y" (t-CO_2 e)
$PE_{y,fugitive,s}$	Fugitive emissions through capture and flare inefficiencies in the anaerobic sludge treatment in the year "y" (t-CO_2 e)

$$\mathbf{PE_{y,fugitive,ww} = (1 - CFE_{ww}) * MEP_{y,ww,treatment} * GWP\_CH_4}$$

where:

CFE_{ww} Capture and flare efficiency of the methane recovery and combustion equipment in the wastewater treatment

$MEP_{y,ww,treatment}$ Methane emission potential of wastewater treatment plant in the year “y” (t)

$$\mathbf{MEP_{y,ww,treatment} = Q_{y,ww} * COD_{y,ww,untreated} * B_{o,ww} * MCF_{ww,treatment\_PJ}}$$

where:

$COD_{y,ww,untreated}$ Chemical oxygen demand of the wastewater entering the anaerobic treatment reactor/system with methane capture in the year “y” (tonnes/m^3)

$MCF_{ww,treatment\_PJ}$ Methane correction factor for the wastewater treatment system that will be equipped with methane recovery and combustion (MCF higher value in table III.H.1)

$$\mathbf{PE_{y,dissolved} = Q_{y,ww} * [CH4]_{y,ww,treated} * GWP\_CH4}$$

where:

$[CH4]_{y,ww,treated}$ Dissolved methane content in the treated wastewater (t/m3)

For the baseline emissions, the following formulae are applied:

$$\mathbf{BE_{y} = Q_{y,ww} * COD_{y,ww,untreated} * B_{o,ww} * MCF_{ww,\ treatment\_BL} * GWP\_CH4}$$

where:

$Q_{y,ww}$ Volume of wastewater treated in the year “y” (m^3)

$COD_{y,ww,treated}$ Chemical oxygen demand of the treated wastewater in the year “y” (t/m^3)

$B_{o,ww}$ Methane generation capacity of the treated wastewater (kg CH_4/kg.COD)

$MCF_{ww,treatment\_BL}$ Methane correction factor for the existing wastewater treatment system to which the sequential anaerobic treatment step is being introduced (MCF lower value in table III.H.1)

GWP_CH_4 Global Warming Potential for CH_4

B.6.2. Data and parameters that are available at validation:

(Copy this table for each data and parameter)

Project/Baseline emissions parameters

Data / Parameter:	$B_{o,ww}$
Data unit:	kg CH_4/kg.COD
Description:	Methane generation capacity of the treated wastewater
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories
Value applied:	0.21
Justification of the choice of data or description of measurement methods and procedures actually applied :	0.21 is proposed as a default value
Any comment:	-

Data / Parameter:	GWP_CH_4
Data unit:	t CO_2e / t CH_4

Description:	Global Warming Potential for CH_4
Source of data used:	IPCC
Value applied:	21
Justification of the choice of data or description of measurement methods and procedures actually applied :	-
Any comment:	-

Project emissions parameters

Data / Parameter:	$MCF_{ww,final}$
Data unit:	-
Description:	Methane correction factor based on type of treatment and discharge pathway of the wastewater
Source of data used:	AMS III.H.
Value applied:	0.1
Justification of the choice of data or description of measurement methods and procedures actually applied :	The Project will use existing well-managed aerobic treatment system to treat the effluent of the Konzen's bioreactor.
Any comment:	-

Data / Parameter:	CFE_{ww}
Data unit:	-
Description:	Capture and flare efficiency of the methane recovery and combustion equipment in the wastewater treatment
Source of data used:	AMS III.H.
Value applied:	0.90
Justification of the choice of data or description of measurement methods and procedures actually applied :	According to the methodology, 0.9 is proposed as a default value.
Any comment:	-

Data / Parameter:	$MCF_{ww,treatment\_PJ}$
Data unit:	-
Description:	Methane correction factor for the wastewater treatment system that will be equipped with methane recovery and combustion
Source of data used:	AMS III.H.
Value applied:	1.0
Justification of the choice of data or	The methodology recommends higher value for the calculation of PE.

description of measurement methods and procedures actually applied :	
Any comment:	-

Data / Parameter:	$[CH_4]_{y,ww,treated}$
Data unit:	t/m^3
Description:	Dissolved methane content in the treated wastewater
Source of data used:	AMS III.H.
Value applied:	0.0001
Justification of the choice of data or description of measurement methods and procedures actually applied :	According to the methodology, 0.0001 is proposed as a default value.
Any comment:	-

Baseline emissions parameters

Data / Parameter:	$MCF_{ww,treatment\_BL}$
Data unit:	-
Description:	Methane correction factor for the existing wastewater treatment system to which the sequential anaerobic treatment step is being introduced
Source of data used:	AMS III.H.
Value applied:	0.8
Justification of the choice of data or description of measurement methods and procedures actually applied :	The existing wastewater treatment system is anaerobic deep lagoon (depth more than 2 meters) and the methodology recommends lower value for the calculation of BE.
Any comment:	-

B.6.3 Ex-ante calculation of emission reductions:

>>

Project emissions

According to the methodology, the project activity direct emission (hereinafter the project emission) is calculated as follows:

$$PE_y = PE_{y,power} + PE_{y,ww,treated} + PE_{y,s,final} + PE_{y,fugitive} + PE_{y,dissolved}$$

According to the methodology, $PE_{y,s,final}$ is neglected for calculation of the project emission and the destiny of the sludge would be monitored since the sludge to be generated by the project would be used for soil application. In addition, $PE_{y,power}$ is also neglected since the onsite palm oil mill generates electricity by utilizing organic solid wastes generated from palm oil production, and supply surplus renewable electricity to the bioreactor. Thus PE_y is calculated as follows:

$$PE_y = PE_{y,ww,treated} + PE_{y,fugitive} + PE_{y,dissolved}$$

$PE_{y,ww,treated}$

$$PE_{y,ww,treated} = Q_{y,ww} * COD_{y,ww,treated} * B_{o,ww} * MCF_{ww,final} * GWP\_CH_4$$

where:

$$PE_{y,ww,treated} = 240{,}000\ (m^3) * 0.005\ (t\text{-}COD/m^3) * 0.21\ (kg\ CH_4/kg\text{-}COD) * 0.1 * 21$$
$$= 529\ (t\text{-}CO_2e)$$

$PE_{y,s,fugitive}$

$$PE_{y,fugitive} = PE_{y,fugitive,ww} + PE_{y,fugitive,s}$$

This project would not capture and flare methane generated from the anaerobic treatment of the sludge, which would be used for land application. Thus, $PE_{y,fugitive}$ is calculated as follows:

$$PE_{y,fugitive} = PE_{y,fugitive,ww}$$

$$PE_{y,fugitive,ww} = (1 - CFE_{ww}) * MEP_{y,ww,treatment} * GWP\_CH_4$$
$$= (1 - CFE_{ww}) * Q_{y,ww} * COD_{y,ww,untreated} * B_{o,ww} * MCF_{ww,treatment\_PJ} * GWP\_CH_4$$

where:

$$PE_{y,fugitive} = (1 - 0.90) * 240{,}000\ (m^3) * 0.0600\ (t\text{-}COD/m^3) * 0.21\ (kg\ CH_4/kg\text{-}COD) * 1.0 * 21$$
$$= 6{,}350\ (t\text{-}CO2\ e)$$

$PE_{y,dissolved}$

$$PE_{y,dissolved} = Q_{y,ww} * [CH4]_{y,ww,treated} * GWP\_CH_4$$

where:

$$PE_{y,dissolved} = 240{,}000\ (m^3) * 0.0001\ (tonnes/m^3) * 21$$
$$= 504\ (t\text{-}CO_2e)$$

Therefore,

$$PE_y = PE_{y,ww,treated} + PE_{y,fugitive} + PE_{y,dissolved}$$
$$= 529\ (t\text{-}CO_2e) + 6{,}350\ (t\text{-}CO_2e) + 504\ (t\text{-}CO_2e)$$
$$= 7{,}383\ (t\text{-}CO_2e)$$

Baseline emissions

According to the methodology for the case of introduction of methane recovery and combustion unit to an existing anaerobic wastewater system, the baseline emission is calculated as follows:

$$BE_y = Q_{y,ww} * COD_{y,ww,untreated} * B_{o,ww} * MCF_{ww,\ treatment\_BL} * GWP\_CH_4$$

where:

$$BE_y = 240{,}000\ (m^3) * 0.0600\ (t\text{-}COD/m^3) * 0.21\ (kg\ CH_4/kg\text{-}COD) * 0.8 * 21$$

$$= 50{,}803\ (t\text{-}CO_2e)$$

Leakage

No leakage is considered since the used technology will not be the equipment transferred from another activity and the existing equipment, open-lagoon, cannot be transferred to another activity.

B.6.4 Summary of the ex-ante estimation of emission reductions:

>>

Year	Estimation of project activity emissions (tCO2 e)	Estimation of baseline emissions (tCO2 e)	Estimation of leakage (tCO2 e)	Estimation of overall emission reductions
2008	1,231	8,467	0	7,237
2009	7,383	50,803	0	43,420
2010	7,383	50,803	0	43,420
2011	7,383	50,803	0	43,420
2012	7,383	50,803	0	43,420
2013	7,383	50,803	0	43,420
2014	7,383	50,803	0	43,420
Total (tonnes of CO2 e)	45,529	313,285	0	267,757

B.7 Application of a monitoring methodology and description of the monitoring plan:

B.7.1 Data and parameters monitored:

(Copy this table for each data and parameter)	
Data / Parameter:	$Q_{y,ww}$
Data unit:	m^3
Description:	Volume of wastewater treated in the year “y”
Source of data to be used:	Project participant
Value of data	240,000
Description of measurement methods and procedures to be applied:	Continuously, aggregated annually Measurement will be done via a flow sensor and meter.

QA/QC procedures to be applied:	Flow meters / sensors will be subjected to a regular maintenance and testing regime to ensure accuracy.
Any comment:	Data will be archived on both hard copy (paper) and soft copy (electronic)

Data / Parameter:	$COD_{y,ww,treated}$
Data unit:	t/m^3
Description:	Chemical oxygen demand of the treated wastewater in the year "y"
Source of data to be used:	Project participant
Value of data	0.005
Description of measurement methods and procedures to be applied:	Measured monthly by manual on-site sampling and analyzing "the treated wastewater" off-site.
QA/QC procedures to be applied:	Off-site analytical tests to be carried out by accredited laboratory.
Any comment:	Data will be archived on both hard copy (paper) and soft copy (electronic).

Data / Parameter:	$COD_{y,ww,untreated}$
Data unit:	tonnes/m3
Description:	Chemical oxygen demand of the wastewater entering the anaerobic treatment reactor/system with methane capture in the year "y"
Source of data to be used:	Project participant
Value of data	0.0600
Description of measurement methods and procedures to be applied:	Measured monthly by manual on-site sampling and analyzing "the wastewater entering the anaerobic treatment reactor/system with methane capture" off-site.
QA/QC procedures to be applied:	Off-site analytical tests to be carried out by accredited laboratory.
Any comment:	Data will be archived on both hard copy (paper) and soft copy (electronic).

Data / Parameter:	$fv_{i,h}$
Data unit:	-
Description:	Volumetric fraction of component *i* in the residual gas in the hour *h* where *i* = CH_4, N_2
Source of data to be used:	Measurements by project participants using a continuous gas analyzer
Value of data	-
Description of measurement methods and procedures to be applied:	Ensure that the same basis (dry or wet) is considered for this measurement and the measurement of the volumetric flow rate of the residual gas ($FV_{RG,h}$) when the residual gas temperature exceeds 60 ºC Monitoring frequency is continuous. Values to be averaged hourly or at a shorter time interval
QA/QC procedures to be applied:	Analyzers must be periodically calibrated according to the manufacturer's recommendation. A zero check and a typical value check should be performed by comparison with a standard certified gas.

Any comment:	As a simplified approach, project participants may only measure the methane content of the residual gas and consider the remaining part as N_2.

Data / Parameter:	$FV_{RG,h}$
Data unit:	m^3/h
Description:	Volumetric flow rate of the residual gas in dry basis at normal conditions in the hour *h*
Source of data to be used:	Measurements by project participants using a gas flow meter
Value of data	-
Description of measurement methods and procedures to be applied:	Ensure that the same basis (dry or wet) is considered for this measurement and the measurement of volumetric fraction of all components in the residual gas ($fv_{i,h}$) when the residual gas temperature exceeds 60 ºC Monitoring frequency is continuous. Values to be averaged hourly or at a shorter time interval.
QA/QC procedures to be applied:	Flow meters are to be periodically calibrated according to the manufacturer's recommendation.
Any comment:	-

Data / Parameter:	$t_{O2,h}$
Data unit:	-
Description:	Volumetric fraction of O_2 in the exhaust gas of the flare in the hour *h*
Source of data to be used:	Measurements by project participants using a continuous gas analyzer
Value of data	-
Description of measurement methods and procedures to be applied:	Extractive sampling analyzers with water and particulates removal devices or in situ analyzers for wet basis determination. The point of measurement (sampling point) shall be in the upper section of the flare (80% of total flare height). Sampling shall be conducted with appropriate sampling probes adequate to high temperatures level (e.g. inconel probes). An excessively high temperature at the sampling point (above 700 ºC) may be an indication that the flare is not being adequately operated or that its capacity is not adequate to the actual flow. Monitoring frequency is continuous. Values to be averaged hourly or at a shorter time interval
QA/QC procedures to be applied:	Analyzers must be periodically calibrated according to the manufacturer's recommendation. A zero check and a typical value check should be performed by comparison with a standard gas.
Any comment:	Monitoring of this parameter is only applicable in case of enclosed flares and continuous monitoring of the flare efficiency.

Data / Parameter:	$fv_{CH4,FG,h}$
Data unit:	mg/m^3
Description:	Concentration of methane in the exhaust gas of the flare in dry basis at normal conditions in the hour *h*
Source of data to be used:	Measurements by project participants using a continuous gas analyser
Value of data	-
Description of	Extractive sampling analysers with water and particulates removal devices or in

measurement methods and procedures to be applied:	situ analyser for wet basis determination. The point of measurement (sampling point) shall be in the upper section of the flare (80% of total flare height). Sampling shall be conducted with appropriate sampling probes adequate to high temperatures level (e.g. inconel probes). An excessively high temperature at the sampling point (above 700 ºC) may be an indication that the flare is not being adequately operated or that its capacity is not adequate to the actual flow. Monitoring frequency is continuous. Values to be averaged hourly or at a shorter time interval
QA/QC procedures to be applied:	Analyzers must be periodically calibrated according to manufacturer's recommendation. A zero check and a typical value check should be performed by comparison with a standard gas.
Any comment:	Monitoring of this parameter is only applicable in case of enclosed flares and continuous monitoring of the flare efficiency. Measurement instruments may read ppmv or % values. To convert from ppmv to mg/m3 simply multiply by 0.716. 1% equals 10 000 ppmv.

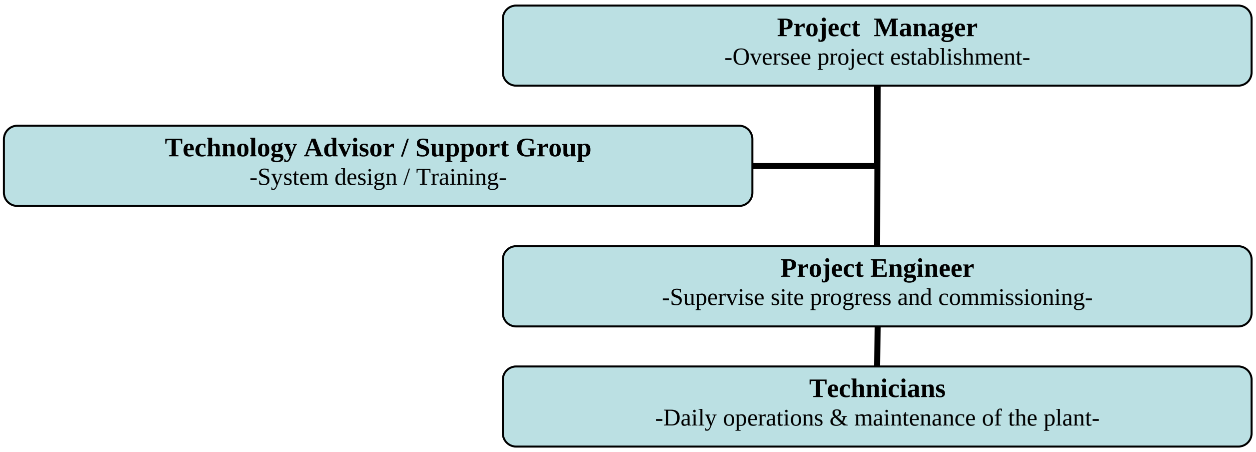
Data / Parameter:	T_{flare}
Data unit:	°C
Description:	Temperature in the exhaust gas of the flare
Source of data to be used:	Measurements by project participants
Value of data	-
Description of measurement methods and procedures to be applied:	Measure the temperature of the exhaust gas stream in the flare by a Type N thermocouple. A temperature above 500 ºC indicates that a significant amount of gases are still being burnt and that the flare is operating. Monitoring frequency is continuous.
QA/QC procedures to be applied:	Thermocouples should be replaced or calibrated every year.
Any comment:	An excessively high temperature at the sampling point (above 700 ºC) may be an indication that the flare is not being adequately operated or that its capacity is not adequate to the actual flow.

Data / Parameter:	End use of final sludge
Data unit:	Use of sludge
Description:	End use of the final sludge in year "y"
Source of data to be used:	N/A
Value of data	Form of final sludge use applied
Description of measurement methods and procedures to be applied:	Sludge removed from the system will directly be applied as fertilizer to the surrounding land. This procedure will be recorded by the responsible persons and the information will be included in the monitoring system.
QA/QC procedures to be applied:	N/A
Any comment:	N/A

B.7.2 Description of the monitoring plan:

>>

The Project will be operated and managed by Konzen. Konzen will ensure safety in operation of the plant as well as in the monitoring of emission reduction which is generated from the project activity. To ensure proper operation of the system, Konzen will assign specific personnel during project implementation and upon successful commissioning to continue with the system operation, maintenance, data collection and monitoring. The following shows the management structure for the above mentioned task.



The Project will comply with all regulatory and statutory requirements as prescribed under the state and central laws and regulations. Konzen will monitor all its activities and performance related not only to GHG emission, but also the other issues, namely environment impacts. In order to further reduce possible discrepancy and inaccuracy of data collecting in the context of proper monitoring, Konzen will ensure the following procedures are strictly adhered to:

- Technicians are to be well trained in the plant operations and the reduction emission monitoring.
- Proper and organized reporting method for both hard copy (paper) as well as soft copy (electronic) with monitoring guidelines clearly stated
- Regular assessment and checks by appointed personnel on equipment calibration, failures and potential emission leakage from the project activity as in the reactors and biogas system
- Apointment of accredited laboratory for wastewater analytical
- Ensure reliability of monitoring equipment used to accurately measure creditable emission reduction.
- To provide guidelines on preventive maintenance and corrective actions should any equipment failed

Installed meters will be calibrated according to the maintenance schedule programmed at the start of the operation and refreshed according to the plants performance requirement. All the monitoring data will be recorded and kept under safe custody of the project manager.

B.8 Date of completion of the application of the baseline and monitoring methodology and the name of the responsible person(s)/entity(ies)

>>

Date of completion of the baseline study and monitoring methodology:

xxth xx 2008

Name of the responsible person(s)/entity(ies):

Mr. Kenjiro Suzuki   Email: kenjirou.suzuki@tk.pacific.co.jp
Mr. Masaru Konishi   Email: masaru.konishi@tk.pacific.co.jp

Pacific Consultants Co., Ltd.
Global Environment Department
Pacific Consultants Co., Ltd.
2-7-1 Nishi-Shinjuku, Shinjuku-ku, Tokyo 163-0730 Japan
Tel: +81-3-3344-1652 Fax: +81-3-3344-1713

(Pacific Consultants Co., Ltd. is NOT the project participant)

SECTION C. Duration of the project activity / crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity:

>>
December, 2007
When the LOI between Konzen and Regional Harvest was concluded.

C.1.2. Expected operational lifetime of the project activity:

>>
25 years

C.2 Choice of the crediting period and related information:

Renewable crediting period

C.2.1. Renewable crediting period

C.2.1.1. Starting date of the first crediting period:

>>
1st Octorber 2008

C.2.1.2. Length of the first crediting period:

>>
7 years

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>>
(This option is not selected for the Project.)

C.2.2.2. Length:

>>
(This option is not selected for the Project.)

SECTION D. Environmental impacts

>>

D.1. If required by the host Party, documentation on the analysis of the environmental impacts of the project activity:

>>

The project activity basically involves the replacement of the existing open anaerobic lagoons for POME treatment by the installation of a closed anaerobic bioreactor. The biogas produced will be captured and combusted for the heat use. The project activity will contribute to the following positive environmental impacts:

- more efficient treatment, less land area required;
- reduced greenhouse gas emission;
- reduced odour problems to surrounding and within the mill;
- promoting the use of renewable energy. The recovered biogas will be utilized effectively.
- promoting better image on palm oil production technology

The negative environmental impact of this project is anticipated to be negligible. Potential negative impact is probably associated with the risk of explosion or leakage of methane collected. These could potentially create a safety risk and harm the surrounding environment. However, with proper design and operation, regular monitoring and maintenance of the system, this risk can be mitigated to almost none.

Under Malaysian Environmental Quality Order 1987, projects involving the upgrading of existing wastewater systems are not listed under the 19 prescribed activities and therefore it is not a formal requirement to carry out an Environmental Impact Assessment.

D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

>>

The project will not bring the environmental impacts which are considered significant.

SECTION E. Stakeholders' comments

>>

E.1. Brief description how comments by local stakeholders have been invited and compiled:

>>

To be completed.

E.2. Summary of the comments received:

>>

To be completed.

E.3. Report on how due account was taken of any comments received:

>>

To be completed.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Regional Harvest Sdn. Bhd. (Dumpas Palm Oil Mill)
Street/P.O.Box:	Lot 9 & 10, Sedco Industrial Estate, Kolombong, Off Jalan Lintas, PO Box 22477
Building:	-
City:	Luyang, Kota Kinabalu
State/Region:	Sabah
Postfix/ZIP:	88784
Country:	Malaysia
Telephone:	+6088-435661
FAX:	+6088-435660, 388766
E-Mail:	-
URL:	-
Represented by:	Mr. Ramesh M. Devaraju
Title:	Mill Manager
Salutation:	Mr.
Last Name:	Ramesh
Middle Name:	-
First Name:	Devaraju
Department:	-
Mobile:	-
Direct FAX:	-
Direct tel:	-
Personal E-Mail:	-

Organization:	Konzen Environment Sdn Bhd
Street/P.O.Box:	No. 1, 2nd Floor, Jalan Singa E 20/E, Section 20
Building:	-
City:	Shah Alam
State/Region:	Selangor Darul Ehsan
Postfix/ZIP:	40300
Country:	Malaysia
Telephone:	+603-5548-8898
FAX:	+603-5542-8898
E-Mail:	miketeo@konzen-environment.com
URL:	www.konzengroup.com
Represented by:	Mike Teo
Title:	Director
Salutation:	Mr.
Last Name:	Teo
Middle Name:	-
First Name:	Mike
Department:	-

Mobile:	+6019-886-6644
Direct FAX:	+603-5542-8898
Direct tel:	+603-5548-8898
Personal E-Mail:	miketeo@konzen-environment.com

Organization:	Japanese private company
Street/P.O.Box:	
Building:	
City:	
State/Region:	
Postfix/ZIP:	
Country:	
Telephone:	
FAX:	
E-Mail:	
URL:	
Represented by:	
Title:	
Salutation:	
Last Name:	
Middle Name:	
First Name:	
Department:	
Mobile:	
Direct FAX:	
Direct tel:	
Personal E-Mail:	

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

Public funding is not used for the Project.

Annex 3

BASELINE INFORMATION

Information on Palm Oil Mill

Capacity	60	MT-FFB/Hour
Operation Hour	20	Hour/Day
	300	Day/Year
POME Flow-rate	40	M3/h

Annex 4

MONITORING INFORMATION

The monitoring of the project activity is as per paragraphs 25-30 of the approved small scale methodology AMS III.H/ version 8.

As per the methodology, the calculation of emission reductions shall be based on the amount of methane recovered and fuelled or flared. The project emissions and leakage will be deducted from the emission reductions calculated from the methane recovered and combusted.

The amount of methane recovered, fuelled, flared or utilized shall be monitored ex-post, using continuous flow meters. The fraction of methane in the gas should be measured with a continuous analyser or, alternatively, with periodical measurements at a 95% confidence level. Temperature and pressure of the gas are required to determine the density of methane combusted.

Regular maintenance should ensure optimal operation of flares. The flare efficiency, defined as the fraction of time in which the gas is combusted in the flare, multiplied by the efficiency of the flaring process, shall be monitored. One of the two following options shall be used to determine the efficiency of the flaring process in an enclosed flare:

(a) To adopt a 90% default value, or
(b) To perform a continuous monitoring of the efficiency.

If option (a) is chosen continuous check of compliance with the manufacturers specification of the flare device (temperature, biogas flow rate) should be done. If in any specific hour any of the parameters is out of the range of specifications 50% of default value should be used for this specific hour. For open flare 50% default value should be used, as it is not possible in this case to monitor the efficiency. If at any given time the temperature of the flare is below 500ºC, 0% default value should be used for this period.

As the methane emissions from anaerobic decay of the final sludge are neglected because the sludge is used for soil application, the end-use of the final sludge will be monitored during the crediting period.