添付資料

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添付資料 1

プロジェクト設計書　概要

マレーシア・パームオイル工場排水処理施設の改善事業
プロジェクトデザインドキュメント（PDD）概要

㈱パシフィックコンサルタンツインターナショナル

A. プロジェクト活動の概要

A.1　プロジェクト活動のタイトル

マレーシアにおけるパームオイル排水処理システムの改善事業

A.2　プロジェクト活動の概要

従来、マレーシアのパーム油工場で行われていた開放型ラグーンによる嫌気性排水処理施設の代わりに高効率排水処理施設を導入し、開放型ラグーンにおけるメタン発生を回避することによって、温室効果ガス排出を抑制する。

本プロジェクトの実施によって達成される温室効果ガス削減量は年間およそ204,035 トン（二酸化炭素換算）に達すると予測される。

マレーシアおよびプロジェクト実施サイトにおいて、以下の点で持続可能な発展に寄与する。

- マレーシアのプラントサプライヤーによる高効率排水処理プラントの建設および運営によって、対象工場のある 13 地域における新規雇用が望める。プラントの建設時並びに運営・運転保守においても、最新の技術を用いたプラントに携わることで、マレーシア国内のキャパシティービルディングに貢献できる。
- KLK 社はマレーシア国内、インドネシアのスマトラ島において約 50 のパームオイル工場を有しており、本プロジェクトで導入される高効率排水処理プラントを他の工場にも導入する計画があり、本プラントの導入が国内外で促進される。
- 高効率排水処理システムはオープンラグーンを使用しない上、より高度な排水処理能力を持つため、従業員、そして周辺環境への影響が軽減されることに加え、処理水をパーム油工場に戻して再利用するため、水の使用量も削減される。

A.3　プロジェクト参加者

ホスト国側：Kuala Lumpur Kepong Bhd. (KLK)

投資国側：Japan Carbon Finance, Ltd.（JCF）

A.4　プロジェクト活動の技術的説明

A.4.1　プロジェクト活動の位置

マレーシア国内の 5 州（スランゴール州、クランタン州、ヌグリ・スンビラン州、ジョホール州、クダ州およびサバ州）にある、KLK 社が所有する 13 のパームオイル工場（図 1 を参照）

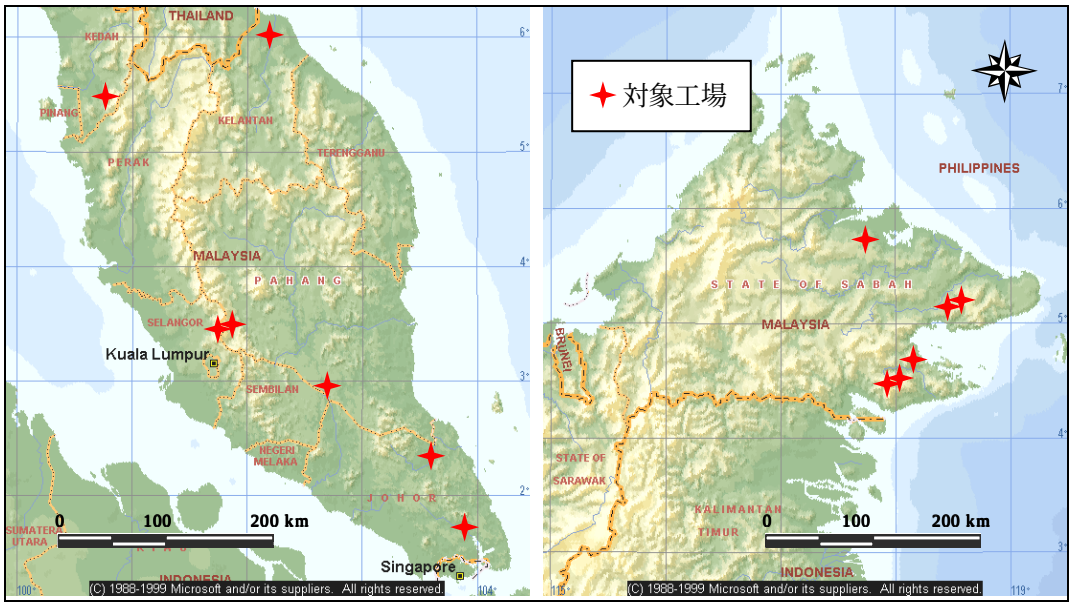

図 1　プロジェクト位置図（左：マレー半島、右：サバ州）

A.4.2　プロジェクト活動の分類

廃棄物処理・処分

A.4.3　プロジェクト活動に適用される技術

排水処理システムは以下の過程で行われる（**図 2** を参照）。

1. 大きなごみをスクリーニングによって分離する
2. 微細な気泡を排水中に吹き込み、油分や微細な固形物質を気泡に吸着させ浮上・分離させる
3. 分離された油分や微細な固形物質は遠心分離装置にかけられ、排水中に含まれる油分の 3/4 を分離・回収する
4. 固形分は脱水処理されて、パームオイル農場で肥料として利用される
5. 残った処理水は曝気槽にて浄化された後、その約 7 割はパーム油工場のプロセスに戻され再利用され、残りの 3 割は農場に肥料として撒かれる。

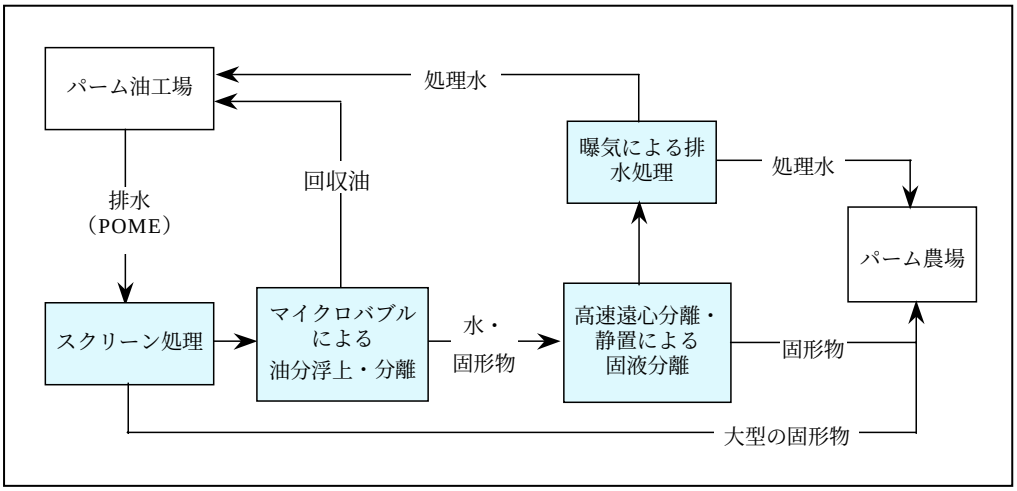

図 2　プロジェクト活動に適用される技術の概要

A.4.4　GHG 削減の根拠

本プロジェクトでは、排水（POME）の中に含まれる油分を回収し、それを売却することによって利益が発生するが、その利益を考慮してもなお事業実施者にとって経済的に魅力のないプロジェクトである上、マレーシアでは初めての導入例となる技術を使用するなど、障壁が存在する。従って、本プロジェクトケースはベースラインシナリオではない。

本プロジェクトでは、現在オープンラグーンで嫌気性処理され、メタンガスの排出源となっている POME を、その中に含まれる油分やスラッジを分離・回収することによって効率的に処理することで、オープンラグーンを利用した排水処理システムの撤廃およびラグーンからのメタンガス排出の回避を行うものである。

A.4.5　プロジェクト活動に対する公的資金

本プロジェクトに公的資金は利用されない。

B. ベースライン方法論の適用

B.1　プロジェクト活動に適用される承認されたベースライン方法論

新ベースライン方法論のタイトル：

「メタンフリー排水処理プロジェクトに関するベースライン方法論」

B.1.1　方法論の適用可能性についての説明

(1)　既存の排水処理システムは、以下の状況にあるオープンラグーンを使用していること。

- オープンラグーンの深さが 1 メートル以上ある
- ラグーン中にあるスラッジの滞留時間が 1 年以上である
- ラグーン中にあるスラッジの温度が常に 15℃以上である

本プロジェクトの対象となっている全ての工場において、現在オープンラグーンを使用した嫌気性処理が採用されており、それらラグーンの深さは 5m～10m、スラッジの滞留時間は 3 年程度、そしてラグーンの温度も常時 20～35℃あり、当該方法論が適用できる条件に合致している。

(2) プロジェクトで導入される排水処理プラントからメタンが全く排出されない、あるいは無視できる程微量の排出しか発生しないこと

プラント自体クローズドシステムであることに加え、排水中の油分が回収され、固形分も排水から分離されること、そして最終処理も好気性処理であることから、導入される高効率排水処理プラントからメタンは発生しない。

B.2. プロジェクト活動に方法論をどのように適用したかの記述

B2.1 ベースラインシナリオ

新ベースライン方法論に従って以下のステップでベースラインシナリオを設定した。

ステップ i：プロジェクト活動の代替案の定義と排水処理法規制によるスクリーニング

プロジェクト活動の代替案は、以下のとおり定義した。

代替案１：開放型ラグーンにおける嫌気性処理（現状の活動の継続）
代替案２：開放型タンク式嫌気性処理
代替案３：電気/熱生成を伴う閉鎖型タンク式嫌気性処理
代替案４：提案プロジェクト（CDM 無し）

また、排水処理法規制によるスクリーニングでは、いずれの代替案もマレーシア国の排水基準を遵守している。また、それに対する助成金や支援制度はない。さらに、排水からのメタン排出を規制する法律はない。

ステップ ii (b)：障壁分析

・ 技術的障壁

開放型ラグーンを除いて、残り 3 つの代替案は技術的な障壁がある程度あるいは大きな障壁が存在する。

・ 投資障壁

開放型ラグーンを除いて、残り 3 つの代替案は経済的なリスクが存在する、あるいは経済性が低いなど、投資の障壁がある。

・ 一般的な慣行による障壁

マレーシアでは、95%のパームオイル工場で開放型ラグーン処理システムが採用されており、他の代替案は一般的に実践されていないため、一般的な慣行による障壁がある。

以上の結果、代替案１「開放型ラグーンにおける嫌気性処理」が、最も障壁が少ないため、本プロジェクトのベースラインは、「現状と同様に、開放型ラグーンにおける嫌気性処理が継続する状態」とされる。

B.3. 本プロジェクトが無かった場合に比べて本プロジェクトはどのように GHG を削減するかの記述

本プロジェクトの追加性については、第 16 回 CDM 理事会において出された追加性証明ツールに準拠して検討した。以下に示す検討結果より、提案プロジェクトは追加的であると証明される。

ステップ０：プロジェクト活動の 開始時期に基づく初期スクリーニング

CDM 理事会への登録前には開始しないので、このステップは適用されない。

ステップ１：現行の法規制に合致したプロジェクト活動の代替案の定義

記述のとおり、４つの代替案が定義され、開放型ラグーンにおける嫌気性処理（現状の活動の継続）がベースラインとして選択される。

ステップ２：投資分析

プロジェクト活動は経済的な便益があり、プロジェクト実施者が要求する収益の程度はベンチマークとして定義できるため、「ベンチマーク分析」が適用される。

投資のベンチマークとして、プロジェクト実施者との協議により、IRR（内部収益率）が本プロジェクトの実施を決定する経済指標として定義された。プロジェクト実施者の KLK 社によると、プロジェクトへの投資には 5 年間の IRR が 20%から 30%以上必要である。提案プロジェクトの IRR は、5 年で 7.9%と計算されるが、この値はベンチマークである 5 年間の IRR よりも格段に低いので、このプロジェクトは経済的に実行可能ではない。

感度分析として、過去 10 年の CPO 販売価格の最大値（1,610 RM/ton）が将来において継続したとしても、予想されるプロジェクトの IRR は 17.9 %でプロジェクト実施者の投資のベンチマークよりも低く、KLK 社にとって、提案プロジェクトは経済的ではないと考えられる。

ステップ３：障壁分析

（投資障壁）

プロジェクトの経済分析の結果、プロジェクトの IRR は 7.9%であり、民間のプロジェクト実施者にとって極めて低い値である。そのため、本プロジェクトは、民間のプロジェクト実施者の投資先としては、魅力がないものとなっている。

（技術的障壁）

本プロジェクトは POME（パーム油排水）からパーム油原油を回収する方法として、マイクロバブル技術を用いている。これは、オーストラリアから導入される先進的な技術を必要とし、マレーシア国への導入事例としては最初のものである。そのため、本プロジェクトには、技術的な障壁がある。

（一般的な慣行による障壁）

提案プロジェクトと同様なプロジェクトは、マレーシア国には事例がなく、開放型ラグーンにおける嫌気性処理が POME 処理の一般的な慣例となっている。そのため、提案プロジェクトの実施において、一般的な慣行による障壁がある。

ステップ４：コモンプラクティスの分析

マレーシア国では、ほとんどのパーム油工場が開放型ラグーンにおける嫌気性処理システムを使用して POME を処理しており、提案プロジェクトの導入事例はない。

ステップ５：CDM 登録による影響

提案プロジェクトは、CDM がない場合は経済的ではないため、CDM 登録はプロジェクトへの経済的な支援となる。CER の売却による追加的な収益によって、プロジェクトの IRR は 5 年間で 7.9%から 27.9%に向上し、これは、プロジェクト実施者が要求している収益の程度である 5 年間の IRR を上回る。そのため、提案プロジェクトの実施において、CDM 登録は不可欠であると考えられる。

以上の分析の結果、本プロジェクトは追加的に行われると証明される。

B.4. 本プロジェクトに適用されたベースライン方法論に関連してプロジェクト領域がどのように設定されたかの記述

プロジェクト領域は次の図および表に示すとおり、嫌気性オープンラグーン（ベースラインバウンダリー）および高効率廃水処理プラント（プロジェクトバウンダリー）が含まれる。

表 1　プロジェクト領域

領域	GHG 排出源	ガス	領域内／外	備考
ベースライン	嫌気性ラグーンにおける排水処理	CH_4	**領域内**	ラグーン中の有機物が嫌気的に分解されてメタンガスが発生する。
プロジェクトケース	高効率排水処理プラントにおける電力消費	CO_2	**領域外**	全ての対象工場ではバイオマス発電のみが現在、およびプロジェクト期間中を通して使用されるため、GHG 排出はない。

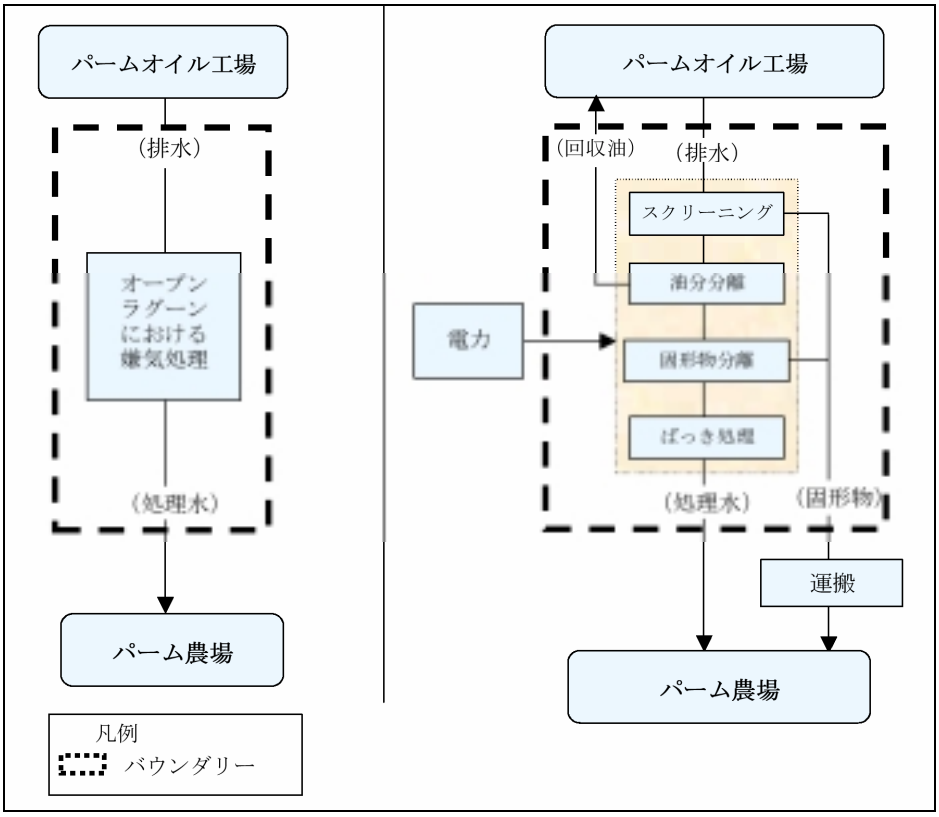

図 3　プロジェクト領域

B.5.　　ベースライン調査の完了時期およびベースライン設定者

ベースライン調査の完了時期：2006 年 2 月 23 日

ベースライン設定者：㈱パシフィックコンサルタンツインターナショナル

C. プロジェクト活動期間／クレジット発生期間

プロジェクト開始日：2008 年 1 月 1 日　　プロジェクト稼動期間：20 年

最初のクレジット期間の開始日（更新可能クレジット期間）：2008 年 1 月 1 日

最初のクレジット期間：7 年

D. モニタリング方法論と計画の適用

D.1　　プロジェクト活動に適用される承認されたモニタリング方法論

新モニタリング方法論のタイトル：

「メタンフリー排水処理プロジェクトに関するモニタリング方法論」

D.2　　方法論の適用可能性についての説明

(1) 既存の排水処理システムは、以下の状況にあるオープンラグーンを使用していること。

本プロジェクトの対象となっている全ての工場において、現在オープンラグーンを使用した嫌気性処理が採用されており、それらラグーンの深さは 5m～10m、スラッジの滞留時間は 3 年程度、そしてラグーンの温度も常時 20～35℃あり、当該方法論が適用できる条件に合致している。

(2) プロジェクトで導入される排水処理プラントからメタンが全く排出されない、あるいは無視できる程微量の排出しか発生しないこと

プラント自体クローズドシステムであることに加え、排水中の油分が回収され、固形分も排水から分離されること、そして最終処理も好気性処理であることから、導入される高効率排水処理プラントからメタンは発生しない。

D.2.1　　プロジェクトシナリオベースラインシナリオにおける排出量のモニタリング

D.2.1.1　プロジェクト活動から発生する排出量をモニターするために収集すべきデータ

（プロジェクト活動から GHG は排出されないため、モニターするデータはなし。）

D.2.1.2　プロジェクト排出量を計算するための数式

（なし）

D.2.1.3　プロジェクト領域内におけるベースライン排出量を計算するために必要なデータ及びデータの保存方法

表 2　モニタリング項目

ID 番号	データ	データ出所	単位	計測方法	計測頻度	備考
1	処理前の排水中の COD 濃度（高効率排水処理プラントの注入口）	プラント実施者（ラボラトリー）	kg COD/処理前の排水 m^3	実測	毎月	工業規格に従って計測を行う。

ID番号	データ	データ出所	単位	計測方法	計測頻度	備考
2	処理前の排水量（高効率排水処理プラントの注入口）	プロジェクト実施者（工場のオペレーションセンター）	処理前の排水 m^3	実測	毎月	プラントに設置された電子計測メーターを使用して水量を計測する。
3	排水からのメタン排出に係わる法規制	中央政府／地方政府法規等	-	-	毎年	法律等が施行された場合には、その実効性を考慮し、ベースラインシナリオの見直しを行う。

D.2.1.4　ベースライン排出量を計算するための計算式

$$\text{ベースライン排出量}\ (CO_2\text{換算トン/年}) = \text{オープンラグーンからのメタン排出量}\ (CH_4\text{トン/年}) \times \text{メタンの地球温暖化係数}\ (CO_2\text{トン/}CH_4\text{トン})$$

また、オープンラグーンからのメタン排出量は以下の計算式で求められる。

$$\text{オープンラグーンからのメタン排出量}\ (CH_4\text{トン/年}) = \text{COD量}\ (\text{トンCOD/年}) \times B_o\ (\text{トン}CH_4/\text{トンCOD}) \times \text{MCF}$$

ここで、

COD（Chemical Oxygen Demand）：化学的酸素要求量。ラグーンに入る前の排水から実測する。

Bo：メタン生成限界量。IPCC のデフォルト値である 0.25 に不確実性を考慮した値である「0.21」を適用する。

MCF：メタン生成係数。新方法論に従い、アジアにおける排水処理プロジェクトのデフォルト MCF 値とされる 0.9 に不確定係数（0.82）を取り入れて保守的に見積もった「0.738」を適用する。

オープンラグーンからのメタン排出量にメタンガスの地球温暖化係数である 21 を乗じたものがベースライン排出量（CO_2換算トン/年）となる。

D.2.2　プロジェクト活動からの排出削減量の直接的なモニタリング

（選択せず）

D.2.3.　モニタリング計画中のリーケージの取り扱いについて

本プロジェクトではリーケージは発生しない。リーケージとして、「プラントからの副産物（肥料）の運搬によって発生する GHG 排出量」が考えられるが、肥料として利用されるこれら固形物は既存の運搬システムを使用して再利用されるた

め、新たな運搬システムの構築や運搬車両の購入は必要とされない。そのため、リーケージはゼロとした。

D.4. モニタリング実施体制

全てのモニタリングは KLK 社のモニタリングシステムに基づいて実施される。

D.5. モニタリング方法論の設定者

モニタリング方法論および計画の完了時期：2006 年 2 月 23 日

モニタリング方法論および計画の設定者：㈱パシフィックコンサルタンツインターナショナル

E. 発生源別 GHG 排出量の計算

E.1. プロジェクトケースにおける GHG 排出量の推計

プロジェクトケースでの GHG 排出はない

E.2. リーケージの推計

本プロジェクトではリーケージは発生しない。

E.3. プロジェクト排出量

0 トン／年

E.4. ベースラインにおける GHG 排出量の推計

ベースライン排出量は以下の通り計算される。

ベースライン排出量	=	COD 量 (トン COD/年)	×	B_o ($トン CH_4$/トン COD)	×	MCF	×	メタンの地球温暖化係数
	=	62,692 (トン COD/年)	×	0.21 ($トン CH_4$/トン COD)	×	0.738	×	21
	=	**204,035 (CO_2 トン/年)**						

なお、COD の平均値（50,000 ppm）はマレーシアの統計による（MPOB：マレーシアパームオイル委員会）。

E.5.　プロジェクト活動による排出削減量

GHG 排出削減量	=	ベースライン排出量 CO_2 トン／年	―	プロジェクト排出量 CO_2 トン／年
	=	204,035	―	0
	=	**204,035** CO_2 トン／年		

E.6.　上記の数式による計算結果表

表 3　GHG 排出削減量

年	プロジェクト排出量	ベースライン排出量	リーケージ	GHG 排出削減量
2008	0	204,035	0	204,035
2009	0	204,035	0	204,035
2010	0	204,035	0	204,035
2011	0	204,035	0	204,035
2012	0	204,035	0	204,035
2013	0	204,035	0	204,035
2014	0	204,035	0	204,035
合計	**0**	**1,428,245**	**0**	**1,428,245**

単位：CO_2 トン／年

F. 環境影響

本プロジェクトの実施によって発生すると思われる環境影響には主に水質、大気、廃棄物、悪臭などが含まれるが、本プロジェクトではこれら全てに環境対策を施し、周辺環境への影響を最小限にする計画である。

特に水質問題に関しては、高効率排水処理プラントは既存のラグーンシステムと比較してより高い処理能力を持ち、マレーシアの排水基準値以下に確実に処理することができる上、処理水の再利用などの処置を施す計画であり、本プロジェクトの実施による周辺水域への影響はない。

なお、本プロジェクトは既存のパームオイル工場敷地内に排水処理施設を建設・運用するものであり、これはマレーシアの EIA の対象とはならない。

G. 利害関係者からのコメント

事業実施者である KLK 社は、マレーシア政府承認を取得する前に利害関係者からのコメントを募り、対応する計画である。

添付資料 2

プロジェクト設計書

CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-PDD)
Version 02 - in effect as of: 1 July 2004)

CONTENTS

Annexes

SECTION A. General description of project activity

A.1 Title of the project activity:

Improvement of POME Treatment System at Palm Oil Mills, Malaysia
Version 1.1, as of 23rd February 2006

A.2. Description of the project activity:

Purpose of the project

This project aims to replace an open-lagoon POME (palm oil mill effluent) treatment system, which is currently adopted in 13 of palm oil mills, with high-efficient methane-free POME treatment plants, which avoid methane emission from the open lagoons and thus contribute to an economically, environmentally and socially sustainable development of palm oil industry in Malaysia.

Background

Kuala Lumpur Kepong Berhad (KLK), one of the leading palm oil plantation and processing firms in Malaysia, has developed a technology that efficiently extracts wasted oil content contained in POME. The new technology allows extraction of such oil, which usually accounts for about 1% of POME volume and still has the same quality and value as regular CPO (crude palm oil). The technology also separates solid wastes contained in POME, which are then recovered and recycled as fertilizer.

Although a pilot project that brought out the technology has proved its high oil extraction capacity, profits generated by recovered oil were not economically attractive enough to introduce the technology to KLK's palm oil mills, unless the CDM scheme is applied to the project. The system replaces the current open lagoons where POME is treated, and the abandonment of lagoons can avoid emissions of methane gas, one of greenhouse gases.

Project Summary

The proposed project (hereinafter referred to as the "Project") intends to introduce high-efficient POME treatment plants in 13 of the KLK's palm oil mills in Malaysia. Target 13 mills process about 2.5 million tons of fresh fruit bunches (FFB) of oil palm and 1.2 million tons of POME. POME discharged at these mills is treated anaerobically using the open lagoons, and then applied to the palm oil fields as irrigation water.

New treatment plant has enabled the efficient separation and recovery of the oil content and solid wastes contained in POME. After going through the aeration process, 70% of the POME is reused at the mill and the remaining 30% are recycled as irrigation water. Recovered solid wastes are dewatered and applied to palm oil fields as fertilizer supplement.

Introduction of high-efficient POME treatment plants will replace the currently practiced open-lagoon process, preventing methane gases to be emitted to the atmosphere. The Project thus contributes to the reduction of greenhouse gas emissions.

Expected emission reductions average about 204,035 tons of CO_2-equivalent in a year.

Contribution of the project activity to sustainable development

Social benefit

- Procurement of POME treatment plant from a Malaysian manufacturer generates employment opportunities and spurs the local economy

Technological benefit

- Contribution to the improvement of the related industries in Malaysia (and possibly in the surrounding countries)

Environmental benefit

- Improved energy efficiency; efficient and effective use of local natural resources
- Cleaner and more efficient treatment of COD-concentrated POME improves the quality of local water bodies
- Avoidance of methane gas emissions leads to the reduction of GHG emissions
- Abandonment of open lagoons leads to the reduction of strong odours from POME

A.3. Project participants:

Name of Party involved	Private and/or public entities project participants	If the Party involved wishes to be considered as project participant (Yes/No)
Malaysia (host)	Kuala Lumpur Kepong Bhd. (KLK)	No
Japan	Japan Carbon Finance, Ltd. （JCF）	No

Kuala Lumpur Kepong Bhd. (KLK):
Established in UK in 1906, KLK is now a leading plantation company in Malaysia. The firm also engages in manufacturing and retailing of palm oil products and property development. KLK currently has over 120,000 hectors of palm oil plantation areas in Malaysia and Sumatra, Indonesia.

Japan Carbon Finance, Ltd. (JCF):
Japan Carbon Finance, Ltd. (JCF), established as of Nov. 25, 2004, is a company that uses the funds from Japan Greenhouse Gas Reduction Fund (JGRF), which is Japan's first carbon fund established in 2004 by a total of 33 entities, to develop greenhouse gas reduction projects and to purchase CERs/ERUs credits for the first commitment period, between 2008 and 2012.

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

The project site is located at 13 palm oil mills in five states (Johor, Selangor, Kelantan, Negeri Sembilan, Sabah).

A.4.1.1. Host Party(ies):

Malaysia

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

Five states (Johor, Selangor, Kelantan, Negeri Sembilan, Sabah)

A.4.1.3. City/Town/Community etc:

A.4.1.4. Detail of physical location, including information allowing the unique identification of this project activity (maximum one page):

The target 13 mills are located in five states in Malaysia, as shown in the table. All the mills are owned and operated by KLK, and each of the new POME treatment plant will be installed inside the target mill's estate. Each estate currently contains oil palm plantation area, a processing mill, and open lagoons for POME treatment.

Table 1: Target palm oil mills

#	Factory Name	State	City
1	Tg. Malim	Selangor	Tg.Malim
2	Tuan Mee	Selangor	Sg.Buloh
3	Kuala Pertang	Kelantan	Kuala Krai
4	Jeram Padang	N.Sembilan	Bahau
5	Kekeyaan	Johor	Keluang
6	Paloh	Johor	Paloh
7	Batu Lintang	Kedah	Serdang
8	KLK (S) Mill 1	Sabah	Tawau
9	KLK (S) Mill 2	Sabah	Tawau
10	Pinang	Sabah	Tawau
11	Bornion	Sabah	Lahad Datu
12	Lungmanis	Sabah	Lahad Datu
13	Rimmer	Sabah	Lahad Datu

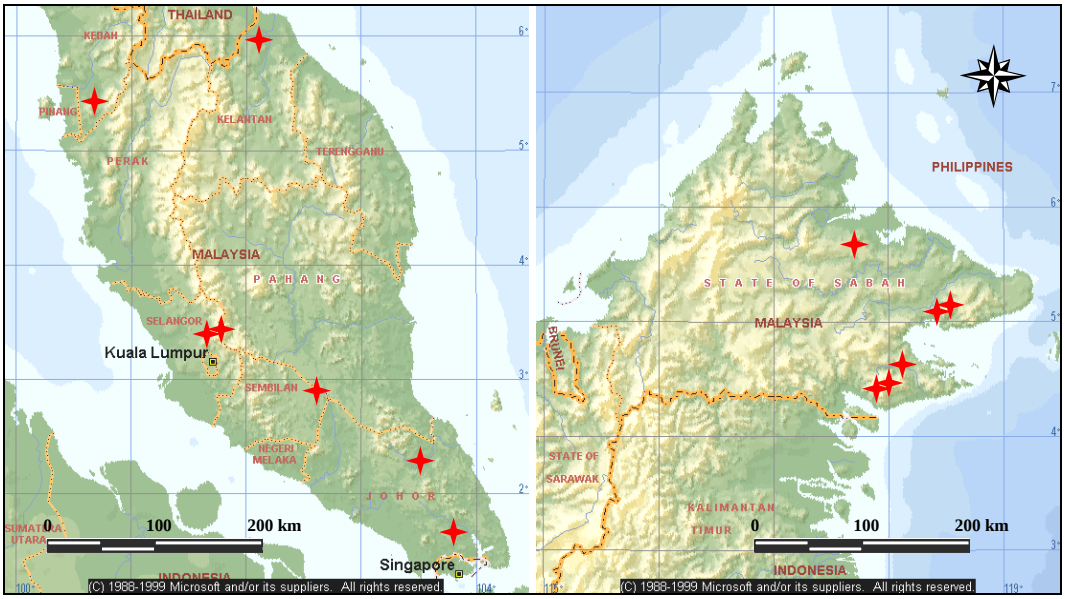

Figure 1: Map and location of 13 palm oil mills
(left: Peninsular Malaysia, right: Sabah state)

Picture 1: KLK's palm oil mill

A.4.2. Category(ies) of project activity:

This project activity belongs to Category 13: "Waste handling and disposal" listed in the sectoral scopes for accreditation of the operational entities (http://cdm.unfccc.int/DOE/scopes.html).

A.4.3. Technology to be employed by the project activity:

In the project activity, the high-efficient POME treatment technology will be installed in 13 palm oil mills belonged to Kuala Lumpur Kepong Bhd. (KLK). 13 mills currently process about 2.5 million tons of fresh fruit bunches (FFB) and 1.2 million tons of POME every year.

As a result of replacing the existing open, anaerobic lagoon systems with high-efficient POME treatment plants, the project activity would avoid methane emissions from open lagoons.

The newly introduced high-efficient POME treatment system works in the following manner (also summarized in the diagram below).

1. POME is screened to eliminate solid materials.
2. Separate oil and particulates by blowing micro bubbles into POME.
3. Around 75 % of oil and solids contained in POME is recovered from the separated oil, and particulates are also separated using cyclone separators. Recovered oil is mixed with CPO (crude palm oil).
4. Recovered solid materials are utilized as fertilizer after dewatering and applied to palm fields.
5. The final effluent is recycled in the plant and applied to palm fields after aeration.

The technology employed under the Project has been adopted in few cases before in Thailand and the Philippines. According to the test results of a pilot plant installed in the KLK's mill in Kedah state, almost 75% of oil and COD is expected to be recovered and treated even in the full-scale plants.

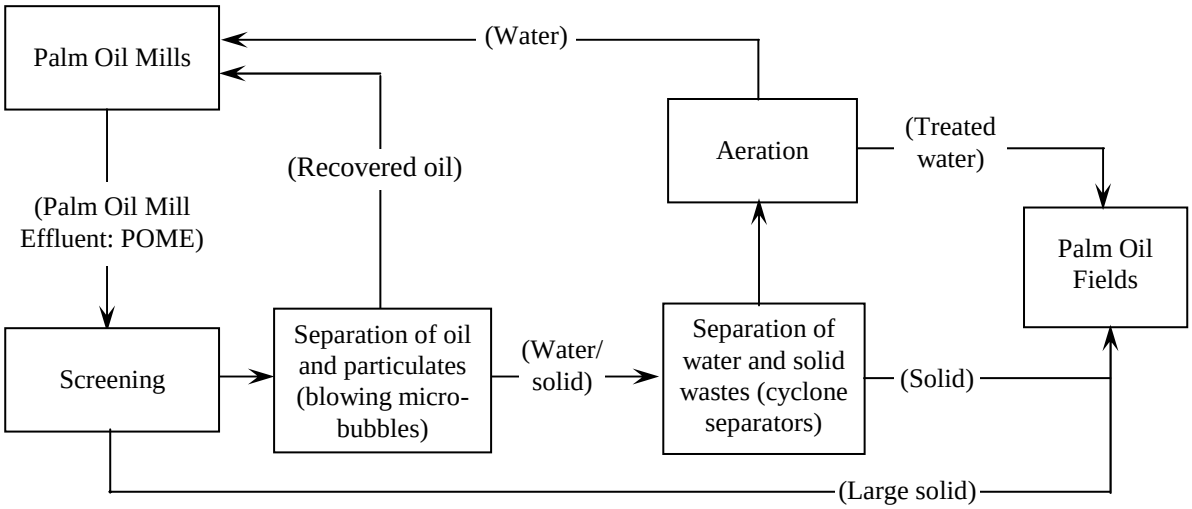

Figure 2: Schematic diagram of high-efficient POME treatment

A.4.4. Brief explanation of how the anthropogenic emissions of anthropogenic greenhouse gas (GHGs) by sources are to be reduced by the proposed CDM project activity, including why the emission reductions would not occur in the absence of the proposed project activity, taking into account national and/or sectoral policies and circumstances:

The high-efficient POME treatment system has an additional revenue base by sales of oil recovery from POME. However, as the system requires high initial investment cost for facility, the internal rate of return (IRR) is 7.9%, which is quite low for a private firm such as KLK. The activity is not likely to be an attractive investment option for private project developers.

The high-efficient POME treatment system utilizes the technology of micro bubbles in order to recover crude palm oil from POME. This technology has not been introduced to Malaysia. Therefore, the project developer would have to face several risks in introducing the high-efficient POME treatment to its factory as the country and, needless to say, the developer processes no experience in this technology.

For this reason, the project scenario, which is the installation of high-efficient POME treatment plant, is not the baseline scenario.

This Project will reduce greenhouse gases (GHGs) as a result of methane avoidance, which is enabled by the installation of a high-efficient POME treatment system instead of maintaining the existing open lagoon system. Methane is naturally produced from POME by microorganisms under anaerobic condition in the existing open lagoon system. According to the results of pilot plant, the high-efficient POME treatment system can recover almost 75% of oils and solids that are source of methane. Therefore, the installation of high-efficient POME treatment plants would replace the existing open lagoon system and avoid methane emissions from open lagoons.

The Project is estimated to reduce 1,428,245 ton-CO_2e during the crediting period.

A.4.4.1. Estimated amount of emission reductions over the chosen crediting period:

The amount of emission reduction will be 204,035 t-CO_2/year, resulting in 1,428,245 t-CO_2 during the seven-year crediting period.

Table 2: Estimated emission reductions during the first crediting period

Year	Annual estimation of emission reductions in tonnes of CO_2 e
2008	204,035
2009	204,035
2010	204,035
2011	204,035
2012	204,035
2013	204,035
2014	204,035
Total estimated reductions	1,428,245
Total number of crediting years	7 (with possibility of renewals)
Annual average over the crediting period of estimated reductions	204,035

A.4.5. Public funding of the project activity:

No public funding is used for the Project.

SECTION B. Application of a baseline methodology

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

Since there exists no approved methodology that can be applied to the Project, a new methodology is herein proposed.

The new baseline methodology is titled "Baseline methodology for methane-free organic wastewater treatment project activities at multiple factories."

B.1.1. Justification of the choice of the methodology and why it is applicable to the project activity:

The proposed new methodology is applicable to the project activity because the project activity fulfils all of the applicable criteria:

(1) The existing wastewater treatment system is an open lagoon system with an 'active' anaerobic condition, which is characterized as follows:
- **The depth of the open lagoon is at least 1 m,**
- **The residence time of the sludge in the open lagoons should be at least one year, and**
- **The temperature of the sludge in the open lagoons is always higher than 15 ^{o}C.**

The current wastewater treatment system in 13 palm oil mills in KLK is an open lagoon system. According to KLK, the depth of open lagoons is within the range of 5 to 10m. The temperature of lagoons is within the range of 20 to 35ºC. The sludge in open lagoons is excavated every 3 years.

(2) No or negligible amount of CH_4 is emitted during the operation of the proposed project plant according to the specifications.

According to the specifications provided by KLK, proposed high-efficient POME treatment system does not emit any methane gas during its operation because;
- the system is a closed system
- oil is extracted and recovered using the micro-bubble technology
- solid wastes are compressed and then separated from liquids, and
- wastewater is then aerobically treated.

B.2. Description of how the methodology is applied in the context of the project activity:

Step i: Identification of alternatives to the proposed project activity and screening based on laws and regulations of wastewater treatment

The following baseline scenario alternatives are identified in Step i:
- Alternative 1: the anaerobic treatment at open lagoon (continuation of current practice)
- Alternative 2: the open-tank digester treatment
- Alternative 3: the closed-tank anaerobic treatment with electricity/ heat generation
- Alternative 4: the proposed project activity without CDM

At first, as the legal barrier analysis, the baseline scenario alternatives are screened based on laws and regulations of wastewater treatment such as legal standard of effluent water quality. They are also screened based on an incentive or financial assistance that favors the activity and/or technology.

There is a regulation on water quality of effluent from palm oil mills. Therefore, the water treatment facility introduced to palm oil mill needs to comply with the standard of effluent water quality.
There is no law to regulate the methane emissions from wastewater.

Alternative 1: the anaerobic treatment at open lagoon is the standard practice in Malaysia. The effluent water qualities from palm oil mills in KLK comply with the standard of effluent water quality according to the information provided by KLK. The methane emissions from open lagoon are not regulated.

Alternative 2: the open-tank digester treatment method complies with the standard of effluent water quality. There is no subsidy or promotional support to the technology.

Alternative 3: the closed-tank anaerobic treatment with electricity/ heat generation complies with the standard of effluent water quality. There is no subsidy or promotional support to the technology.

Alternative 4: the proposed project activity without CDM complies with the standard of effluent water quality. There is no subsidy or promotional support to enhance the introduction, as this activity is the first case in Malaysia.

Therefore, all the alternatives comply with the laws and regulations in Malaysia.

Step ii(b): Barriers analysis

Technical barrier:

Alternative 1: the anaerobic treatment at open lagoon, which is the pond-based wastewater treatment method, is commonly used in palm oil mill in Malaysia. Alternative 1 dose not require the advanced technology. Therefore, alternative 1 has no technical barrier.

Alternative 2: the open-tank digester treatment system is not commonly practiced at palm oil mills in Malaysia; however, the digester tank and technology is available in Malaysia. Also, required skills for this technology are locally available. Therefore, alternative 2 has little technical barrier.

Alternative 3: the closed-tank anaerobic treatment with electricity/ heat generation is not a common practice at palm oil mills in Malaysia. Currently, only one palm oil mill in Malaysia is using this technology for POME treatment. The technology for POME treatment digesters as well as required skills for this technology is locally available in Malaysia, except technologies for heat and power generation. Therefore, alternative 3 has a technical barrier.

Alternative 4: the proposed project activity is the first case to introduce the technology in Malaysia. This activity employs a micro bubbles technology in order to recover crude palm oil from POME. This micro bubbles technology requires state-of-the-art technology imported from Australia. Therefore, alternative 4 has a technical barrier.

Investment barrier:

Alternative 1: the anaerobic treatment at open lagoon is the continuation of the current practice. As this activity meets the current regulation of effluent water quality, it requires no additional investment. This activity is financially attractive as it contains little financial risk. Therefore, alternative 1 has no investment barrier.

Alternative 2: the open-tank digester treatment process works only for wastewater treatment. This activity would not have any revenue base from, for example, energy production or by-product. This activity is not financially attractive because the project developer cannot collect the investment for facility. Therefore, alternative 2 has an investment barrier.

Alternative 3: the closed-tank anaerobic treatment with electricity/ heat generation requires much initial investment cost for facility and operational cost. This activity would have revenue base from energy production and by-product like compost. The revenue from energy production depends on the biogas production, which contains a technology risk. This technology requires constant and precise handling. This activity is not financially attractive because a project developer must have a financial risk. Therefore, alternative 3 has an investment barrier.

Alternative 4: the proposed project activity would have a revenue base from oil recovery from POME even in the absence of CDM. However, as this activity requires much initial investment cost for facility, the internal rate of return (IRR) is quite low for a private firm. This activity is not financially attractive. Therefore, alternative 4 has an investment barrier.

Barrier due to prevailing practice:

Alternative 1: the anaerobic treatment at open lagoon is the most commonly practiced POME treatment method at palm oil mills in Malaysia. According to Malaysian Palm Oil Board (MPOB), which is a governing agency of the Malaysian palm oil industry, 95% of the POME treatment method currently practiced at palm oil mills in Malaysia is the open lagoon anaerobic treatment method. Project developers have thus experiences and skills for management of this activity. Therefore, alternative 1 has no barrier due to the prevailing practice.

Alternative 2: the open-tank digester treatment process is not a common practice at palm oil mills in Malaysia. MPOB data shows that currently only 4% of all palm oil mills in Malaysia uses the technology. Although small in numbers, this activity is found domestically in Malaysia, which means a project developer in palm oil industry could employ experiences and skills in Malaysia. Therefore, alternative 2 has little barrier due to the prevailing practice.

Alternative 3: the closed-tank anaerobic treatment with electricity/ heat generation is not a common practice at palm oil mills in Malaysia. According to MPOB, currently only one palm oil mill is using the technology in Malaysia. Another two mills have also introduced the method before but they are not currently generating biogas and heat/power but instead flaring the gas. Although the digester technology and required human resources are locally available, some parts of the facility, such as motors and turbines need to be imported. Therefore, alternative 3 has a barrier due to the prevailing practice.

Alternative 4: the proposed project activity without CDM is the first case in Malaysia. The technology used in this activity requires state-of-the-art technology imported from Australia and also the

equipment must be employed from Australia. Therefore, alternative 4 has a barrier due to the prevailing practice.

Therefore, Alternative 1, "the anaerobic treatment at open lagoon," contains the least barrier.

As a result, Alternative 1: the anaerobic treatment at open lagoon is selected as BASELINE.

B.3. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered CDM project activity:

The determination of the additionality is done by using the "Tool for the demonstration and assessment of additionality," as published in Annex 1 of the sixteenth meeting of the Executive Board (EB-16). The additionality tool has been applied to the proposed project activity as described below.

Step 0. Preliminary screening based on the starting date of the project activity
(Not applicable to the proposed project activity because it would not start prior to registration.)

Step 1. Identification of alternatives to the project activity consistent with current laws and regulations
Sub-step 1a. Define alternatives to the project activity:
The following baseline scenario options are identified in section B2:

- Alternative 1: the anaerobic treatment at open lagoon (continuation of current practice)
- Alternative 2: the open-tank digester treatment
- Alternative 3: the closed-tank anaerobic treatment with electricity/ heat generation
- Alternative 4: the proposed project activity without CDM

As mentioned in section B2, Alternative 1: the anaerobic treatment at open lagoon (continuation of current practice) is selected as BASELINE.

Sub-step 1b. Enforcement of applicable laws and regulations:
Alternative 1: the anaerobic treatment at open lagoon (baseline) and Alternative 4: the proposed project activity without CDM both comply with the laws and regulations of wastewater in Malaysia.

There are currently no law or regulation in Malaysia that controls open-lagoon anaerobic treatment system and methane emissions from open lagoons. Likewise, there are no incentive, or any financial scheme that assists the methane-free water treatment system. There is currently no plan to establish such laws or incentives in the near future in Malaysia.

Step 2. Investment analysis
Sub-step 2a. Determine appropriate analysis method:
Option III. "benchmark analysis" is applied since the proposed project activity generates financial benefits and project developer's required return is available as a benchmark.

Sub-step 2b. Apply benchmark analysis:
According to the discussion with the project participant, the IRR is identified as a financial indicator suitable for the project type and decision context.
As mentioned in Sub-step 2a, the project developer's required return is available.
According to KLK, the project developer, higher than 20 to 30% IRR for 5 years is necessary to invest for the project.

Sub-step 2c.Calculation and comparison of financial indicators:
The IRR of the proposed project is calculated at 7.9% for 5 years on basic assumptions as shown in Table 4.

It clearly demonstrates that the Project is not commercially feasible since the IRR is much lower than the benchmark of 20% IRR for 5 years, as mentioned in Sub-step 2b.

Table 3: Basic assumptions for the project IRR

Cost	Initial investment cost	32 million RM
	O&M cost	1.9 million RM/year
Revenue	Profit from sale of recovered CPO	9.9 million RM/year
	Selling price of CPO	1,316 RM/ton
Pay-back period		4 years

RM: Malaysia Rinngit

Sub-step 2d. Sensitivity analysis:
Sensitivity of selling price of CPO to the IRR is analyzed as shown in Table 5 since selling price of CPO is considered one of the most crucial variables to the IRR.

According to Malaysian Palm Oil Board (MPOB) and the project developer, KLK, CPO selling price is affected by various unforeseeable factors such as weather in palm oil producing countries, consumers' demand pattern, soybean market, introduction of biodiesel fuels, etc., and therefore, estimation of the future price is extremely difficult. It is thus reasonable to assume that the price would not dramatically change from the market price in the last 10 years. Even if the maximum CPO price in the last 10 years remains in the coming years, expected project IRR is below the benchmark of the project developer, and the proposed Project is expected to remain financially unattractive for KLK.

Table 4: Sensitivity analysis

Selling price of CPO	Project IRR
1,316 RM/ton (10-year average)	7.9 %
1,610 RM/ton (max of last 10 years)	17.9 %
895 RM/ton (min of last 10 years)	-8.7 %

(Data source for CPO price: MPOB)
Note: CPO price for the year 1998 is not included in the analysis, as the price in that year was affected by unusual event, a financial crisis in Asia, and is considered atypical.

Step 3. Barrier Analysis
The project faces investment barrier as explained below:

Sub-step 3a. Identify barriers that would prevent the implementation of type of the proposed project activity:

Investment barrier

The proposed project would not be commercially feasible and operable as a project to be undertaken by the private sector. Economic analysis of the project shows that the IRR will be 7.9%, which is quite low for a private project developer and makes the project activity not attractive as an investment option for private project developers.

Technological barrier

The Project plant has a micro bubbles technology in order to recover crude palm oil from POME. This micro bubbles technology requires state-of-the-art technology imported from Australia and it is the first time to introduce this technology in Malaysia. Therefore, this explains a technological barrier.

Barrier due to prevailing practice

As explained in "Technological barrier," there is no similar case to the Project and also the open anaerobic lagoon system is the prevailing practice in Malaysia. Therefore, there is a barrier due to the prevailing practice for the project implementation.

Sub-step 3b. Show that the identified barriers would not prevent the implementation of at least one of the alternatives (except the proposed project activity):
The abovementioned barriers would not prevent the scenario of Alternative 1: the anaerobic treatment at open lagoon (baseline), because:

- The open, anaerobic lagoon system is a traditional water treatment method and does not require substantial initial investment. Thus it does not face the technological and investment barriers and the barriers due to prevailing practice that apply to the proposed project activity.

Step 4. Common practice analysis
Almost all of palm oil mills in Malaysia use open lagoon systems. There is no similar case to the Project. Therefore, this explains that the project activity is not considered as a common practice.

Step 5. Impact of CDM registration
The impact of CDM registration will be financial support for the Project, because the proposed project activity is not financially viable without CDM as demonstrated in Step 3. The CDM registration will provide additional revenue from sales of CER and improve IRR of the Project from 7.9% to 27.9 % for 5 years, which is higher than the project developer's required return of 20 % for 5 years. Therefore, it is considered that the CDM registration is necessary to the implementation of the proposed project activity.

Therefore, according to the above demonstration and assessment, the Project is proved additional because Step 1, 3, 4 and 5 are satisfied.

B.4. Description of how the definition of the project boundary related to the baseline methodology selected is applied to the project activity:

The project boundary for the proposed project activity has been determined as shown in the following figure, which includes the Project plant site (for the project boundary) and the anaerobic open lagoons (for the baseline boundary).

Table 5: project boundary

Activity	Source	Gas	Included?	Justification / Explanation
Baseline	Wastewater Treatment in anaerobic open lagoons	CH_4	Yes	Methane gas is emitted by biodegradation in anaerobic open lagoons.
Project Activity	Electricity consumption by high-efficient POME treatment plant	CO_2	No	As all the target mills currently consume and will consume in the future electricity that is generated by biomass fuels, CO_2 is not generated as a result of the project activity.

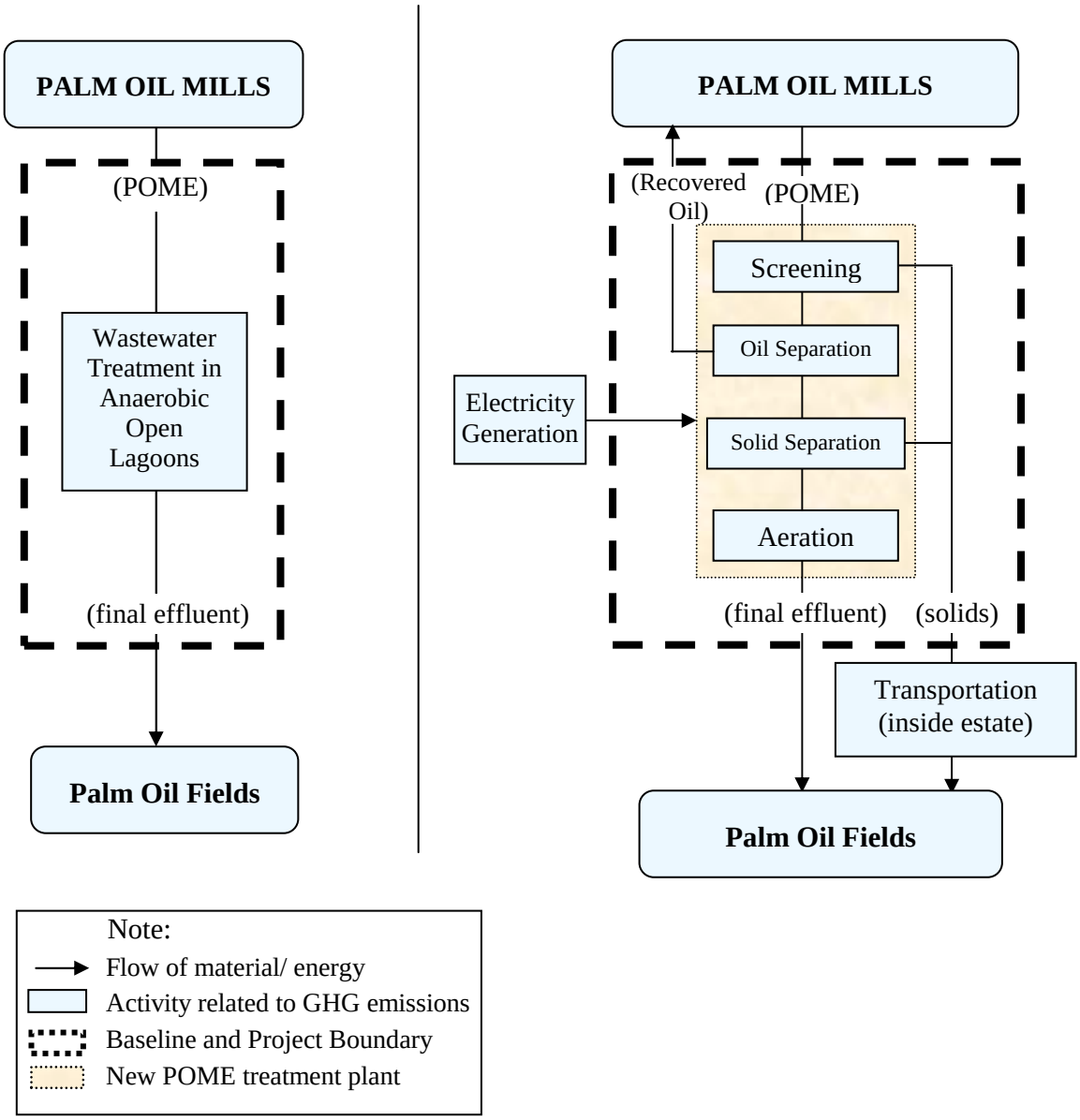

Figure 3: Baseline boundary (left) and Project boundary (right)

B.5. Details of baseline information, including the date of completion of the baseline study and the name of person (s)/entity (ies) determining the baseline:

< Date of completion of the baseline study >
23rd February 2006

< Name of person (s)/entity (ies) determining the baseline >
Pacific Consultants International

Mr. Masahiko Fujimoto
Deputy General Manager
Energy and Environmental Management Department
Pacific Consultants International
1-7-5 Sekido Tama-shi, Tokyo 206-8550 Japan
Tel:+81-42-376-6248 Fax:+81-42-372-6358
Email: fujimotom@pcitokyo.co.jp

The above person/entity is not 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:

01/01/2008

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

20 years 0 month

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

C.2.1. Renewable crediting period

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

01/01/2008

C.2.1.2. Length of the first crediting period:

Seven (7) years 0 month

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. Application of a monitoring methodology and plan

D.1. Name and reference of approved monitoring methodology applied to the project activity:

Since there exists no approved methodology that can be applied to the Project, a new methodology is herein proposed.

The new monitoring methodology is titled "Monitoring methodology for methane-free organic wastewater treatment project activities at multiple factories."

D.2. Justification of the choice of the methodology and why it is applicable to the project activity:

The proposed new methodology is applicable to the project activity because the project activity fulfils all of the applicable criteria:

(1) The existing waste water treatment system is an open lagoon system with an 'active' anaerobic condition, which is characterized as follows:

- **The depth of the open lagoon is at least 1 m,**
- **The residence time of the sludge in the open lagoons should be at least one year, and**
- **The temperature of the sludge in the open lagoons is always higher than 15 ^{o}C.**

The current wastewater treatment system in 13 palm oil mills in KLK is an open lagoon system. According to KLK, the depth of open lagoon is within the range of 5 to 10m. The temperature of lagoon is within the range of 20 to 35 ºC. The sludge in open lagoon is excavated every 3 years.

(2) No or negligible amount of CH_4 is emitted during the operation of the proposed project plant according to the specifications.

According to the specifications provided by KLK, proposed high-efficient POME treatment system does not emit any methane gas during its operation because;

- the system is a closed system
- oil is extracted and recovered using the micro-bubble technology
- solid wastes are compressed and then separated from liquids, and
- wastewater is then aerobically treated.

D.2. 1. Option 1: Monitoring of the emissions in the project scenario and the baseline scenario

D.2.1.1. Data to be collected in order to monitor emissions from the project activity, and how this data will be archived:								
ID number *(Please use numbers to ease cross-referencing to D.3)*	Data variable	Source of data	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment

No data is monitored since no emission is expected during the operation of the project.

D.2.1.2. Description of formulae used to estimate project emissions (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.)

n/a

D.2.1.3. Relevant data necessary for determining the baseline of anthropogenic emissions by sources of GHGs within the project boundary and how such data will be collected and archived :								
ID number *(Please use numbers to ease cross-referencing to table D.3)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e),	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
1	COD concentration in raw effluent (at CH_4 free organic wastewater treatment plant inlet)	KLK's laboratory	kg COD/m^3 raw effluent	m	monthly	100%	Electronic/paper	Samples from each mill to be tested at KLK's central laboratories (TQCC/KDC). Measuring devices are to be calibrated according to the industrial standard.
2	Volume of raw effluent (at CH_4 free organic wastewater treatment plant inlet)	Operation centre at palm oil mill	m^3 raw effluent	m	continuously	100%	Electronic/paper	To be measured by flow meters at the plant. Measuring devices are to be calibrated according to the industrial standard. Data to be aggregated monthly.
3	Regulations and incentives relevant to CH_4 emission from effluent	National/ regional legislation	-	-	annually	100%	Electronic/paper	To be checked according to law, regulation and national policy.

Note: Data needs to be archived until two years following after the end of the crediting period.

D.2.1.4. Description of formulae used to estimate baseline emissions (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.)

Baseline emissions consist of the methane emissions from an open lagoon wastewater treatment system.
The formulae to estimate baseline emissions in a given year is described as follows:

Baseline Emissions (tCO_2/yr)	=	Methane emission from open lagoon ($t\ CH_4/yr$)	*	21

Methane emission from open lagoon ($t\ CH_4/yr$)	=	Total COD (kg COD/yr)	*	Bo ($kgCH_4/kgCOD$)	*	MCF	*	0.001 (t/kg)

Where:
COD is Chemical Oxygen Demand of effluent entering lagoons (measured)
B_o is maximum methane producing capacity, and
MCF is methane conversion factor.

The COD will be measured as indicated in D.2.1.3.
The value for B_o will be applied in a conservative manner with 0.21 kg CH_4/kg COD[1].
Since the project is located in Asia, an MCF value of 0.738 will be adopted[2].
Calculated CH_4 emissions amount is transformed into CO_2 equivalents by multiplying with CH_4 global warming potential (GWP) of 21.

D. 2.2. Option 2: Direct monitoring of emission reductions from the project activity (values should be consistent with those in section E).

[1] Based on a conservative assumption provided in the new baseline methodology

[2] IPCC value for Asia, 0.9, multiplied by the conservativeness factor, 0.82, as provided in the new baseline methodology

(This option is not selected for the Project.)

D.2.2.1. Data to be collected in order to monitor emissions from the project activity, and how this data will be archived:								
ID number	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e),	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment

D.2.2.2. Description of formulae used to calculate project emissions (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.):

>>

D.2.3. Treatment of leakage in the monitoring plan

D.2.3.1. If applicable, please describe the data and information that will be collected in order to monitor leakage effects of the project activity

ID number	Data variable	Source of data	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment

No Leakage is identified from the Project.
Although each mill will use about 2 to 5 vehicles/day (depending on the size of mill) for transporting solid wastes, which are applied to palm oil fields inside the estate, those wastes are delivered through the existing fertilizer (EFB) transportation system of each mill. And therefore, no additional transportation vehicles will be needed, and thus, CO_2 emissions from such vehicles are negligible.

D.2.3.2. Description of formulae used to estimate leakage (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.)

>>

D.2.4. Description of formulae used to estimate emission reductions for the project activity (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.)

GHG emission reduction (tCO_2/yr) = Baseline Emissions (tCO_2/yr) - Project Emissions (tCO_2/yr)

D.3. Quality control (QC) and quality assurance (QA) procedures are being undertaken for data monitored

Data *(Indicate table and ID number e.g. 3.-1.; 3.2.)*	Uncertainty level of data (High/Medium/Low)	Explain QA/QC procedures planned for these data, or why such procedures are not necessary.
1	Low	Sampling will be carried out adhering to internationally recognized procedures.
2	Low	Flow meters will undergo maintenance/calibration subject to appropriate industry standards.
3	Low	Quality control for the existence and enforcement of relevant regulations and incentives is beyond the bounds of the project activity. Instead, the DOE will verify the evidence collected.

D.4 Please describe the operational and management structure that the project operator will implement in order to monitor emission reductions and any leakage effects, generated by the project activity

Project proponent will conduct the monitoring activities under its management regime shown below.

- KLK CDM Office

CDM Office will be established inside KLK Headquarter and the CDM Office is responsible for overall management of the CDM project, including the supervision of all monitoring activities.

The CDM Office is responsible for compiling and analyzing the data received from TQCC (Technology and Quality Control Centre of KLK), KDC (Kalumpang Development Corporation), and each of the 13 mills. The data will be compiled in an electronic format and stored at the Office during the Project period. The CDM Office is also responsible for checking the domestic/ regional regulations and incentives relevant to CH_4 emission control from open lagoons.

The CDM Office is also responsible for preparing and submitting a monitoring report, and acts as the contact point for verification.

- TQCC/ KDC

TQCC (KLK Technology and Quality Control Centre) and KDC (Kalumpang Development Corporation) are certified QA/QC laboratories of KLK, which are responsible for conducting POME tests and analysis. TQCC functions as a central laboratory of KLK's palm oil mills in Peninsular Malaysia, and KDC takes the same role in Sabah state.

TQCC and KDC issue Effluent Test Certificates endorsed by SAMM (Skim Akreditasi Makmal Malaysia), a Malaysian unified laboratory accreditation scheme, which is administered by Department of Standards Malaysia. TQCC and KDC have both obtained ISO/IEC 17025 in 2002.

TQCC and KDC's main tasks under the Project include testing and analysis of the data provided by target palm oil mills (TQCC for 7 mills in Peninsular Malaysia and KDC for 6 mills in Sabah), preparation of test reports, data storage, preparation of monitoring manuals for lab staff and mill workers, and provision of training. Calibration of POME analysis instrument is checked by external agencies (such as SIRIM-SIME or Pyrometro). Internal audit is conducted once a year, and external audit is conducted three times a year (such as JKM Proficiency Testing Program, Golden Hope Effluent Cross-check, and SLCC Cross-check). TQCC and KDC also conduct audit of assigned mills' laboratory at least once a year, and check all the monitoring activities are sufficiently performed.

- Palm oil mills

Main task for 13 target mills in Peninsular Malaysia and Sabah is to take samples of POME at a designated frequency and also read the digital flow meter for POME, and send the result to TQCC/ KDC for testing.

Each mill will regularly conducts internal audit and training is also provided to mill workers by TQCC/ KDC. Mill manager and assistant manager of each mill will cross check the result before reporting to KLK CDM Office.

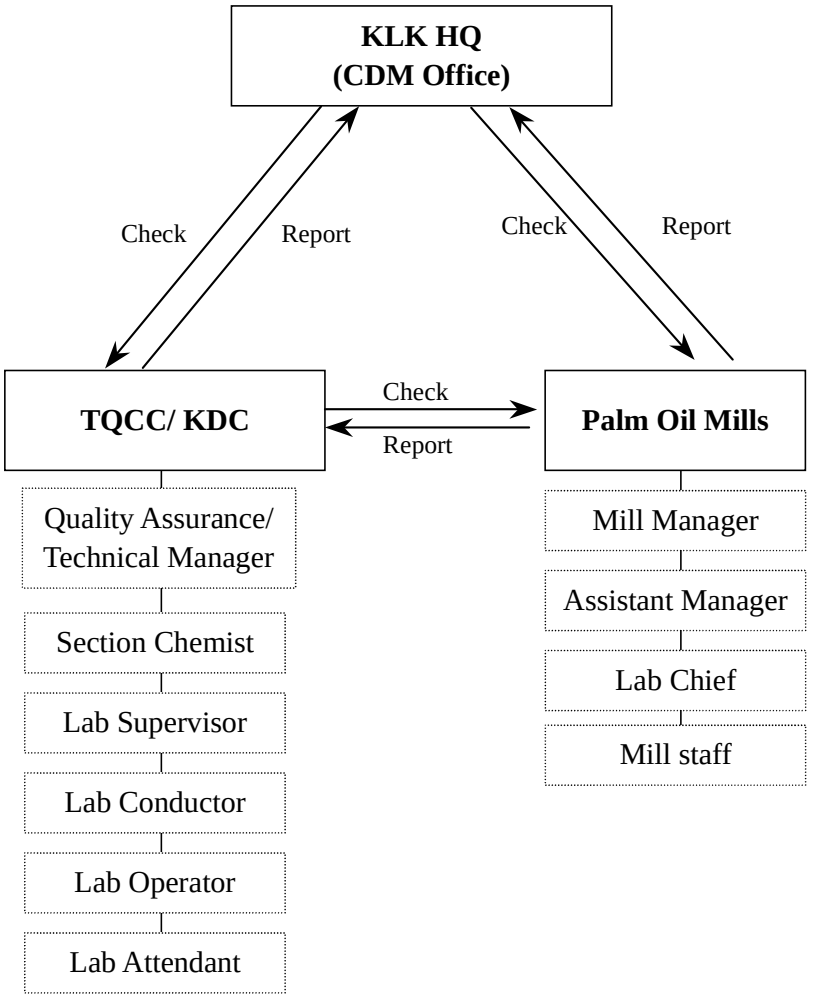

Figure 3 Monitoring Regimes for the Project

D.5	Name of person/entity determining the monitoring methodology:

< Date of completion of the monitoring methodology and plan>
23rd February 2006

< Name of person (s)/entity (ies) determining the monitoring methodology and plan >
Pacific Consultants International

Mr. Masahiko Fujimoto
Deputy General Manager
Energy and Environmental Management Department
Pacific Consultants International
1-7-5 Sekido Tama-shi, Tokyo 206-8550 Japan
Tel:+81-42-376-6248 Fax:+81-42-372-6358
Email: fujimotom@pcitokyo.co.jp

The above person/entity is not project participant.

SECTION E. Estimation of GHG emissions by sources

E.1. Estimate of GHG emissions by sources:

No GHG emission associated with the project activity is expected.

E.2. Estimated leakage:

No leakage is estimated from the Project.

E.3. The sum of E.1 and E.2 representing the project activity emissions:

0 t-CO_{2e}/year

E.4. Estimated anthropogenic emissions by sources of greenhouse gases of the baseline:

GHG emissions associated with the baseline consist of the methane emissions from an open lagoon wastewater treatment system.
The formulae to estimate baseline emissions in a given year is described as follows:

Baseline Emissions (tCO2/yr) = Methane emission from open lagoon (tCH_4/yr) * 21

Methane emission from open lagoon (t CH_4/yr) = Total COD (tCOD/yr) * B_o (tCH_4/tCOD) * MCF

Where
COD is Chemical Oxygen Demand of effluent entering lagoons (measured)
B_o is maximum methane producing capacity, and
MCF is methane conversion factor.

As described in D.2.1.4, a conservative value of 0.21 kg CH_4/kg COD for B_o and 0.738 MCF will be applied. The COD value is based on the average COD concentration provided in the national statistics (Malaysia Palm Oil Board).

Table 6: Methane emission from open lagoon

No	Factory Name	Anual POME volume (t/yr)	Annual average COD concentrartion (ppm)	Total COD (tCOD/yr)	Methane emission from open lagoon (t-CH_4/yr)
1	Batu Lintang	68,950	50,000	3,447	534
2	Tg. Malim	63,627	50,000	3,181	493
3	Tuan Mee	51,522	50,000	2,576	399
4	Kuala Pertang	38,748	50,000	1,937	300
5	Jeram Padang	93,366	50,000	4,668	723
6	Kekayaan	213,500	50,000	10,675	1,654

No	Factory Name	Anual POME volume (t/yr)	Annual average COD concentrartion (ppm)	Total COD (tCOD/yr)	Methane emission from open lagoon (t-CH_4/yr)
7	Paloh	107,972	50,000	5,399	837
8	KLK (S) Mill 1	59,694	50,000	2,985	463
9	KLK (S) Mill 2	114,193	50,000	5,710	885
10	Pinang	128,502	50,000	6,425	996
11	Bornion	106,515	50,000	5,326	825
12	Lungmanis	110,460	50,000	5,523	856
13	Rimmer	96,784	50,000	4,839	750
	Total	1,253,835	-	62,692	9,716

Baseline emissions are estimated as:

Baseline Emissions (tCO_2/yr)	=	**204,035 (t-CO_{2e}/year)**		
	=	9,716 (t-CH_4/yr)	*	21

Where

Methane emission from open lagoon (t CH_4/yr)	=	Total COD (tCOD/yr)	*	B_o (tCH_4/tCOD)	*	MCF
9,716 (t-CH_4/yr)	=	62,692 (tCOD/yr)	*	0.21 (t-CH_4/tCOD)	*	0.738

E.5. Difference between E.4 and E.3 representing the emission reductions of the project activity:

GHGs Emission reduction t-CO_{2e}/year	=	Baseline GHGs emission t-CO_{2e}/year	-	Project GHGs emission t-CO_{2e}/year
	=	204,035t-CO_{2e}/year	-	0 t-CO_{2e}/year
	=	**204,035 t-CO_{2e}/year**		

E.6. Table providing values obtained when applying formulae above:

GHGs emission reduction in first crediting period is estimated below:

Table 7: Estimated GHG emission reduction for the first crediting period

Year	Estimation of project emissions (tonnes of CO_2e)	Estimation of baseline emissions (tonnes of CO_2e)	Estimation of leakage (tonnes of CO_2e)	Estimation of emission reductions (tonnes of CO_2e)
2008	0	204,035	0	204,035
2009	0	204,035	0	204,035
2010	0	204,035	0	204,035
2011	0	204,035	0	204,035
2012	0	204,035	0	204,035
2013	0	204,035	0	204,035
2014	0	204,035	0	204,035
Total	0	1,428,245	0	1,428,245

SECTION F. Environmental impacts

F.1. Documentation on the analysis of the environmental impacts, including transboundary impacts:

The Project involves construction and operation of a POME treatment plant at the existing palm oil mill estate. According to the Malaysian Department of Environment, EIA is not required for the proposed activity under the Malaysian "Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 1987."

The new plant complies with all the Malaysian environmental regulations, and has no significant adverse impacts on the surrounding environment as described below.

- Water Pollution

  The new POME treatment plant cleans wastewater more thoroughly and efficiently than the current open lagoon treatment system. POME is sufficiently treated below the Malaysian effluent discharge limits (both watercourse and land use) and applied to palm oil estates as fertilizer supplement. In addition, the new plant reuses the treated POME as processing water, reducing the amount of water consumed at the mill.

Table 8: Watercourse Discharge limit from POME in Malaysia

Parameter	Unit	Limits
Biological Oxygen Demand (3-day, 30ºC)	mg/l	100*
Suspended Solids	mg/l	400
Oil and Grease	mg/l	50
Ammoniacal Nitrogen	mg/l	150 (filtered sample)
Total Nitrogen	mg/l	200 (filtered sample)
pH	-	5.0 – 9.0
Temperature	°C	45

*Note: BOD limit for land discharge is 5,000 mg/l
Source: Environmental Quality (Prescribed Premises) (Crude Palm-Oil) Regulation, 1977

- Air Pollution

New plant will not emit any harmful pollutants to environment and complies with the Malaysian air pollution standards.

- Solid Wastes

  New plant generates solid wastes during the POME processing phase. Solid wastes will amount for less than 2% of FFB (fresh fruit bunch) and they are environmentally sound. Wastes are applied to palm oil fields as fertilizer supplement together with EFB (empty fruit bunches), which is currently used as a fertilizer.

  Solid wastes and FFB do not go through any specific conversion processes to fertilizer; solid wastes and FFB are just applied to palm oil fields where they are naturally decomposed by ecosystem.

- Odour

  New plant solves the odour problem arising from the current POME treatment at open lagoons as the plant gives off no significant odour.

F.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:

As described in section F.1., no adverse impacts are expected as a result of the construction and operation of new POME treatment plants. Project proponent will take additional measures to mitigate environmental impacts as described above.

SECTION G. Stakeholders' comments

>>

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

KLK will invite and compile the local stakeholders comments before Malaysian government approval.

G.2. Summary of the comments received:

KLK will invite and compile the local stakeholders comments before Malaysian government approval.

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

KLK will invite and compile the local stakeholders comments before Malaysian government approval.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Kuala Lumpur Kepong Bhd. (KLK)
Street/P.O.Box:	
Building:	
City:	Ipoh
State/Region:	Perak Darul, Ridzuan
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Country:	Malaysia
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FAX:	
E-Mail:	ck.cheah@klk.com.my
URL:	http://www.klk.com.my/main.htm
Represented by:	
Title:	
Salutation:	Mr.
Last Name:	Chen Kin
Middle Name:	
First Name:	Cheah
Department:	
Mobile:	
Direct FAX:	
Direct tel:	
Personal E-Mail:	

Organization:	Japan Carbon Finance, Ltd
Street/P.O.Box:	1-3, Kudankita 4-Chome
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City:	Chiyoda-ku
State/Region:	Tokyo
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Country:	Japan
Telephone:	+81-3-5212-8885
FAX:	+81-3-5212-8886
E-Mail:	y-matsushita@jcarbon.co.jp
URL:	http://www.jcarbon.co.jp/
Represented by:	
Title:	
Salutation:	Mr.
Last Name:	Matsushita
Middle Name:	
First Name:	Yoichiro
Department:	Carbon Finance Department
Mobile:	
Direct FAX:	
Direct tel:	
Personal E-Mail:	

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funding is used in the project.

Annex 3

BASELINE INFORMATION

The following table shows the indicators used to determine baseline scenario.

Barriers	Indicators	Option 1	Option 2	Option 3	Option 4
		Anaerobic treatment at open lagoon	Open-tank digester	Closed-tank anaerobic treatment with electricity/ heat generation	Proposed project activity (without CDM)
Legal	Does the activity comply with laws and regulations such as standard of effluent water quality?	Yes	Yes	Yes	Yes
	Is there an incentive or financial assistance that favours the activity and/or technology?	No	No	No	No
Technical	Is the technology a common practice in Malaysia?	Yes	No	No	No
	Is the technology locally available?	Yes	Yes	No	No
	Are equipment and experiences/ skills locally available for the technology?	Yes	Yes	No	No
Investment	Is the technology attractive compared with other technologies?	Yes	No	No	No
	Does the technology involve NO financial risk?	Yes	No	No	No
Prevailing Practice	The country has experience in the activity/ technology.	Yes	Yes	No	No

Annex 4

DETAIL INFORMATION REGARDING MONITORING PLAN

Monitoring activities shall be carried out according to the monitoring system described below.

1. KLK Headquarter (CDM Office)

Monitoring and QA/QC System	
Report Preparation	Prepare sufficient monitoring reports to be validated by DOE.
Training program for monitoring staff	Hold a meeting regularly and provide information such as Project progress and overall monitoring system/ activities to the monitoring staff from TQCC/KDC and palm oil mills.
Data storage method and Storage period	Data provided by TQCC/KDC and 13 palm oil mills are stored in an electronic format or on hard copies. Data are stored during the Project period.
Check Method	Check regularly that the Project monitoring is sufficiently performed. Check also that the current monitoring system is functioning properly; if not, establish and perform appropriate countermeasures.

2. TQCC/ KDC

Monitoring and QA/QC System	
Data reporting methods	SAMM endorsed Effluent Test Certificates
Monitoring procedure manual	Laboratory Quality Manual, Laboratory Quality Assurance Procedures and other supporting documents which compliance with ISO/IEC 17025 requirements.
Training program for monitoring staff	Yearly In-house Training Program.
QA/QC of Monitored Data	
Calibration of Monitoring Device(s)	Monitoring devices calibrated by External ISO/IEC 17025 Accredited Bodies such as SIRIM-SIME & Pyrometro.
Data storage method and Storage period	Data Storage Methods: Filing system of quality & technical records. Storage Period: - Quality & Technical Records: Min 6 years - Training Records: All employees' training record will keep in their respective employee's personnel file if they still under employment.

Cross-Check Method	Internal Cross-check: - Intra Lab Effluent Cross-check (once/year) External Cross-check: - JKM Proficiency Testing Program (twice/year) - Golden Hope Effluent Cross-check (once/year) - SLCC Cross-check (KDC only)
Quality Management System	ISO / IEC 17025 – Year approved in 2002

3. Palm Oil Mills

Monitoring and QA/QC System	
Data reporting methods	KLK's standard format is used for reports.
Monitoring procedure manual	Laboratory manuals
Training program for monitoring staff	- On the job training - Training by mill's laboratory chief - Training by TQCC/KDC
QA/QC of Monitored Data	
Calibration of Monitoring Device(s)	Oil and flow measurement system/ instrument will be calibrated annually by a third-party according to the Malaysian standard.
Data storage method and Storage period	Data will be stored in an electronic format or in hard copies. Data will be stored during the project period.
Cross-Check Method	Internal crosscheck will be conducted by mill manager and assistant manager.

Each monitored item is monitored in the following manner.

a. COD Concentration in Raw POME

COD concentration (in kg COD/ m^3 effluent) in raw POME will be measured monthly at each mill.

Under the project, mill staff will take samples of raw POME before it enters the new treatment plant. Mill manager and assistant manager regularly check if the measuring activity is properly performed. Upon confirmation from the managers, sample is then sent to TQCC/ KDC for testing and analysis. Special attention is paid while delivering the sample to TQCC/ KDC so that POME content will not be altered during transportation.

Test results are sent to KLK CDM Office where all the data are compiled and stored as hard copies.

b. Volume of Raw POME

Amount of POME entering new treatment plant (in m^3) will be measured by reading a digital flow meter (that has a totalizer function) equipped to the new treatment plant.

Mill staff will read a meter daily and record the result. The result will be checked and calculated by mill manager and assistant manager. Upon confirmation, data will be aggregated monthly at each mill and sent to the CDM Office, where POME flow data from 13 mills will be stored as hard copies during the Project period.

c. Regulations and Incentives on GHG Emissions from Open Lagoon

Law/ regulation and incentives regarding the GHG emissions from open lagoons in Malaysia will be monitored annually by CDM Office.

d. Oil concentration in raw POME

Although it is not stipulated in the Monitoring Methodology, the Project will monitor the oil concentration in raw POME (in % of m^3 POME).

As one of the key factors that affect the Project IRR, amount of oil recovered from the new POME treatment plant will be identified. Oil content in POME is used to calculate the oil recovery volume by new treatment plant. If the CPO recovery volume and thus the profit from CPO is high enough to make the Project IRR over the project proponent's benchmark, baseline should be re-identified during the 2^{nd} crediting period.

Monitoring of oil concentration in raw effluent will be performed in the following manner.

Monitoring will be conducted by staff of each mill using the composite sampling method: a designed volume of POME sample, say 1 litre, is taken every two hours at the same sampling spot, and all the samples taken in one day are aggregated at the end of the day.

Oil concentration is measured at mill laboratory of each mill every day, and aggregated data is sent to CDM Office for financial analysis.

Although not forming a part of this CDM-PDD, information on the analysis of environmental impacts shall be collected and archived as per regulatory requirements.

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添付資料 3

新方法論（ベースライン）

CLEAN DEVELOPMENT MECHANISM
PROPOSED NEW METHODOLOGY: BASELINE (CDM-NMB)
Version 02 - in effect as of: 15 July 2005

CONTENTS
PROPOSED NEW METHODOLOGY: BASELINE (CDM-NMB)

SECTION A. Methodology title and summary description

Methodology title:

Baseline methodology for methane free organic wastewater treatment project activities at multiple factories
Version 1.0, as of 23rd February 2006

Summary description:

This methodology applies to project activities that aim to avoid methane emission from organic wastewater treatment plants at multiple factories. This methodology is structured in a way that would be practical enough for project activities with such characteristics to be undertaken as CDM project activities, and, at the same time, ensure satisfactory level of accuracy and conservativeness.

I. Analysis of applicability condition (Section B)

The applicability condition for project activity shall be checked.

II. Description of project boundary (Section C)

The project boundary shall be described. The project boundary shall include the physical, geographical site where the CH_4 free organic wastewater treatment plant and the anaerobic open lagoons locate, and the physical, geographical site of electricity generation utilized in this project activity.

III. Identification of baseline scenario (Section D)

The baseline scenario shall be determined.

Step i: Identification of alternatives to the proposed project activity and screening based on laws and regulations of wastewater treatment

- Project developer shall check whether any laws and regulations oblige the target factories to follow any baseline scenario or not, and alternatives comply with legal standards of wastewater quality or not.

Step ii: Investment analysis/Barrier analysis

- Project developer shall assess financial viability or barriers of all scenarios.

IV. Demonstration of additionality (Section E)

Using the results of Section D, project developer shall apply "Tool for the demonstration and assessment of additionality" (herein after referred as the "additionality tool") in order to prove that the proposed project activity is additional.

V. Calculation of emission reduction (Section F,G,H,I)

Baseline emission shall consist of methane emission from open lagoons wastewater treatment system.

Project activity emission shall include CO_2 emission from electricity consumption in CH_4 free organic wastewater treatment plant.

Leakage shall include CO_2 emission from transporting by-products from the plant.

Emission reductions shall be calculated as the difference between baseline and project emissions, taking into account any adjustment for leakage.

If this methodology is a based on a previous submission, please state the previous reference number (NMXXXX/AMXXXX) here:

Not applicable

SECTION B. Applicability/ project activity

Methodology procedure:

List of Category of project activity to which the methodology may apply.
The project activity would fall under category 13: Waste handling and disposal, utilizing the list of sectoral scopes of accreditation for DOEs.

Applicability Condition
This methodology is applicable to CH_4 free organic wastewater treatment project activities at multiple factories under the following conditions:

- The existing wastewater treatment system is an open lagoon system with an 'active' anaerobic condition, which is characterized as follows:
  - The depth of the open lagoon is at least 1 m,
  - The residence time of the sludge in the open lagoons should be at least one year, and
  - The temperature of the sludge in the open lagoons is always higher than 15 ^{o}C.

- No or negligible amount of CH_4 is emitted during operation of the proposed project plant according to the specifications.

Explanation/justification:

Firstly, this methodology assumes that the proposed project plant treats the organic wastewater, which would be treated under 'active' anaerobic condition in the existing open lagoon. The three conditions are important aspects in order to ensure the existing anaerobic condition is 'active', as required in version 2 of AM0013, "Forced methane extraction from organic water-water treatment plants for grid-connected electricity supply and/or heat production".

Secondly, this methodology assumes that the wastewater treatment plants do not emit methane during operation. This condition should be imposed on the project activity, which treats the organic wastewater without causing methane emission, unlike anaerobic method. Therefore, this condition distinguishes this methodology from other methodologies for methane reduction CDM project, such as power/heat

generation from captured methane, where captured methane could be released if the methane is not combusted.

Whether or not an approved methodology exists for the same conditions of application

No methodology with the same conditions of application has been approved although the following two approved methodologies apply to organic wastewater treatment projects:

- AM0013 " Forced methane extraction from organic waste-water treatment plants for grid-connected electricity supply and/or heat production"

The project activities for AM0013 are to supply electricity to the grid and/or produce heat from the combustion of CH_4 extracted at a single factory. On the other hand, the proposed methodology applies to project activities that avoid CH_4 emission from organic wastewater treatment at multiple factories without any electricity/heat generation.

- AM0022 " Avoided Wastewater and On-site Energy Use Emissions in the Industrial Sector"

The project activities for AM0022 are to generate electricity/heat for on-site use and to improve an existing wastewater treatment facility, which is assumed as the anaerobic treatment system, as stated in one of the applicability conditions, "In the project, the biogas recovered from the anaerobic treatment system is used on-site for heat and/or power generation, surplus biogas is flared." On the other hand, the proposed methodology applies to the project activities that install a new CH_4 free wastewater treatment plant to replace the existing open-lagoons without any electricity/heat generation.

SECTION C. Project Boundary

Methodology procedure:

The project boundary is defined as the physical, geographical site where the CH_4 free organic wastewater treatment plant and the anaerobic open lagoons locate, and the physical, geographical site of electricity generation utilized in this project activity.

Activity	Source	Gas	Included?	Justification / Explanation
Baseline	Wastewater treatment in anaerobic open lagoons	CO_2	No	Organic matters treated in anaerobic open lagoons are renewable.
		CH_4	Yes	Methane gas is emitted by biodegradation in anaerobic open lagoons.
		N_2O	No	N_2O emitted by biodegradation in anaerobic open lagoons is negligible.
Project Activity	Electricity consumption by CH4 free organic wastewater treatment plant	CO_2	Yes	In case source of electricity is national grid and/or diesel generation plant, the electricity consumption causes CO_2 emission. (Or, demonstration that it is negligible.)
		CH_4	No	Emission from electricity generation is negligible.
		N_2O	No	Emission from electricity generation is negligible.

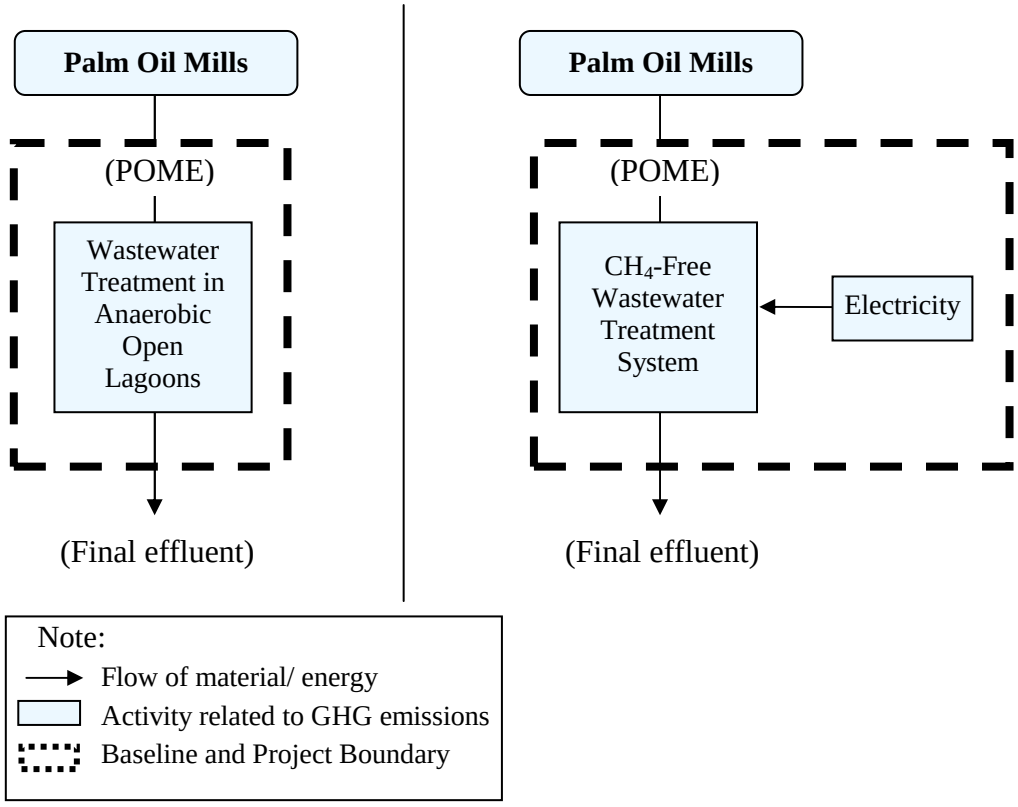


Figure : Baseline boundary (left) and Project boundary (right)

Explanation/justification:

In case the electricity used in this project activity is supplied from national grid and/or diesel generation plant, CO_2 emission from electricity consumption shall be included in the project boundary.

If the electricity is derived by renewable energy or biomass power generator, or project developer can show CO_2 emission from electricity consumption is less than 1% of the annual total CERs, it will be negligible for the project boundary.

D. Baseline Scenario

Methodology procedure:

The process of identifying the baseline scenario in the proposed methodology covers Steps 1 to 3 of the additionality tool, as follows:

Step i: Identification of alternatives to the proposed project activity and screening based on laws and regulations of wastewater treatment

The following three possible alternatives for baseline are considered:

Alternative 1: No improvement on the current wastewater treatment system, such as open-lagoon will be introduced (continuation of current practice);
Alternative 2: Alternative wastewater treatment system(s) will be introduced, and
Alternative 3: The proposed project plant will be introduced without CDM.

Project developer shall list up all alternative wastewater treatment systems to the proposed project and check whether any system is in fact obliged under relevant laws and regulations of host country. If such laws and regulations are effectively enforced, the obliged scenario should be implemented in baseline scenario, namely Alternative 2 or Alternative 3 for the proposed project. In case it is justified that such laws and regulations exist but are not effectively enforced, then proceed Step ii(a) or ii(b) on condition that the effectiveness of such laws and regulations are monitored in monitoring plan to confirm that such laws and regulations are not effectively enforced.

Project developer shall confirm whether all alternative systems/proposed project could comply with legal standards of waste-water quality with proper justification. This screening shall be conducted based on the information gathered from wastewater treatment activities of similar factories to the target ones.

Step ii(a): Financial analysis

1) Project developer shall identify a financial indicator (e.g., payback period, IRR, etc.) that is applied to the decision making on investment for the proposed project, and identify the benchmark value(s) (e.g., government bond rates) relevant to the financial indicator if available. In case the proposed project activity generates no financial or economic benefits other than CDM related income, then apply the simple cost analysis described in the additionality tool.

2) Project developer shall assess the financial indicator value of each alternative system with the relevant benchmark values or the value of the proposed project.
3) Project developer shall identify order of financial feasibility of all scenarios and check which scenarios, including the proposed project, are financially viable themselves if the benchmark value(s) is available.

Step ii(b): Barriers analysis

Project developer shall assess that both proposed project and alternative systems are facing certain barriers and thus will not be undertaken as a normal business practice for some reasons. Project

developer shall provide transparent justifications stating that legitimate barriers exist in the proposed project and alternative systems.

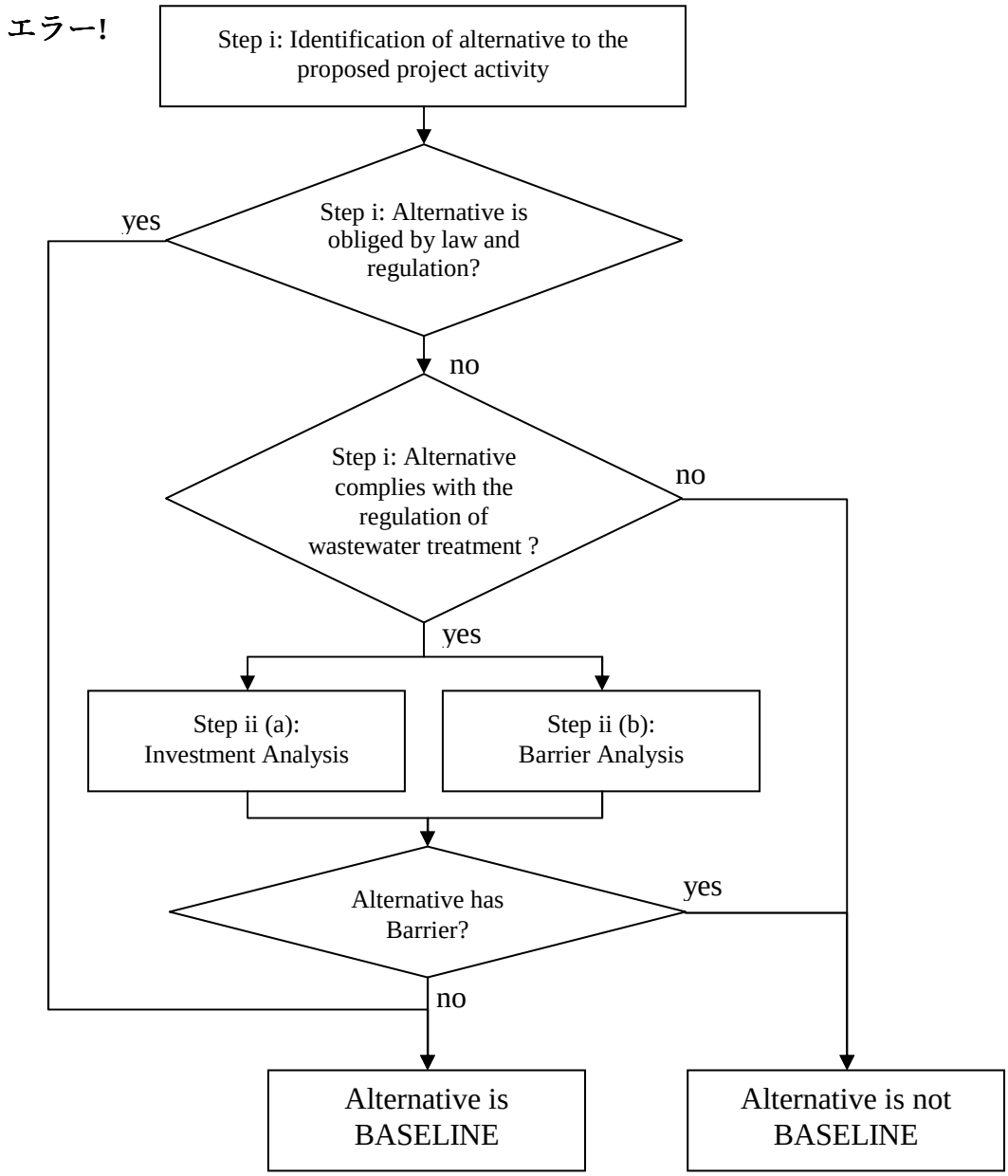


Figure : Summary of procedures of identifying baseline scenario

Explanation/justification:

This section of the methodology explains the process to identify the baseline scenario, and, concurrently covers Steps 1 through Step 3 of the additionality tool.

Explanation of Step i: Identification of alternatives to the proposed project activity and screening based on laws and regulations of wastewater treatment
Project developer shall check whether alternatives listed are obliged by law and regulation in the host country. This corresponds to part of Step 1 of the additionality tool.

The alternatives listed shall be identified to comply with the legal standards of wastewater quality. Because any alternative could not be brought about if the target factories will not comply with the legal standard. This corresponds to part of Step 1 of the additionality tool.

Explanation of Step ii(a): Investment analysis
This analysis shall be conducted in order to identify the scenarios that are economically beneficial thus are likely to be the normal business practice. This corresponds to part of Step 2 of the additionality tool.

Explanation of Step ii(b): Barrier analysis
This analysis shall be conducted mainly based on the information gathered through interviews/surveys and any other relevant information as necessary, regarding barriers including investment barriers, technological barriers and/or barriers due to prevailing practices as described in the additionality tool. This corresponds to part of Step 3 of the additionality tool.

SECTION E. Additionality

Methodology procedure:

Project developer shall apply "*Tool for demonstration and assessment of additionality (Annex I,EB16*)" to demonstrate the proposed project activity is additional using the results of Section D.

Explanation/justification:

Section D explains the process of determining the baseline scenario as CDM project activity. If the baseline scenario is determined as Alternative 1 "No improvement on the current wastewater treatment system such as open-lagoon, will be introduced (continuation of current practice)," the proposed project activity will constitute the CDM project activity. The process applied in Section D covers Steps 1 to 3 of the additionality tool.

Using the results of Section D, project developer shall apply all steps of additionality tool in order to prove that the proposed project activity is additional.

SECTION F. Baseline emissions

Methodology procedure:

GHG emissions associated with the baseline consist of the methane emissions from an open lagoon wastewater treatment system.

Baseline emission (tCO_2/yr)	=	Emissions from open lagoon wastewater treatment system (tCO_2/yr)				
	=	Methane emission from open lagoon wastewater treatment system (t CH_4/yr)	*	21 (tCO_2/tCH_4)		(equation 1)

Emission from open lagoon:
The baseline emissions from the open lagoon are estimated based on AM 0013/Version 02 shown below.

The baseline emissions from the lagoon are estimated based on the chemical oxygen demand (COD) of the effluent that would enter the lagoon in the absence of the project activity, multiplied by the maximum methane producing capacity (B_o) and a methane conversion factor (MCF).

These CH_4 emissions from wastewater should be calculated according to the IPCC Guidelines as follows:

Methane emission from open lagoon wastewater treatment system (t CH_4/yr)	=	Total COD (kg COD/yr)	*	B_o ($kgCH_4/kgCOD$)	*	MCF	*	0.001 (t/kg)	(equation 2)

where
COD Is Chemical Oxygen Demand of effluent entering lagoons (measured)
B_o Is maximum methane producing capacity
MCF Is methane conversion factor (fraction)

COD is to be directly measured by the project as the baseline activity level since the effluent that goes into the lagoon in the baseline situation is the same as the one that goes into the CH_4 free organic wastewater treatment plant in the project situation. In case the emission from open lagoon is estimated *ex ante*, COD is to be applied from national statistics or measuring data of effluent that goes into the lagoon.

The default IPCC value for B_o, the maximum amount of CH_4 that can be produced from a given quantity of wastewater, is 0.25 kg CH_4/kg COD. Taking into account the uncertainty of this estimate, project participants should use a value of 0.21 kg CH_4/kg COD[1] as a conservative assumption for Bo.

The IPCC guidelines do not provide a single default factor for MCF, but provide a value of 0.9 for MCF in Africa, Asia and Latin America & Caribbean[2]. In order to reflect the uncertainty of this key parameter

[1] Lowest value provided by IPCC Good Practice Guidance, Page 5.17

and for the purpose of providing conservative estimates of emission reductions, a conservativeness factor must be applied to the default value, assuming an uncertainty range of 50-100% and in accordance with table 2 below. The MCF default value to be adopted for projects in these area will be then 0.738.

For North America, Australia and New Zealand, the IPCC factor is 0.7. With the same assessment of conservativeness the MCF default value for projects in this area will be 0.574.

Where project participants use own estimates for MCF, for example based on measurements undertaken, they should justify these values, estimate the uncertainty range associated with these estimates and apply the corresponding conservativeness factors.

Table: Conservativeness factors[3]

Estimated uncertainty range (%)	Assigned uncertainty band (%)	Conservativeness factor where lower values are more conservative
Less than or equal to 10	7	0.98
Greater than 10 and less than or equal to 30	20	0.94
Greater than 30 and less than or equal to 50	40	0.89
Greater than 50 and less than or equal to 100	75	0.82
Greater than 100	150	0.73

The total baseline CH_4 emissions are translated into CO_2 equivalent emissions by multiplying by its global warming potential (GWP) of 21.

Explanation/justification:

In the methodology of calculating methane emission from open lagoon, equation, parameters which are maximum methane producing capacity (Bo) and methane conversion factor(MCF), and conservativeness manner for parameter setting are based on AM 0013/Version 02.

[2] Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories: Reference Manual. Table 6-8.

[3] The general guidance for the procedure is included in document FCCC/SBSTA/2003/10/Add.2, pages 11-27.

SETION G. Project activity emissions

Methodology procedure:

GHG emissions associated with the project activity consist of emissions related to the consumption of electricity in CH_4 free organic wastewater treatment plant.

The formulae to estimate project emissions is described as follows:

Project activity emission (tCO_2/yr)	=	Emission from electricity consumption by CH_4 free organic wastewater treatment plant (tCO_2/yr)	(equation 3)

Emission from electricity consumption by CH4 free organic wastewater treatment plant:

Emission from electricity consumption by CH_4 free organic wastewater treatment plant (tCO_2/yr)	=	Electricity consumption by CH_4 free organic wastewater treatment plant (MWh/yr)	*	Carbon emission factor for electricity (tCO_2/ MWh)	(equation 4)

Carbon emission factor for electricity by source (e.g., national grid, diesel, etc) shall be calculated in a conservative manner. If the CH_4 free organic wastewater treatment plant is powered by electricity derived by renewable energy or biomass power generator, CO_2 emission from electricity consumption is considered to be zero. If project developer can show CO_2 emission from electricity consumption are less than 1% of the annual total CERs, it will be negligible.

Explanation/justification:

Carbon emission factor for electricity from national grid shall be determined in a conservative manner, using a weighted average emission factor of the grid mix, or determined in line with ACM0002. Carbon emission factor for electricity from diesel power generation shall be calculated in accordance with ACM0002.

SECTION H. Leakage

Methodology procedure:

Leakage is expected to arise from the consumption of fossil fuels for transporting by-product wastes.

Emission from fossil fuel consumption of transporting by-product wastes:

Leakage (tCO_2/yr)	=	Emission from fossil fuel consumption of transporting by-product wastes (tCO_2/yr)	=	Fossil fuel consumption of transporting by-product wastes (ton/yr)	*	Carbon emission factor of fossil fuel type (tCO_2/ ton)		(equation 5)

Carbon emission factor of fossil fuel type shall be calculated in a conservative manner. It shall be determined based on the "Revised 1996 IPCC Guidelines" and local statistics of calorific value of fossil fuel. If the emission from fossil fuel consumption of transporting by-product wastes is demonstrated to be relatively small in the total emissions, it could be neglected.

Explanation/justification:

Methane leakage from CH_4 free organic wastewater treatment plant is negligible because it is neglected in the applicability condition.

SECTION I. Emission reductions

Methodology procedure:

Emission reduction (tCO_2/yr)	=	Baseline emission (tCO_2/yr)	-	Leakage (tCO_2/yr)	-	Project activity emission (tCO_2/yr)		(equation 6)

Explanation/justification:

Emission reductions are calculated as the difference between baseline and project emissions, taking into account any adjustment for leakage.

SECTION J. Changes required for methodology implementation in 2nd and 3rd crediting periods (if relevant / optional)

Methodology procedure:

No changes are required in second and third crediting period.

Explanation/justification:

N/A

SECTION K. Selected baseline approach from paragraph 48 of the CDM modalities and procedures

Choose One (delete others):

Existing actual or historical emissions, as applicable

Explanation/justification of choice:

The approach listed in paragraph 48 (a) of CDM M&P is considered the most appropriate because of the following reasons:

- Considering barriers to investment, there is no possibility for the introduction of economically attractive technologies to the target plant except continuation of current practice. For this reason. The approach listed in paragraph 48 (b) of CDM M&P is not applied.

- No similar projects have actually been conducted in the target country or similar regions except continuation of current practice. For this reason. The approach listed in paragraph 48 (c) of CDM M&P is not applied.

SECTION I. Other Information

Explanation/justification:

1) Explanation of how the baseline methodology allows for the development of baselines in a transparent and conservative manner:

- Baseline scenario is determined based on stepwise approach.
- The real and verifiable data is applied with little use of default value.
- The approved *additionality tool* is fully applied.

These allow transparent and conservative baseline development.

2) What are the potential strengths and weaknesses of this proposed new methodology?

Strength:
- This methodology is simple and is based on stepwise approach.
- This methodology applies the approved *additionality tool* in full.
- The methodology of baseline emission calculation is based on the approved baseline methodology, namely AM0013/version02.

Weakness:
N/A

-.-.-.-

添付資料４

新方法論（モニタリング）

CLEAN DEVELOPMENT MECHANISM
PROPOSED NEW METHODOLOGY: MONITORING (CDM-NMM)
Version 01 - in effect as of: 1 July 2004

CONTENTS

SECTION A. Identification of methodology

A.1. Title of the proposed methodology:

Monitoring methodology for methane free organic wastewater treatment project activities at multiple factories
Version 1.0, as of 23rd February 2006

A.2. List of category(ies) of project activity to which the methodology may apply:

The project activity would fall under category 13: Waste handling and disposal, utilizing the list of sectoral scopes of accreditation for DOEs.

A.3. Conditions under which the methodology is applicable to CDM project activities:

This methodology is applicable to CH_4 free organic wastewater treatment project activities at multiple factories under the following conditions:

- The existing waste water treatment system is an open lagoon system with an 'active' anaerobic condition, which is characterized as follows:
  - The depth of the open lagoon is at least 1 m,
  - The residence time of the sludge in the open lagoons should be at least one year, and
  - The temperature of the sludge in the open lagoons is always higher than 15 ^{o}C

- No or negligible amount of CH_4 is emitted during operation of the proposed project plant according to the specifications

A.4. What are the potential strengths and weaknesses of this proposed new methodology?

Strength:
The monitoring data will be collected by usual activities of project participants and not particularly prepared only for the CDM project activity. So it will be collected through usual measurement methods and system. Third-party confirmation system is also established, for example, the QA/QC system according to the international standard such as ISO 9001, which could confirm the monitoring condition objectively. The methodology of monitoring is mainly based on the AM0013/version02.

Weakness:
N/A

SECTION B. Proposed new monitoring methodology

B.1. Brief description of the new methodology:

The methodology of monitoring, which is mainly based on the AM0013/version02, is schematically presented in the figure below, showing the flows between the processes. The parameters for each of the flows to be monitored are shown in dashed boxes.

Monitoring data to be collected for the project activity includes:

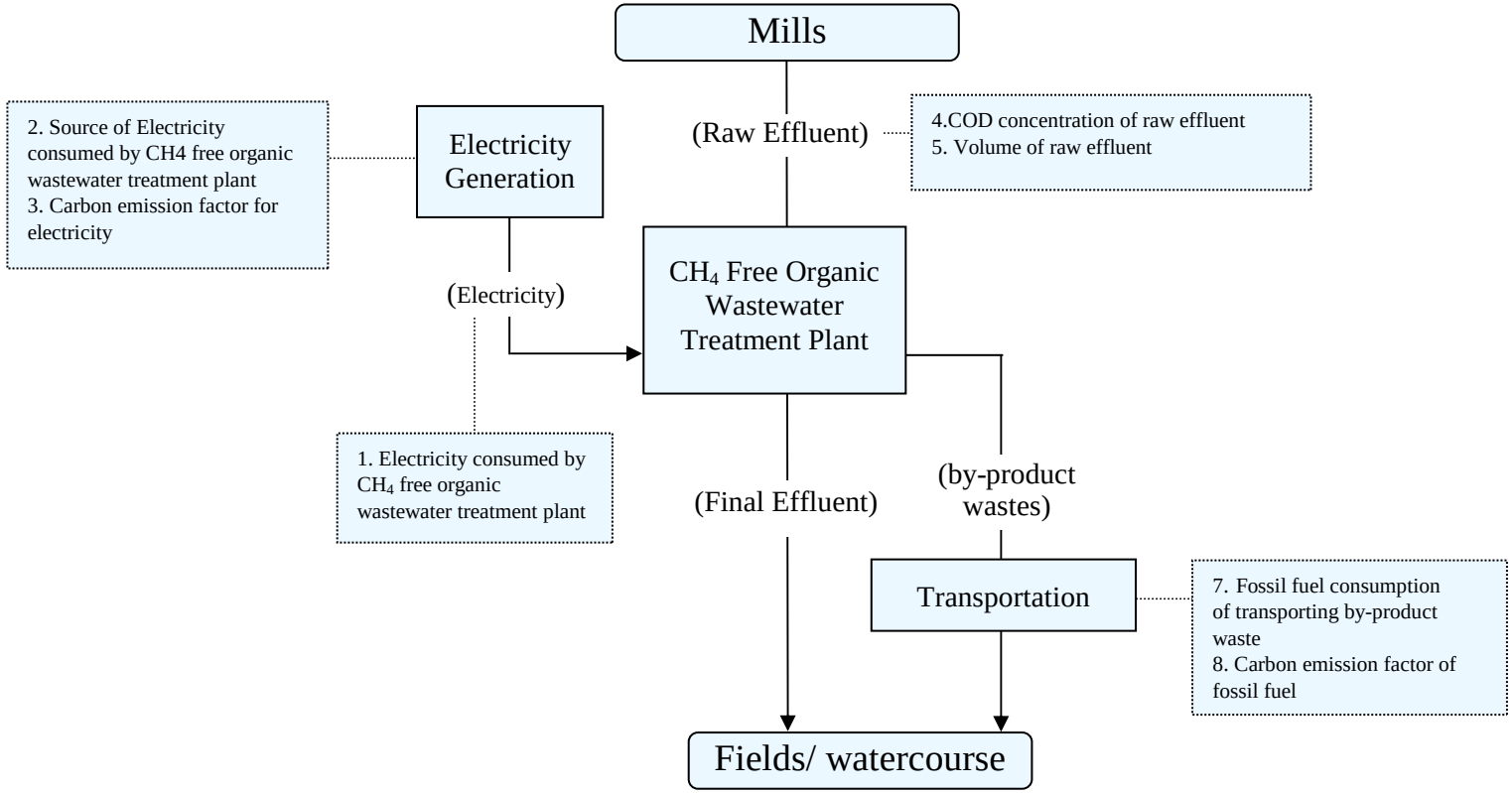
1. Electricity consumed by CH4 free organic wastewater treatment plant
2. Source of Electricity consumed by CH4 free organic wastewater treatment plant
3. Carbon emission factor for electricity

Monitoring data to be collected for the baseline includes:

4. COD concentration of raw effluent
   (at CH_4 free organic wastewater treatment plant inlet)
5. Volume of raw effluent
   (at CH_4 free organic wastewater treatment plant inlet)
6. Regulations and incentives relevant to CH_4 emission from effluent

Monitoring data to be collected for the leakage includes:

7. Fossil fuel consumption of transporting by-product wastes
8. Carbon emission factor of fossil fuel


Mills
(Raw Effluent)
4.COD concentration of raw effluent
5. Volume of raw effluent
2. Source of Electricity consumed by CH4 free organic wastewater treatment plant
3. Carbon emission factor for electricity
Electricity Generation
(Electricity)
CH4 Free Organic Wastewater Treatment Plant
1. Electricity consumed by CH4 free organic wastewater treatment plant
(Final Effluent)
(by-product wastes)
Transportation
7. Fossil fuel consumption of transporting by-product waste
8. Carbon emission factor of fossil fuel
Fields/ watercourse

B.2. Option 1: Monitoring of the emissions in the project scenario and the baseline scenario:

B.2.1. Data to be collected or used in order to monitor emissions from the project activity, and how this data will be archived:

ID number	Data variable	Source of data	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
1	Electricity consumed by CH_4 free organic wastewater treatment plant	Operation centre at palm oil mill	MWh	m	monthly	100%	Electronic/paper	To be measured from electrical meters installed at the plant. Data quality is assured by cross checking measured data.
2	Source of Electricity consumed by CH_4 free organic wastewater treatment plant	Operation centre at palm oil mill	-	m	monthly	100%	Electronic/paper	To be monitored if the source of electricity is electricity grid, diesel or renewable sources.
3	Carbon emission factor for electricity	Statistics	tCO_2e/ MWh	c	yearly	100%	Electronic/paper	To be calculated in a conservative manner based on statistics of national grid, and/or fossil fuel consumption and electricity generation of power generator.

Note: Data needs to be archived until two years following after the end of the crediting period.

B.2.2. Description of formulae used to estimate project emissions (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.):

Project emissions consist of the CO_2 emissions related to the consumption of electricity in the CH_4 free organic wastewater treatment plant.
The formulae to estimate project emissions is described as follows:

Project activity emission (tCO_2/yr)	=	Emission from electricity consumption by CH_4 free organic wastewater treatment plant (tCO_2/yr)			(equation 1)
Emission from electricity consumption by CH4 free organic wastewater treatment plant (tCO_2/yr)	=	Electricity consumption by CH4 free organic wastewater treatment plant (MWh/yr)	*	Carbon emission factor for electricity (tCO_2/ MWh)	(equation 2)

Carbon emission factor for electricity by source (e.g., national grid, diesel, etc) shall be estimated based on conservative manner. If the CH_4 free organic wastewater treatment plant is powered by electricity derived from renewable energy or biomass power generator, CO_2 emission from electricity consumption is considered to be zero. If project developer can show CO_2 emission from electricity consumption are less than 1% of the annual total CERs, it will be negligible.

B.2.3. Relevant data necessary for determining the baseline of anthropogenic emissions by sources of greenhouse gases (GHG) within the project boundary and how such data will be collected and archived:								
ID number	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e),	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
4	COD concentration in raw effluent (at CH_4 free organic wastewater treatment plant inlet)	Laboratory	kgCOD/ m^3 raw effluent	m	monthly	100%	Electronic/ Paper	To be measured based on the method of industrial standard.
5	Volume of raw effluent (at CH_4 free organic wastewater treatment plant inlet)	Operation centre at palm oil mill	m^3 raw effluent	m	continuously	100%	Electronic/ Paper	To be measured by flow meters at the plant. Measuring devices are to be calibrated according to the industrial standard.
6	Regulations and incentives relevant to CH_4 emission from effluent	National/ regional legislation	-	-	annually	100%	Electronic/ Paper	To be checked according to law, regulation and national policy.

Note: Data needs to be archived until two years following after the end of the crediting period.

B.2.4. Description of formulae used to estimate baseline emissions (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.):

Baseline emissions consist of the methane emissions from an open lagoon wastewater treatment system.
The formulae to estimate baseline emissions in a given year is described as follows:

Baseline Emissions (tCO_2/yr)	=	Emission from open lagoon wastewater treatment system (tCO_2/yr)							(equation 3)
	=	Methane emission from open lagoon wastewater treatment system (t CH_4/yr)	*	21 (t CO_2/t CH_4)					
Methane emission from open lagoon wastewater treatment system (t CH_4/yr)	=	Total COD (kg COD/yr)	*	B_o ($kgCH_4$/kgCOD)	*	MCF	*	0.001 (t/kg)	(equation 4)

where
COD is Chemical Oxygen Demand of effluent entering lagoons (measured)
B_o is maximum methane producing capacity, and
MCF is methane conversion factor.

The default IPCC value for B_o should be applied in a conservative manner with 0.21 kg CH_4/kg COD.
Since the project is located in Asia, an MCF default value of 0.738 should be adopted in Africa, Asia and Latin America & Caribbean in a conservative manner. For North American, Australia and New Zealand, an MCF default value should be applied with 0.574 in a conservative manner.

Where project participants use own estimates for MCF, for example based on measurements undertaken, they should justify these values, estimate the uncertainty range associated with these estimates and apply the corresponding conservativeness factors.

Table: Conservativeness factors[1]

Estimated uncertainty range (%)	Assigned uncertainty band (%)	Conservativeness factor where lower values are more conservative
Less than or equal to 10	7	0.98
Greater than 10 and less than or equal to 30	20	0.94
Greater than 30 and less than or equal to 50	40	0.89
Greater than 50 and less than or equal to 100	75	0.82
Greater than 100	150	0.73

Calculated CH_4 emissions amount is transformed into CO_2 equivalents by multiplying with CH_4 global warming potential (GWP) of 21.

B.3. Option 2: Direct monitoring of emission reductions from the project activity:

The Option 2 was not selected for this methodology.

B.3.1. Data to be collected or used in order to monitor emissions from the project activity, and how this data will be archived:

ID number	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e),	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment

B.3.2. Description of formulae used to calculate project emissions (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.):

B.4. Treatment of leakage in the monitoring plan:

Leakage is expected to arise from the fossil fuel consumption of transporting by-product wastes.

[1] The general guidance for the procedure is included in document FCCC/SBSTA/2003/10/Add.2, pages 11-27.

B.4.1. If applicable, please describe the data and information that will be collected in order to monitor leakage effects of the project activity:								
ID number	Data variable	Source of data	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
7	Fossil fuel consumption of transporting by-product wastes	Operation centre at palm oil mill	Ton/ month	m	monthly	100%	Electronic/paper	To be measured by reading fuel consumption meter of vehicle.
8	Carbon emission factor of fossil fuel	IPCC guideline, Statistics	tCO_2e/ton	c	yearly	100%	Electronic/paper	To be calculated in a conservation manner based on IPCC guideline and calorific value of fossil fuel.

B.4.2. Description of formulae used to estimate leakage (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.):

Leakage (tCO_2/yr) = Emission from fossil fuel consumption of transporting by-product wastes (tCO_2/yr) (equation 5)

Emission from fossil fuel consumption of transporting by-product waste (tCO_2/yr) = Fossil fuel consumption of transporting by-product waste (ton/yr) * Carbon emission factor of fossil fuel type (tCO_2/ ton) (equation 6)

Carbon emission factor of fossil fuel type shall be calculated in a conservative manner. It shall be determined based on the "Revised 1996 IPCC Guidelines" and local statistics of calorific value of fossil fuel. If the emission from fossil fuel consumption of transporting by-product wastes is demonstrated to be relatively small in the total emissions, it could be neglected.

B.5. Description of formulae used to estimate emission reductions for the project activity (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.):

GHG emission reduction (tCO_2/yr)	=	Baseline Emissions (tCO_2/yr)	-	Project Emissions (tCO_2/yr)	-	Leakage (tCO_2/yr)						(equation 7)
GHG emission reduction (tCO_2/yr)	=	Total COD (kg COD/yr)	*	B_o ($kgCH_4$/kgCOD)	*	MCF	*	0.001 (t/kg)	*	21		
	-	Fossil fuel consumption of transporting by-product waste (ton/yr)	*	Carbon emission factor of fossil fuel type (tCO_2/ ton)	-	Electricity consumption by CH4 free organic wastewater treatment plant (MWh/yr)	*	Carbon emission factor for electricity (tCO_2/ MWh)				(equation 8)

B.6. Assumptions used in elaborating the new methodology:

In elaborating the new methodology, the following assumption is used.

Based on the specifications of the proposed project plant, CH_4 from the plant is not emitted or CH_4 amount is negligible during operation.

B.7. Please indicate whether quality control (QC) and quality assurance (QA) procedures are being undertaken for the items monitored:		
Data	Uncertainty level of data (High/Medium/Low)	Explain QA/QC procedures planned for these data, or why such procedures are not necessary.
1	Low	Electricity meters will undergo maintenance/calibration subject to appropriate industry standards. The accuracy of the meter readings will be verified by receipts issued by the purchasing power company.
2	Low	This data will be reviewed by QA/QC personnel.
3	Low	This data will be reviewed by QA/QC personnel.
4	Low	Sampling will be carried out adhering to internationally recognized procedures.
5	Low	Flow meters will undergo maintenance/calibration subject to appropriate industry standards.
6	Low	Quality control for the existence and enforcement of relevant regulations and incentives is beyond the bounds of the project activity. Instead, the DOE will verify the evidence collected.
7	Low	Meter readings will be compared to fuel purchase receipts.
8	Low	This data will be reviewed by QA/QC personnel.

B.8. Has the methodology been applied successfully elsewhere and, if so, in which circumstances?

Regarding the monitoring items identified, there is no particular problem on their implementation arrangements as well as ensuring data accuracy, since many items are routinely read or measured at the existing process.
Nevertheless, there are no existing cases that provide results of a monitoring plan for projects similar to this one.

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添付資料 5

仮有効性審査レポート

PRELIMINARY VALIDATION REPORT

IMPROVEMENT OF POME TREATMENT SYSTEM AT PALM OIL MILLS IN MALAYSIA

REPORT NO. 2006-0221

REVISION NO. 0

DET NORSKE VERITAS

PRELIMINARY VALIDATION REPORT

Date of first issue: 2006-02-10	Project No.: 45010012
Approved by: Einar Telnes Technical Director	Organisational unit: DNV Certification, International Climate Change Services
Client: Pacific Consultants International	Client ref.: Mr. Masahiko Fujimoto

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DNV Certification

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Org. No: NO 945 748 931 MVA

Summary:

Det Norske Veritas Certification has carried out a preliminary validation of the "Improvement of POME Treatment System at Palm Oil Mills in Malaysia" project. This report summarises the preliminary findings of the validation of the project, performed on the basis of UNFCCC criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

Based upon PCI's request, the preliminary validation has been performed as a desk review of the project design, the baseline determination and the GHG emission reduction estimates presented in the project design document submitted by PCI. In addition, PCI has been visited and staff related to the project has been interviewed. The preliminary validation has NOT assessed Malaysian requirements for CDM projects, including sustainable development criteria, and the assumptions made for the baseline determination. These topics will be assessed through interviews with stakeholders in Malaysia at a later stage.

The project is likely to mitigate GHG emission by introducing the POME treatment technology, avoiding the emission of biogas from open lagoons. However, the project investment analysis and other barriers should be reviewed through the interviews with stakeholders in Malaysia before the conclusion whether the project is environmentally additional to what would have occurred in the absence of the project. Furthermore, contribution to the sustainable development in Malaysia and clarification requests presented in this report need to be addressed

Report No.: 2006-0221	Subject Group: Environment	
Report title: Improvement of POME Treatment System at Palm Oil Mills in Malaysia		
Work carried out by: Tsuyoshi Nakao		
Work verified by: Michael Lehmann		
Date of this revision: 2006-02-08	Rev. No.: 0	Number of pages: 11

Indexing terms

Key words Climate Change Kyoto Protocol Validation Clean Development Mechanism	Service Area Verification Market Sector Waste Treatment

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Abbreviations

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
CH_4	Methane
CL	Clarification request
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
COD	Chemical Oxygen Demand
CPO	Crude Palm Oil
DNV	Det Norske Veritas
DNA	Designated National Authority
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
IRR	Internal Rate of Return
KDC	Kalumpang Development Corporation
KLK	Kuala Lumpur Kepong Berhad
MP	Monitoring Plan
MPOB	Malaysian Palm Oil Board
MVP	Monitoring and Verification Plan
N_2O	Nitrous oxide
NGO	Non-governmental Organisation
ODA	Official Development Assistance
PCI	Pacific Consultants International
PDD	Project Design Document
POME	Palm oil mill effluent
SD	Sustainable Development
TQCC	KLK Technology and Quality Center
UNFCCC	United Nations Framework Convention on Climate Change

1 INTRODUCTION

Pacific Consultants International (PCI) has commissioned Det Norske Veritas Certification (DNV) to perform a validation of the "Improvement of POME Treatment System at Palm Oil Mills, Malaysia" project (hereafter called "the project"). The project intends to introduce high-efficient palm oil mill effluent (POME) treatment plants at 13 palm oil mills in Malaysia, replacing the currently used open-lagoons. The project is expected to reduce GHG emissions through avoidance of methane emissions from the open lagoons.

This report summarises the findings of a preliminary validation of the project, performed on the basis of UNFCCC criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to the Kyoto Protocol criteria and the CDM rules and modalities as agreed in the Marrakech Accords, and the subsequent decisions by the CDM Executive Board.

The validation team consisted of the following personnel:

Mr. Tsuyoshi Nakao	DNV Yokohama, Japan	Team Leader, Waste management expert
Mr. Michael Lehmann	DNV Oslo, Norway	Technical reviewer

1.1 Validation Objective

The purpose of a validation is to have an independent third party assess the project design. In particular, the project's baseline, the monitoring plan, and the project's compliance with relevant UNFCCC and host country criteria are validated in order to confirm that the project design as documented is sound and reasonable and meets the identified criteria. Validation is a requirement for all CDM projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of certified emission reductions (CERs).

1.2 Scope

The validation scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords and the relevant decisions by the CDM Executive Board. The validation team has, based on the recommendations in the IETA/PCF Validation and Verification Manual /3/ employed a risk-based approach, focusing on the identification of significant risks for project implementation and the generation of CERs.

Based on PCI's request, DNV has only carried out a preliminary validation with a limited scope. This preliminary validation included a desk review of the project design, the baseline determination and the GHG emission reduction estimates presented in the project design document (PDD) submitted by PCI /1/. In addition, PCI has been visited and staff involved in the project has been interviewed /5/. However, the preliminary validation has NOT assessed Malaysian requirements for CDM projects, including sustainable development criteria, and the assumptions made for the baseline determination. These topics will be assessed through interviews with stakeholders in Malaysia at a later stage. Moreover, DNV has not yet invited comments by Parties, stakeholders and UNFCCC accredited NGOs. Hence, the preliminary

validation carried out by DNV Certification does not represent a complete validation of the project in accordance with the CDM modalities and procedures.

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

1.3 Description of Proposed CDM Project

The proposed project intends to introduce high-efficient POME treatment plants at 13 palm oil mills operated by Kuala Lumpur Kepong Berhad (KLK) in Malaysia. These 13 mills process about 2.5 million tons of fresh fruit bunches (FFB) for the production of palm oil and this process produces about 1.2 million tons of POME. POME discharged at these mills is currently treated anaerobically using open lagoons, and the treated POME is eventually applied to palm oil fields as irrigation water.

In the proposed CDM project the implementation of new treatment plants will enable the efficient separation and recovery of the oil content and solid wastes contained in POME. After going through the aeration process, 70% of the POME is reused at the mill and the remaining 30% are recycled as irrigation water. Recovered solid wastes are dewatered and applied to palm oil fields as fertilizer supplement. The introduction of high-efficient POME treatment plants will replace the currently practiced open-lagoon process, and the project activity is expected to avoid methane emissions compared to those which would otherwise occur with traditional open lagoon systems (baseline scenario). The project is estimated to abate CH_4 emissions to the extent of 51 885 tCO_2e in the 1st year and 204 035 tCO_2e in the subsequent years.

2 METHODOLOGY

The preliminary validation consisted of the following three phases:

I Desk review of the presented project documentation,

II Follow-up interviews at PCI, and

III The resolution of outstanding issues and the issuance of a preliminary validation report.

This preliminary validation report summarises the findings after phase I and II.

2.1 Review of Documents

The draft Project Design Document (PDD) of December 2005 /1/ submitted by PCI and the new proposed baseline and monitoring methodology /2/ that is applied by the project were assessed.

In order to ensure transparency, a validation protocol was customised for the project, according to the Validation and Verification Manual (VVM) /3/. The protocol shows, in a transparent manner, criteria (requirements), means of verification and the results from validating the identified criteria. The validation protocol serves the following purposes:

- It organises, details and clarifies the requirements a CDM project is expected to meet;
- It ensures a transparent validation process where the validator will document how a particular requirement has been validated and the result of the validation.

The validation protocol consists of three tables. The different columns in these tables are described in Figure1.

Validation Protocol Table 1: Mandatory Requirements for CDM Project Activities			
Requirement	***Reference***	***Conclusion***	***Cross reference***
The requirements the project must meet.	*Gives reference to the legislation or agreement where the requirement is found.*	*This is either acceptable based on evidence provided (**OK**), a **Corrective Action Request (CAR)** of risk or non-compliance with stated requirements or a request for **Clarification (CL)** where further clarifications are needed.*	*Used to refer to the relevant checklist questions in Table 2 to show how the specific requirement is validated. This is to ensure a transparent Validation process.*

Validation Protocol Table 2: Requirement Checklist				
Checklist Question	***Reference***	***Means of verification (MoV)***	***Comment***	***Draft and/or Final Conclusion***
The various requirements in Table 1 are linked to checklist questions the project should meet. The checklist is organised in seven different sections. Each section is then further sub-divided. The lowest level constitutes a checklist question.	*Gives reference to documents where the answer to the checklist question or item is found.*	*Explains how conformance with the checklist question is investigated. Examples of means of verification are document review (DR) or interview (I). N/A means not applicable.*	*The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is further used to explain the conclusions reached.*	*This is either acceptable based on evidence provided (**OK**), or a **Corrective Action Request (CAR)** due to non-compliance with the checklist question (See below).A request for **Clarification (CL)** is used when the validation team has identified a need for further clarification.*

Validation Protocol Table 3: Resolution of Corrective Action Requests and Requests for Clarification			
Draft report corrective action requests and requests for clarifications	***Ref. to Table 2***	***Summary of project participants' response***	***Final conclusion***
If the conclusions from the draft Validation are either a Corrective Action Request or a Clarification Request, these should be listed in this section.	*Reference to the checklist question number in Table 2 where the Corrective Action Request or Clarification Request is explained.*	*The responses given by the project participants during the communications with the validation team should be summarised in this section.*	*This section should summarise the validation team's responses and final conclusions. The conclusions should also be included in Table 2, under "Final Conclusion".*

Figure 1 Validation protocol tables

2.2 Follow-up Interviews

On 24 January 2006, a lead validator performed interviews with key personnel of PCI to confirm selected information and to resolve issues identified in the document review /5/. The main topics of the interviews are summarised in Table1.

Table 1 Interview topics

Interviewed organisation	Interview topics
Pacific Consultants International (PCI)	➢ Project's environmental additionality as mandated in Article 12 of the Kyoto Protocol ➢ Technological, institutional, legal/policy, investment, market, environmental and/or other barriers to investment in the projects ➢ Project technology and provisions for technology and capacity transfer to the host country ➢ Estimation of emission reductions and potential leakage

2.3 Corrective Action Requests and Resolution of outstanding issues

The objective of this phase of the validation was to resolve the requests for corrective actions (CAR) and requests for clarification (CL), which needed to be resolved for DNV Certification's positive conclusion on the project design.

Corrective Action Requests (CAR) are issued, where:

i) mistakes have been made with a direct influence on project results;

ii) validation protocol requirements have not been met; or

iii) there is a risk that the project would not be accepted as a CDM project or that emission reductions could not be certified

A request for *Clarification* (CL) is issued where additional information was needed to fully clarify an issue.

The corrective action requests and request for clarification raised by DNV are expected to be resolved during communications between the PCI and DNV.

To guarantee the transparency of the preliminary validation process, the concerns raised are summarised in chapter 3 below and documented in more detail in Table 3 of the Validation Protocol in Appendix A. PCI is requested to provide a response to DNV's concerns, preferably by completing the third column in Table 3 of the Validation Protocol in Appendix.

3 PRELIMINARY VALIDATION FINDINGS

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

The findings are structured to reflect the main parts of the preliminary validation scope:

- Participation requirements
- Project design
- Baseline determination
- Monitoring plan
- Calculation of GHG emissions
- Environmental impact
- Comments by local stakeholders

3.1 Participation Requirements

The project participants are Kuala Lumpur Kepong Bhd. (KLK) of Malaysia and Pacific Consultants International (PCI) of Japan. The participating Parties are Malaysia as the host Party and Japan as the participating Annex I Party.

The Government of Malaysia ratified the Kyoto Protocol on 04 September 2002. The Conservation and Environmental Management Division of Ministry of Natural Resources and Environment (NRE) was designated as the National Authority for the CDM. The Government of Japan ratified the Kyoto Protocol in June 2002, and The Liaison Committee for the Utilization of the Kyoto Mechanisms was designated as the National Authority for the CDM.

PDD is written based on version 02 of the CDM PDD of July 2004. Both Parties will not be project participants/4/.

The project is at the stage of a Feasibility Study and the project has thus not yet been presented for approval by the DNAs of Malaysia and Japan. However, the formal approvals by both Parties are required prior to registration of the project.

3.2 Project Design

The project proposes the implementation of high-efficient POME treatment systems, which separate oil and particulates in POME by blowing micro bubbles in POME. The separated oil is recovered and used as Crude Palm Oil (CPO). The system does not emit any CH_4 during the operation and can avoid the methane emissions which would occur through the current treatment of POME in open anaerobic lagoons. The project design engineering reflects good engineering practice through the POME treatment technology imported from Australia, and the project will be the first one to use this technology in Malaysia. The project hence results in technology and capacity transfer.

The project design is sound and the geographical boundary comprises 13 Palm Oil Mills in Malaysia. Each project site includes equipment for screening, a separator of oil and particulates by blowing micro-bubbles and a cyclone separator. However, the system and components inside of the system boundary at each palm oil mill are not clear and DNV requests a clarification with regard to the system and components in the palm oil mills which are inside of each site's system boundary.

A renewable crediting time of 7 years is selected starting in 1 June 2007.

The project will contribute to sustainable development by providing job opportunities and environmental benefits, such as efficient treatment of waste water and reduction of odour problems resulting from the current open lagoons, and by technology transfer of POME treatment technology from Australia to Malaysia. Whether this is in accordance with sustainable development priorities of Malaysia will be assessed through follow-up interview, which is out of scope of this preliminary validation.

The financial plans for the project will not involve public funding from Annex I countries. However, as the project is at the stage of a Feasibility Study only, this issue will be validated more in detail after the financial plan is completed.

Clarification (CL1 in Table 2 of Appendix A):

- *DNV requests a clarification with regard to the system and components in the palm oil mills which are inside of each site's system boundary.*

3.3 Baseline Determination and Additionality

In the absence of suitable baseline methodologies approved by the CDM Executive Board, a new baseline methodology is proposed for this project, i.e. "Baseline methodology for methane free organic wastewater treatment project activities at multiple factories". The baseline methodology was selected in line with the approach given in paragraph 48 (a) of the Marrakech Accords, i.e. the baseline emissions are the emissions from a technology that represents existing actual or historical emissions. The methodology has not yet been approved and the applied baseline methodology needs to be submitted for approval by the CDM Executive Board.

The applicability conditions for the methodology are (1) "the existing wastewater treatment system is an open lagoon system with an 'active' anaerobic condition" and (2) "No or negligible amount of CH_4 is emitted during operation of the proposed project plant according to the specification." Considering the proposed system, the proposed project might be fully applicable. However, a site visit will have to confirm that the current practise is POME treatment in open lagoons. This is out of scope of this preliminary validation.

Following the baseline selection steps given in the proposed new methodology and the analyses of four baseline alternatives, the anaerobic treatment in open lagoons (current scenario) was selected as the most likely baseline scenario.

The additionality of the project was assessed using the "Tool for the demonstration and assessment of additionality": The PDD concludes that the project is not viable and thus a likely baseline scenario due to the following.

Investment analysis:

A benchmark analysis is presented. According to KLK, the project developer in Malaysia, an internal rate of return (IRR) higher than 23 to 30% for 5 years is necessary to invest for the project. In the absence of CDM benefits, which means no additional revenue besides the sale of recovered crude palm oil (CPO), the IRR is 4.6%. Additional revenue from sales of the certified emission reduction (CER) by the CDM, would increase the IRR up to 23.8%. However, DNV requests the clarification with regard to standard returns in the market in Malaysia to support the selected benchmark used for the investment analysis..

Barrier analysis:

1) Investment barrier

Given the low IRR in absence of CDM benefits, the project activity not attractive as an investment option for private project developers.

2) Technological barrier

The project applies a micro bubbles technology in order to recover crude palm oil from POME. This technology must be imported from Australia and it is the first time that this technology is introduced in Malaysia.

3) Barrier due to prevailing practice

There is no similar case to the project and open anaerobic lagoon systems are the prevailing practice for treating POME in Malaysia.

DNV requests a sensitivity analyses for investment barrier by changing plant operating length, CER prices and CPO selling price. Furthermore, these barriers will have to be reviewed through the interviews with KLK and other project stakeholders in Malaysia before DNV can conclude and confirm the presented barriers. This is out of scope of this preliminary validation.

Clarification (CL2 and 3 in Table 2 of Appendix A):

- *DNV requests a sensitivity analyses for the investment barrier by changing plant operating length, CER prices and CPO selling price.*
- *DNV requests the clarification with regard to standard returns in the market in Malaysia to support the selected benchmark used for the investment analysis.*

3.4 Monitoring Plan

The project applies the new monitoring methodology “Monitoring methodology for methane free organic wastewater treatment project activities at multiple factories”, which is proposed for this project /2/. The methodology has not yet been approved and the applied monitoring methodology needs to be submitted for approval by the CDM Executive Board.

The project could potentially result in GHG emissions due to the electricity consumption of the POME treatment system and the monitoring methodology provides for the collection and archiving of the relevant data for determining these emissions, i.e. the electricity consumption and the source of the electricity. In the monitoring plan of the proposed project, these emissions are not monitored because the electricity consumed by the POME treatment system is generated by biomass fuel in the Palm Oil Mills and emissions due to electricity consumption are considered climate neutral. However, it needs to be confirmed through follow-up interviews in Malaysia that the biomass power plant has sufficient capacity to meet the demand of the POME

treatment system and the previous electricity demand of the palm oil mills. This is out of scope of this preliminary validation.

Fuel consumption for the transportation of solid waste produced by the proposed POME treatment system is accounted as leakage in the proposed new monitoring methodology. In the PDD for the proposed project, these emissions are considered negligible. DNV requests a clarification with regard to how much solid waste has to be transported daily and how much the GHG emissions from solid waste transportation are estimated to be.

The Chemical Oxygen Demand (COD) and volume of POME are monitored for the estimation of baseline emissions. The proposed new methodology describes that the raw effluent volume is monitored continuously. Meanwhile, it will be recorded daily for the proposed project, which is described in the PDD. DNV requests a clarification with regard to the appropriateness of the daily monitoring of the effluent. The regulations and incentive relevant to CH_4 emissions from effluent will also be monitored for avoiding the risk of selection of baseline selection.

CDM office of KLK headquarters is responsible for overall management of the CDM project including the issuance of monitoring report. TQCC and KDC are responsible for conducting POME tests and analysis, and checking the monitoring data collected by Palm Oil Mills. Monitoring procedures and QA/QC procedures are described in the PDD and Annex 4, and this will need to be reviewed through the follow up interview in the Malaysia, which is out of scope of the preliminary validation. TQCC and KDC will also provide operating and maintenance procedures as well as procedures for emergency preparedness and will check that these procedures are sufficiently implemented before commissioning the project.

Clarification (CL3 and 4 in Table 2 of Appendix A):

- DNV requests a clarification with regard to how much solid waste has to be transported daily and how much the GHG emissions from solid waste transportation are estimated to be.
- DNV requests the clarification with regard to the appropriateness of the daily monitoring of the effluent.

3.5 Calculation of GHG Emissions

No project emissions are accounted for the proposed project because electricity utilised for the project activity is generated by the biomass power plants at the Palm Oil Mills. However, this will have to be confirmed through follow-up interviews in Malaysia, which is out of scope of the preliminary validation.

For the baseline methane emissions from POME treatment in open lagoons, default factors for B_0 and MCF obtained from the IPCC Good Practice Guidance are applied. There might be large uncertainties when determining methane emissions from the waste water using IPCC default factors. Hence, the conservativeness factors of FCCC/SBSTA/2003/10/Add2, which are also applied in AM0013, are applied for adjusting MCF for uncertainties. As for Bo, 0.21 kg CH4 /kg COD is applied, which takes into account the uncertainty for the IPCC default value of 0.25.

The COD of POME of will be measured ex-post on a monthly basis. However, DNV requests a clarification with regard to the selected data source and the appropriateness of the COD applied in the ex-ante estimation of baseline emissions in the PDD.

Clarification (CL3, 4 in Table 2 of Appendix A):

- DNV requests a clarification with regard to the selected data source the appropriateness of COD applied in the ex-ante estimation of baseline emissions.

3.6 Environmental Impacts

The project is not likely to create adverse environmental effects. According to an interview with PCI in January 2006 /5/, an Environmental Impact Assessment (EIA) is not required for the proposed project under the Malaysian "Environmental Quality Order 1987", and the proposed plant will comply with Malaysian effluent discharge limits (Environmental Quality Regulation, 1977). However, relevant Malaysia regulations will have to be assessed through interviews with key personnel in Malaysia. This is out of scope of this preliminary validation.

3.7 Comments by Local Stakeholders

No local stakeholder consultation process has yet been carried out. KLK will invite and compile the local stakeholder comments prior to submission of a final PDD for validation.

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

Due to the limited scope of this preliminary validation, DNV has not invited comments by Parties, stakeholders and UNFCCC accredited Non-Governmental Organisations (NGO).

5 CONCLUSIONS

DNV has carried out a preliminary validation of the "Improvement of POME Treatment System at Palm Oil Mills in Malaysia" project. This report summarises the preliminary findings of the validation of the project, performed on the basis of UNFCCC criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

Based upon PCI's request, the preliminary validation has been performed as a desk review of the project design, the baseline determination and the GHG emission reduction estimates presented in the project design document submitted by PCI. In addition, PCI has been visited and staff related to the project has been interviewed. The preliminary validation has NOT assessed Malaysian requirements for CDM projects, including sustainable development criteria, and the assumptions made for the baseline determination. These topics will be assessed through interviews with stakeholders in Malaysia at a later stage.

The proposed new baseline methodology applied by the project was selected in line with an approach recognised by the Marrakech Accords. Nevertheless, the applied new baseline methodology will need to be submitted for approval by the CDM Executive Board prior to the formal validation of the project.

A benchmark investment analysis and an analysis of investment barriers, technology barriers and barriers due to prevailing practice are presented to demonstrate the additionality of the project. The project investment analysis and the presented barriers will have to be assessed through the interviews with KLK and other key personnel in Malaysia before DNV can conclude on the project's additionality.

The preliminary validation of the project identified some CLs (request for Clarification) and the project participants are invited to provide a respond to CLs listed in Table 3 of the Validation Protocol in Appendix A to this report..

REFERENCES

Documents provided by the project proponent that relate directly to the project:

/1/ PCI: *Project Design Document for "Improvement of POME Treatment System at Palm Oil Mills, Malaysia" project*. Version 01 of 5 December 2005

/2/ PCI: *Baseline and monitoring methodology for methane free organic waste water treatment project activities at municipal factories*. Version 01, 27 January 2006

Background documents related to the design and/or methodologies employed in the design or other reference documents:

/3/ International Emission Trading Association (IETA) & the World Bank's Prototype Carbon Fund (PCF): *Validation and Verification Manual*. http://www.vvmanual.info

/4/ CDM-EB: *Guideline for completing the project design document (CDM-PDD), the proposed new methodology: baseline (CDM-NMB) and the proposed new methodology: monitoring (CDM-NMM), version 04, July, 2005*

Persons interviewed during the validation, or persons who contributed with other information that are not included in the documents listed above:

/5/ Pacific Consultants International (PCI), January 24. 2006, at PCI, Tokyo, Japan

- Mr. Masahiko Fujimoto (Professional Engineer, Planning Department, PCI)
- Mr. Tetsuya Yoshida (Energy & Environment Department, PCI)

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APPENDIX A

CDM VALIDATION PROTOCOL

Table 1 Mandatory Requirements for Clean Development Mechanism (CDM) Project Activities

Requirement	Reference	Conclusion	Cross Reference / Comment
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3	Kyoto Protocol Art.12.2	OK	Table 2, Section E.4.1
2. The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof	Kyoto Protocol Art. 12.2, CDM Modalities and Procedures §40a	(OK)	Table 2, Section A.3
3. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC	Kyoto Protocol Art.12.2.	OK	Table 2, Section E.4.1
4. The project shall have the written approval of voluntary participation from the designated national authority of each party involved	Kyoto Protocol Art. 12.5a, CDM Modalities and Procedures §40a	Not yet.	This project will apply for the approval from the Parties after this preliminary validation.
5. The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change	Kyoto Protocol Art. 12.5b	CL4,6	Table 2, Section E
6. Reduction in GHG emissions shall be additional to any that would occur in absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity	Kyoto Protocol Art. 12.5c, CDM Modalities and Procedures §43	CL2, 3	Table 2, Section B.2
7. In case public funding from Parties included in Annex I is used for the project activity, these Parties shall provide an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of these Parties.	Decision 17/CP.7, CDM Modalities and Procedures Appendix B, § 2	OK	
8. Parties participating in the CDM shall designate a national authority for the CDM	CDM Modalities and Procedures §29	OK	DNA of Malaysia: "Conservation and Environmental Management

Requirement	Reference	Conclusion	Cross Reference / Comment
			Division, Ministry of Natural Resources and Environment; (NRE)" DNA of Japan: "The Liaison Committee for Utilization of the Kyoto Mechanism".
9. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol	CDM Modalities §30/31a	OK	Malaysia is a Party to the Kyoto Protocol and ratified it on 04 September 2002. Japan is a Party to the Kyoto Protocol and ratified it on 4 June 2002.
10. The participating Annex I Party's assigned amount shall have been calculated and recorded	CDM Modalities and Procedures §31b	OK	Japan's assigned amount is 94% of the emission in 1990.
11. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7	CDM Modalities and Procedures §31b	OK	Japan has in place a national registry and reported in May 2005 its national GHG inventory for the years 1990-2003.
12. Comments by local stakeholders shall be invited, a summary of these provided and how due account was taken of any comments received	CDM Modalities and Procedures §37b	N/A	Table 2, Section G
13. Documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts, shall be submitted, and, if those impacts are considered significant by the project participants or the Host Party, an environmental impact assessment in accordance with procedures as required by the Host Party shall be carried out.	CDM Modalities and Procedures §37c	(OK)	Table 2, Section F
14. Baseline and monitoring methodology shall be previously approved by the CDM Executive Board	CDM Modalities and Procedures §37e	N/A	Table 2, Section B.1.1 and D.1.1
15. Provisions for monitoring, verification and reporting shall be in accordance with the modalities described in the Marrakech	CDM Modalities and Procedures §37f	CL4,5	Table 2, Section D

Requirement	Reference	Conclusion	Cross Reference / Comment
Accords and relevant decisions of the COP/MOP			
16. Parties, stakeholders and UNFCCC accredited NGOs shall have been invited to comment on the validation requirements for minimum 30 days, and the project design document and comments have been made publicly available	CDM Modalities and Procedures §40	Not yet	The PDD will be made publicly available after this preliminary validation.
17. A baseline shall be established on a project-specific basis, in a transparent manner and taking into account relevant national and/or sectoral policies and circumstances	CDM Modalities and Procedures §45c,d	CL2, 3	Table 2, Section B.2
18. The baseline methodology shall exclude to earn CERs for decreases in activity levels outside the project activity or due to force majeure	CDM Modalities and Procedures §47	CL2, 3	Table 2, Section B.2
19. The project design document shall be in conformance with the UNFCCC CDM-PDD format	CDM Modalities and Procedures Appendix B, EB Decision	OK	The PDD is in conformance with version 02 of CDM PDD of July 2004.

Table 2 Requirements Checklist

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
A. General Description of Project Activity *The project design is assessed.*					
A.1. Project Boundaries *Project Boundaries are the limits and borders defining the GHG emission reduction project.*					
A.1.1. Are the project's spatial (geographical) boundaries clearly defined?	/1/ /5/	DR I	The project geographical boundaries are 13 palm oil mills in five states in Malaysia.		OK
A.1.2. Are the project's system (components and facilities used to mitigate GHGs) boundaries clearly defined?	/1/ /5/	DR I	The system boundary includes Screening, Separator of oil and particulates by blowing micro-bubbles, and cyclone separator. DNV requests the clarification with regard to the system and components in the palm oil mills which are inside of each site's system boundary.	CL1	
A.2. Technology to be employed *Validation of project technology focuses on the project engineering, choice of technology and competence/ maintenance needs. The validator should ensure that environmentally safe and sound technology and know-how is used.*					
A.2.1. Does the project design engineering reflect current good practices?	/1/ /5/	DR I	The project design and engineering might reflect good practice through the application of an improved Palm Oil Mill Effluent (POME) treatment system, which is imported from Australia.		OK
A.2.2. Does the project use state of the art technology	/1/	DR	The technology applied is better than the	(OK)	

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
or would the technology result in a significantly better performance than any commonly used technologies in the host country?	/5/	I	open lagoon, which is common practice for waste water treatment in Malaysia. This will be confirmed through the follow-up interview, which is out of scope of the preliminary validation.		
A.2.3. Is the project technology likely to be substituted by other or more efficient technologies within the project period?	/1/ /5/	DR I	The project is unlikely to be substituted by other more efficient technologies.		OK
A.2.4. Does the project require extensive initial training and maintenance efforts in order to work as presumed during the project period?	/1/ /5/	DR I	Training for the POME treatment system is necessary and will be carried out by mill's laboratory chief and TQCC/KDC.		OK
A.2.5. Does the project make provisions for meeting training and maintenance needs?	/1/ /5/	DR I	- ditto -		OK
A.3. Contribution to Sustainable Development *The project's contribution to sustainable development is assessed.*					
A.3.1. Is the project in line with relevant legislation and plans in the host country?	/1/ /5/	DR I	The new POME treatment plant can meet the Malaysian effluent discharge limits (Environmental Quality Regulation, 1977). This will be confirmed through the follow-up interview, which is out of scope of the preliminary validation.	(OK)	
A.3.2. Is the project in line with host-country specific CDM requirements?	/1/	DR	The assessment of CDM requirement of Malaysia is out of scope of the preliminary validation.	N/A	
A.3.3. Is the project in line with sustainable development policies of the host country?	/1/	DR	The assessment of sustainable development policies of Malaysia is out of scope of the preliminary validation.	N/A	
A.3.4. Will the project create other environmental or social benefits than GHG emission reductions?	/1/	DR	The POME treatment technology will improve effluent quality and reduce odour		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			problem compared to the current open lagoon.		
B. Project Baseline *The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.*					
B.1. Baseline Methodology *It is assessed whether the project applies an appropriate baseline methodology.*					
B.1.1. Is the baseline methodology previously approved by the CDM Executive Board?	/1/	DR	This project validation is based on a feasibility study, and the new baseline methodology will be presented to the CDM-EB for approval after PCI's decision to carry out the project.	N/A	
B.1.2. Is the baseline methodology the one deemed most applicable for this project and is the appropriateness justified?	/1/ /5/	DR I	The baseline methodology is drawn up for the proposed project and applicability conditions are confirmed in B1.1 in the PDD and they seem to be satisfied because of the following reason; 1). Open lagoon system - The depth of open lagoons is within the range of 5 to 10m. - The temperature of lagoons is within the range of 20 to 35ºC. - The sludge in open lagoons is excavated every 3 years. 2). Proposed plant does not emit any methane gas during its operation because;	(OK)	

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			- the system is a closed system - oil is extracted and recovered using the micro-bubble technology - solid wastes are compressed and then separated from liquids, and - wastewater is then aerobically treated. The above issues should be reviewed through follow-up interview, which is out of scope of the preliminary validation.		
The below questions only apply when the validator is reviewing the baseline methodology prior to submission to the CDM EB (Two Steps Approach):					
B.1.3. Is the discussion and selection of the baseline methodology transparent?	/1/ /2/ /5/	DR I	The applicability conditions of the proposed methodology and the selection steps of the baseline scenario are described transparently in the methodology.		OK
B.1.4. Is the proposed baseline methodology in line with one of the approaches outlined in Paragraph 48 of the Marrakech Accords?	/1/ /2/	DR	The baseline approach is “Existing actual or historical emissions, as applicable.”		OK
B.1.5. Does the baseline methodology specify data sources and assumptions?	/1/ /2/	DR	The methodology applies IPCC default data.		OK
B.1.6. Does the baseline methodology sufficiently describe the underlying rationale for algorithm/formulae (e.g. marginal vs. average, etc.)	/1/ /2/	DR	Baseline emissions from anaerobic lagoons are estimated based on IPCC guideline default values. Carbon emission factor for electricity is determined by using a weighted average emission factor or methodology of ACM0002 by conservative manner.		OK
B.1.7. Does the baseline methodology specify types of variables used (e.g. fuels used, fuel consumption rates, etc)?	/1/ /2/	DR	For the estimation of CH4 emissions from anaerobic lagoon, IPCC default values for B0 and MCF are applied. COD is to be		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			directly measured data. CO2 emissions are estimated based on fossil fuel consumption per year.		
B.1.8. Does the baseline methodology specify the spatial level of data (local, regional, national)?	/1/ /2/	DR	The methodology screens possible alternatives by assessing them against host country's regulations.		OK
B.1.9. Does the baseline methodology specify an approach to demonstrate the additionality of the project?	/1/ /2/	DR	The methodology applies a step by step approach and the "Tool for the demonstration and assessment of additionality" is applied for the demonstration of additionality.		OK
B.2. Baseline Determination *The choice of baseline will be validated with focus on whether the baseline is a likely scenario, whether the project itself is not a likely baseline scenario, and whether the baseline is complete and transparent.*					
B.2.1. Is the application of the methodology and the discussion and determination of the chosen baseline transparent?	/1/ /2/ /5/	DR I	The methodology is based on the proposed new methodology. Each step to identify the baseline scenario is transparently applied.		OK
B.2.2. Has the baseline been determined using conservative assumptions where possible?	/1/ /5/	DR I	Alternative scenarios are: - the anaerobic treatment in open lagoons (continuation of current practice) - treatment in open-tank digester - anaerobic treatment in closed-tank with electricity/ heat generation - the proposed project activity without CDM Technical barrier, barrier due to prevailing practice, and investment barrier are	CL2	

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			discussed to the above alternatives. DNV requests a sensitivity analyses for the investment barrier by changing plant operating length, CER prices and CPO selling price.		
B.2.3. Has the baseline been established on a project-specific basis?	/1/	DR	The baseline is established through step be step approach on a project specific basis.		OK
B.2.4. Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	/1/ /5/	DR I	Legal and regulatory requirements are considered in the Step 1 of the additionality assessment. Currently, there are no law or regulation in Malaysia that controls open-lagoon anaerobic treatment system and methane emissions from the open lagoons. The Malaysian requirement, sectoral policies, and political aspirations will be reviewed through the follow-up interview, which is out of scope of the preliminary validation.	(OK)	
B.2.5. Is the baseline determination compatible with the available data?	/1/ /5/	DR I	The determination of the baseline is based on Malaysian circumstances and financial data. The provided qualitative information needs to be confirmed through follow-up interview, which is out of scope of the preliminary validation.	(OK)	
B.2.6. Does the selected baseline represent the most likely scenario among other possible and/or discussed scenarios?	/1/ /5/	DR I	DNV requests the clarification with regard to standard returns in the market in Malaysia to support the selected benchmark in the investment analysis.	CL2, 3	

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			Also see B.2.2.		
B.2.7. Is it demonstrated/justified that the project activity itself is not a likely baseline scenario?	/1/ /5/	DR I	- ditto -	CL2, 3	
B.2.8. Have the major risks to the baseline been identified?	/1/ /5/	DR I	The risk might be regulation concerning control of methane emissions from open lagoons and water quality. These regulations might not be established during the project operation. However, this needs to be confirmed through follow-up interview, which is out of scope of the preliminary validation.	(OK)	
B.2.9. Is all literature and sources clearly referenced?	/1/	DR	Information for baseline identification is from KLK and MPOB.		OK
C. Duration of the Project/ Crediting Period *It is assessed whether the temporary boundaries of the project are clearly defined.*					
C.1.1. Are the project's starting date and operational lifetime clearly defined and reasonable?	/1/	DR	Project starting date is June 2007, and expected operational lifetime of the project activity is 20 years.		OK
C.1.2. Is the assumed crediting time clearly defined (renewable crediting period of seven years with two possible renewals or fixed crediting period of 10 years with no renewal)?	/1/	DR	Starting date of the crediting period is June 2007 and length of the first crediting period is 7 years.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
D. Monitoring Plan *The monitoring plan review aims to establish whether all relevant project aspects deemed necessary to monitor and report reliable emission reductions are properly addressed ((Blue text contains requirements to be assessed for optional review of monitoring methodology prior to submission and approval by CDM EB).*					
D.1. Monitoring Methodology *It is assessed whether the project applies an appropriate baseline methodology.*					
D.1.1. Is the monitoring methodology previously approved by the CDM Executive Board?	/1/	DR	This project validation is based on a feasibility study, and the new monitoring methodology will be presented to the CDM-EB for approval after PCI's decision to carry out the project.	N/A	
D.1.2. Is the monitoring methodology applicable for this project and is the appropriateness justified?	/1/ /5/	DR I	The monitoring methodology was specifically developed for this project, and the applicability conditions are justified in the section B.	(OK)	
D.1.3. Does the monitoring methodology reflect good monitoring and reporting practices?	/1/	DR	The monitoring methodology reflects good monitoring and reporting practices.		OK
D.1.4. Is the discussion and selection of the monitoring methodology transparent?	/1/ /5/	DR I	The monitoring methodology is drawn up for the proposed project and applicability conditions are confirmed in PDD in section B, and they seem to be satisfied.	(OK)	
The below questions only apply when the validator is reviewing the monitoring methodology prior to submission to the CDM EB (Two Steps Approach):					

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
D.1.5. Does the monitoring methodology provide for the collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas emissions within the project boundary during the crediting period?	/1/ /2/	DR	All data monitored are summarised in B1 of the proposed new methodology. Monitoring items are described in the Figure in P3 of the new methodology.		OK
D.1.6. Is the selected monitoring methodology supported by the monitored and recorded data?	/1/ /2/	DR	The baseline emissions are supported by COD measurements data and IPCC default value.		OK
D.1.7. Are the monitoring provisions in the monitoring methodology consistent with the project boundaries in the baseline study?	/1/ /2/	DR	Yes, the monitoring provisions are consistent with the project boundaries.		OK
D.1.8. Have any needs for monitoring outside the project boundaries been evaluated and if so, included as applicable?	/1/ /2/	DR	CEF for grid electricity is monitored. Fossil fuel consumption of transporting by-product wastes is also measured for leakage.		OK
D.1.9. Does the monitoring methodology allow for conservative, transparent, accurate and complete calculation of the ex post GHG emissions?	/1/ /2/	DR	0.21 kg CH4 /kg COD is applied for Bo, which is taking into account the uncertainty of the IPCC default value of 0.25. 0.738 is applied for MCF. The value is provided by applying a conservative discount factor to the IPCC default value for Asian region.		OK
D.1.10. Are formulas used for calculations stated and calculations incorporated or referenced?	/1/ /2/	DR	GHG emissions in the baseline scenario are estimated by using formula of the IPCC guideline.		OK
D.1.11. Do the methodologies for calculating emission reductions comply with existing good practice?	/1/ /2/	DR	The methodology represents good practise.		OK
D.1.12. Is the monitoring methodology clear and user friendly?	/1/ /2/	DR	Yes.		OK
D.1.13. Does the methodology mitigate possible monitoring errors or uncertainties addressed?	/1/ /2/	DR	B7 in the new monitoring methodology describes QA/QC requirements.		OK

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
D.2. Monitoring of Project Emissions *It is established whether the monitoring plan provides for reliable and complete project emission data over time.*					
D.2.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas emissions within the project boundary during the crediting period?	/1/ /5/	DR I	For the project activity emissions, electricity consumption is taken into account in the proposed new methodology. However, the electricity is generated by biomass fuel and then the emissions due to the electricity consumption are considered climate neutral. It needs to be confirmed through follow-up interviews in Malaysia that the biomass power plant has sufficient capacity to meet the demand of the POME treatment system and the previous electricity demand of the palm oil mills. This is out of scope of the preliminary validation. Emissions through fuel consumption by transportation of solid wastes are also considered but neglected. DNV requests a clarification on the distance that solid waste has to be transported daily and how much the GHG emissions from the solid waste transportation are estimated to be.	CL4	
D.2.2. Are the choices of project GHG indicators reasonable?	/1/ /5/	DR I	- ditto -	CL4	
D.2.3. Will it be possible to monitor / measure the specified project GHG indicators?	/1/ /5/	DR I	- ditto -	CL4	
D.2.4. Will the indicators give opportunity for real	/1/	DR	- ditto -	CL4	

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
measurements of project emissions?	/5/	I			
D.2.5. Will the indicators enable comparison of project data and performance over time?	/1/ /5/	DR I	- ditto -	CL4	
D.3. Monitoring of Leakage *It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.*					
D.3.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	/1/ /5/	DR I	No leakage is accounted. This should be reviewed through the follow-up interview, which is out of scope of the preliminary validation.	(OK)	
D.3.2. Are the choices of leakage indicators reasonable?	/1/ /5/	DR I	- ditto -		
D.3.3. Will it be possible to monitor / measure the specified leakage indicators?	/1/ /5/	DR I	- ditto -		
D.3.4. Will the indicators give opportunity for real measurements of leakage effects?	/1/ /5/	DR I	- ditto -		
D.4. Monitoring of Baseline Emissions *It is established whether the monitoring plan provides for reliable and complete project emission data over time.*					
D.4.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining baseline emissions during the crediting period?	/1/ /5/	DR I	The baseline GHG emissions are related to the methane emissions from anaerobic open lagoon, and COD and discharge volume of raw effluent are measured. Discharge volume of raw effluent is monitored daily and the new methodology describes it is monitored continuously. DNV requests a clarification with regard to the	CL5	

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			appropriateness of the daily monitoring of the effluent.		
D.4.2. Is the choice of baseline indicators, in particular for baseline emissions, reasonable?	/1/ /5/	DR I	The monitoring items are selected following the monitoring methodology and reasonable. .		OK
D.4.3. Will it be possible to monitor / measure the specified baseline indicators?	/1/	DR	Yes, COD and discharge volume of raw effluent is monitored monthly.		OK
D.4.4. Will the indicators give opportunity for real measurements of baseline emissions?	/1/	DR	COD and discharge volume of raw effluent are monitored and it will give opportunity for real measurement of achieved emission reductions.		OK
D.5. Monitoring of Sustainable Development Indicators/ Environmental Impacts *It is checked that choices of indicators are reasonable and complete to monitor sustainable performance over time.*					
D.5.1. Does the monitoring plan provide the collection and archiving of relevant data concerning environmental, social and economic impacts?	/1/ /5/	DR I	There might be no specific significant environmental impacts expected from the proposed project activity. The new monitoring methodology does not require the monitoring of specific sustainable development indicators. Possible Malaysian requirements are not described, but this needs to be confirmed through the follow-up interview which are out of scope of preliminary validation.	（OK）	
D.5.2. Is the choice of indicators for sustainability development (social, environmental, economic) reasonable?	/1/ /5/	DR I	- ditto -		
D.5.3. Will it be possible to monitor the specified sustainable development indicators?	/1/	DR	- ditto -		

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
	/5/	I			
D.5.4. Are the sustainable development indicators in line with stated national priorities in the Host Country?	/1/ /5/	DR I	- ditto -		
D.6. Project Management Planning *It is checked that project implementation is properly prepared for and that critical arrangements are addressed.*					
D.6.1. Is the authority and responsibility of project management clearly described?	/1/	DR	CDM office of KLK Headquarter is responsible for the project management of the proposed project.		OK
D.6.2. Is the authority and responsibility for registration, monitoring, measurement and reporting clearly described?	/1/	DR	Palm oil mills is responsible for monitoring of the project and reporting to TQCC/KDC. TQCC/KDC analyze the data and KLK compile and analyze the data.		OK
D.6.3. Are procedures identified for training of monitoring personnel?	/1/ /5/	DR I	The training are conducted be TQCC and KDC. The detail of the training are reviewed through the follow-up interview.	(OK)	
D.6.4. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/ /5/	DR I	PDD does not describe emergency situations. It will be reviewed through the follow-up interview, which is out of scope of the preliminary validation.	(OK)	
D.6.5. Are procedures identified for calibration of monitoring equipment?	/1/	DR	Monitoring devices will be calibrated by external ISO/IEC 17025 accredited bodies. Oil and flow measurement system/instrument will be calibrated according to the Malaysian Standard.		OK
D.6.6. Are procedures identified for maintenance of monitoring equipment and installations?	/1/ /5/	DR I	PDD does not describe about the maintenance of monitoring equipment and	(OK)	

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			this will be reviewed through the follow-up interview, which is out of scope of the preliminary validation.		
D.6.7. Are procedures identified for monitoring, measurements and reporting?	/1/ /5/	DR I	Palm Oil Mills carry out the monitoring and send the report to TQCC/KDC. Details for monitoring, measurements and reporting are reviewed through the follow-up interview, which is out of scope of the preliminary validation.	(OK)	
D.6.8. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	/1/ /5/	DR I	- ditto -	(OK)	
D.6.9. Are procedures identified for dealing with possible monitoring data adjustments and uncertainties?	/1/ /5/	DR I	- ditto -	(OK)	
D.6.10. Are procedures identified for review of reported results/data?	/1/	DR	TQCC/KDC will review the monitoring report from Palm Oil Mills and KLK will review the report from TQCC/KDC.		OK
D.6.11. Are procedures identified for internal audits of GHG project compliance with operational requirements where applicable?	/1/	DR	TQCC/KDC will conduct the internal audit for Palm Oil Mills.		OK
D.6.12. Are procedures identified for project performance reviews before data is submitted for verification, internally or externally?	/1/	DR	KLK will review the data before the verification.		OK
D.6.13. Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting?	/1/ /5/	DR I	Data management system is roughly identified and the detail procedures are reviewed through the follow-up interview, which is out of scope of the preliminary validation.	(OK)	

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
E. Calculation of GHG Emissions by Source *It is assessed whether all material GHG emission sources are addressed and how sensitivities and data uncertainties have been addressed to arrive at conservative estimates of projected emission reductions.*					
E.1. Project GHG Emissions *The validation of ex-ante estimated project GHG emissions focuses on transparency and completeness of calculations.*					
E.1.1. Are all aspects related to direct and indirect GHG emissions captured in the project design?	/1/ /5/	DR I	GHG emissions through electricity consumption and transportation of by-product are discussed. Electricity consumed for the oil mill plants are generated by biomass fuel and the proposed project will be operated by the electricity. Hence, the carbon emissions due to the electricity consumption are considered climate neutral. Emissions through transportation of the solid wastes are also neglected and DNV requests the clarification on the distance that waste has to be transported daily and how much GHG emissions the transportation of waste causes. See D.2.1.	CL4	
E.1.2. Are the GHG calculations documented in a complete and transparent manner?	/1/ /5/	DR I	- ditto -	CL4	
E.1.3. Have conservative assumptions been used to calculate project GHG emissions?	/1/ /5/	DR I	- ditto -	CL4	

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
E.1.4. Are uncertainties in the GHG emissions estimates properly addressed in the documentation?	/1/ /5/	DR I	- ditto -	CL4	
E.1.5. Have all relevant greenhouse gases and source categories listed in Kyoto Protocol Annex A been evaluated?	/1/ /5/	DR I	- ditto -	CL4	
E.2. Leakage *It is assessed whether there leakage effects, i.e. change of emissions which occurs outside the project boundary and which are measurable and attributable to the project, have been properly assessed and estimated ex-ante.*					
E.2.1. Are potential leakage effects beyond the chosen project boundaries properly identified?	/1/ /5/	DR I	No leakage is accounted. See D.3.1.	(OK)	
E.2.2. Have these leakage effects been properly accounted for in calculations?	/1/ /5/	DR I	- ditto -		
E.2.3. Does the methodology for calculating leakage comply with existing good practice?	/1/ /5/	DR I	- ditto -		
E.2.4. Are the calculations documented in a complete and transparent manner?	/1/ /5/	DR I	- ditto -		
E.2.5. Have conservative assumptions been used when calculating leakage?	/1/ /5/	DR I	- ditto -		
E.2.6. Are uncertainties in the leakage estimates properly addressed?	/1/ /5/	DR I	- ditto -		

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
E.3. Baseline Emissions *The validation of ex-ante estimated baseline GHG emissions focuses on transparency and completeness of calculations.*					
E.3.1. Have the most relevant and likely operational characteristics and baseline indicators been chosen as reference for baseline emissions?	/1/	DR	Baseline emissions are estimated through the IPCC Guidelines through COD, maximum methane production (Bo), and methane conversion factor (MCF).		OK
E.3.2. Are the baseline boundaries clearly defined and do they sufficiently cover sources and sinks for baseline emissions?	/1/ /5/	DR I	Baseline boundary is the project site.		OK
E.3.3. Are the GHG calculations documented in a complete and transparent manner?	/1/ /5/	DR I	The estimation of GHG emissions are based on the new methodology and documented in a complete and transparent manner. DNV requests the clarification with regard to the selected data source and the appropriateness of COD applied in the ex-ante estimation of baseline emissions.	CL6	
E.3.4. Have conservative assumptions been used when calculating baseline emissions?	/1/ /5/	DR I	0.21 kg CH4 /kg COD is applied for Bo, which lead by taking account the uncertainty for the IPCC default value of 0.25. 0.738 is applied for MCF. The value is provided by applying a conservative IPCC default value for Asian area.		OK
E.3.5. Are uncertainties in the GHG emission estimates properly addressed in the documentation?	/1/ /5/	DR I	- ditto-		OK
E.3.6. Have the project baseline(s) and the project emissions been determined using the same appropriate methodology and conservative	/1/	DR	Yes and both are based on the new proposed methodology.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
assumptions?					
E.4. Emission Reductions *Validation of ex-ante estimated emission reductions*.					
E.4.1. Will the project result in fewer GHG emissions than the baseline scenario?	/1/	DR	The project is expected to abate GHG emissions to the extent of 1 276 095 tCO2 year for 7 years.		OK
F. Environmental Impacts *Documentation on the analysis of the environmental impacts will be assessed, and if deemed significant, an EIA should be provided to the validator.*					
F.1.1. Has an analysis of the environmental impacts of the project activity been sufficiently described?	/1/ /5/	DR I	Environmental Impact Assessment (EIA) is not required for the project under the Malaysian "Environmental Quality Order 1987". The project is required to comply with Malaysian environmental regulations and standards, and the compliance should be reviewed through the follow-up interview, which is out of scope of the preliminary validation.	(OK)	
F.1.2. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved?	/1/ /5/	DR I	According to the "Environmental Quality Order 1987", an EIA is not required for the proposed project. This will have to be confirmed through the follow-up interview, which is out of scope of the preliminary validation.	(OK)	
F.1.3. Will the project create any adverse environmental effects?	/1/ /5/	DR I	The proposed project will has no significant adverse impacts on environment. This is confirmed through the follow-up interview, which is out of scope of the preliminary	(OK)	

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			validation.		
F.1.4. Are transboundary environmental impacts considered in the analysis?	/1/	DR	The proposed project will have no significant transboundary environment impacts.		OK
F.1.5. Have identified environmental impacts been addressed in the project design?	/1/ /5/	DR I	Waste water from POME treatment plant is sufficiently treated under Malaysian effluent discharge limits. This is confirmed through the follow-up interview, which is out of scope of the preliminary validation.	(OK)	
F.1.6. Does the project comply with environmental legislation in the host country?	/1/ /5/	DR I	- ditto -	(OK)	
G. Stakeholder Comments *The validator should ensure that a stakeholder comments have been invited and that due account has been taken of any comments received.*					
G.1.1. Have relevant stakeholders been consulted?	/1/ /5/	DR I	The local stakeholder consultation process has not yet been conducted and KLK will consult local stakeholders after this preliminary validation.	N/A	
G.1.2. Have appropriate media been used to invite comments by local stakeholders?	/1/ /5/	DR I	- ditto -		
G.1.3. If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	/1/ /5/	DR I	- ditto -		
G.1.4. Is a summary of the stakeholder comments received provided?	/1/ /5/	DR I	- ditto -		
G.1.5. Has due account been taken of any stakeholder comments received?	/1/ /5/	DR I	- ditto -		

Table 3 Resolution of Corrective Action and Clarification Requests

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
CL 1: DNV requests a clarification with regard to the system and components in the palm oil mills of which are inside of each site's system boundary.	A.1.2		
CL 2: DNV requests a sensitivity analyses for the investment barrier by changing plant operating length, CER prices and CPO selling price.	B.2.2., 2.6., 2.7		
CL 3: DNV requests the clarification with regard to standard returns in the market in Malaysia to support the benchmark selected for the investment analysis.	B.2.6., 2.7		
CL 4: DNV requests the clarification on the distance and the amount of solid waste transports and how much GHG will be emitted due to the transportation.	D.2.1-5 E.1.1.-5		
CL 5: DNV requests the clarification with regard to the appropriateness of the daily monitoring of effluent.	D.4.1		
CL 6: DNV requests the clarification with regard to the selected data source and the appropriateness of the COD applied in the ex-ante estimation of baseline emissions.	E.3.3		

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添付資料 6

出張報告書

「マレーシア・パームオイル工場排水処理施設の改善による CDM 事業化調査」
出張報告書

- **現地調査の実施状況**

現地調査	調査期間	主な協議先	出張者
第一次	2005 年 8 月 1 日～ 2005 年 8 月 10 日	- KLK 本社 - KLK・Batu Lintang 工場 - マレーシア DNA（資源環境省内） - PTM（マレーシアエネルギーセンター） - マレーシア環境省	中山良一 藤本雅彦 吉田哲也 淺川賢司（PCKK）
第二次	2005 年 11 月 14 日～ 2005 年 11 月 25 日	- KLK 本社 - TQCC（KLK 品質管理センター） - MPOB（マレーシアパームオイル委員会）	藤本雅彦 吉田哲也
第三次	2006 年 2 月 22 日～ 2006 年 2 月 25 日	- KLK 本社	藤本雅彦 吉田哲也

1. 第一次現地調査（2005 年 8 月 1 日～10 日実施）

本プロジェクトのマレーシア国側の実施企業である KLK 社およびマレーシア国の DNA である資源環境省・保全環境管理局（CEMD）に面談し、本 F/S 調査の内容を説明し、協力体制、調査の進め方について協議を行った。さらに、KLK 本社および同社の Batu Lintang パーム油工場を訪問し、高効率排水処理施設のパイロットプラントを視察し、モニタリング体制や QA/QC の手続きについてヒアリングした。

① DNA：資源環境省・保全環境管理局（CEMD）

マレーシア国の DNA である保全環境管理局（CEMD）の Dr. Nadzri 氏および Chong 氏と面談を行い、本プロジェクトの概要説明を行うとともに、本プロジェクトの CDM 化の可能性、マレーシア側の審査クライテリアの確認などを行った。以下に主な協議内容を示す。

- 本プロジェクトの持続可能な開発への貢献は、環境面では非常に大きい。経済的な貢献がより明確になるとよい。
- 排水プラントで得られる CPO の売却益による経済的なメリットによって、本プロジェクトの追加性が成立するかどうか検討が必要である。
- 日本側の本プロジェクトへの参加として、日本の環境省の資金による F/S の実施、PDD・新方法論作成の補助、アップフロントペイメントの利用可能性検討、およびこれらを実施することによるマレーシア側への CDM や環境問題に関する知識･ノウハウの提供､キャパシティーディベロップメントにつながる、という点は確認できる。
- 日本のアップフロントペイメントの本プロジェクトへの適用可能性を検討してほしい。
- マレーシアには、排水処理ラグーンから排出されるメタンガスの抑制に関する法規制は存在しない。また、今後そのような法規制を整備する予定は現段階ではない。
- 本プロジェクトの実施に当たってはマレーシアの EIA は必要とならないが、水質、大気、騒音の各基準はクリアする必要がある。

写真 1　DNA における協議風景

② マレーシアエネルギーセンター（PTM）

森林プロジェクト以外の全ての CDM プロジェクトの事務局となっている PTM を訪問し、マレーシアにおける CDM プロジェクトの申請・承認プロセスの確認、SD クライテリアの確認等を行った。以下が主な協議内容である。

- マレーシアで CDM プロジェクトを実施する場合、PIN（Project Idea Note）を DNA に提出する。
- SD（持続可能な発展）に関する国家 CDM クライテリアを現在作成中であり、最終承認を得たら PTM のウェブで公表する予定。
- Annex-I 国の本プロジェクトへの参加について以下の確認
    a. Equity あるいは Technical Collaboration が望ましく、CER の売却・購入に関する契約のみだと不十分となる可能性もある。
    b. オーストラリアからの技術面からの参加の他にも、日本側の参加に関する記述が必要。
    c. PIN には日本側がどのような形で参加するかを明確に記すこと。
    d. GEC 資金による F/S の実施および PDD 作成、アップフロント・ペイメントなどを通じて「日本側は PDD 作成を補助するとともに、マレーシア側の CDM に関する知識･情報を強化（capacity development of human and institutional resources）する」ことを証明すること。
- パブリックコメントを PDD 作成時までには収集することが望ましい。

写真 2　PTM における協議風景

③　環境省（DOE）

- 本プロジェクトは「パームオイル工場における排水処理システムの効率化」およびそれに伴うプラント建設等であり、マレーシア EIA（環境影響評価）の対象とはならない。
- プラントを建設する際には、対象工場がある各州の DOE から許可証を取得する必要がある。

写真 2　環境省における協議風景

④　KLK 社 Batu Lintang パーム油工場（クダ州）

KLK のパームオイル工場を視察し、現状の排水処理システム（オープンラグーン方式）および本プロジェクトで導入される高効率排水処理施設のパイロットプラントを視察した。また、工場長を含めた工場スタッフと協議を行い、KLK の工場および本社におけるモニタリングシステムの確認も合わせて行った。

a.　パームオイル工場・排水処理の現状

- KLK の本社があるイポー市から車で 1 時間半ほど北にある Batu Lintang 工場を視察。
- 敷地面積はおよそ 2,000 ヘクタールで操業開始は 1980 年。規模は毎時 25 トン FFB（果房）の処理能力。
- 排水処理システムは、①オイルトラップ 2 箇所、②冷却用ため池、③嫌気性ラグーン 3 面（100m×33m、深さ 3m）、④好気性ラグーン 2 面（100m×33m、深さ 1.5m）のプロセスで行われる。処理に要する期間はおよそ 120 日間（嫌気 80 日、好気 40 日）。
- 嫌気性ラグーン 3 面では発酵がかなり進んでおり、強い悪臭が離れた場所か

らも確認できた。

- ラグーンの中の温度はモニターしていないが、年間を通して温暖な外気温とほぼ同じ、35～38℃で推移している。
- 電力源はバイオマスボイラーで、グリッドから電力の購入はしていない。このボイラーで全工場の電力を賄っている。
- バイオマスボイラーのスタートアップには軽油が使用される。1 日 10 分程度の使用。
- POME 処理に必要とされている電力は、4 基の送水ポンプが使用する電力のみであり、これらは工場内の総電力使用量の 5%以下と微量である。
- ラグーンの底に溜まったスラッジを 1 年～2 年に一度除去する。除去作業には重機が使用され、除去されたスラッジはラグーンの横にある敷地に放置される。乾燥したスラッジは肥料として再利用される。

写真 3　工場概観（1）

写真 4　工場概観（2）

写真 5　嫌気性ラグーン

写真 6　好気性ラグーン

b. 排水処理パイロットプラントについて

- パームオイル工場の敷地内、現在ラグーンがある場所のすぐそばにパイロットプラントが設置されている。
- 排水処理、油分回収の効率はいずれも非常に高いものであった。
- 異臭、騒音は確認されなかった。
- 処理水は工場に戻して再利用し、固形廃棄物は肥料化して農場で使用している。

c. プロジェクト実施後のモニタリング内容・体制について）

- 処理前・処理後の BOD/COD の値、POME の流量・組成がプラント各所に取り付けられた計器で計測される。
- 排水のサンプルを工場(QC ラボ)で採取し、それを KLK の中央検査室(TQCC: Technology and Quality Control Centre）に送付し、中央ラボでそれを測定、データとして管理される。
- 関連データはプロジェクトが終了するまで電子データとして保管される。
- TQCC は ISO の認証を取得しておりモニタリング体制・品質管理システムは確立されている。
- 計測器のキャリブレーションは KLK 独自に毎月行うほか、政府機関（Department of Weights and Measures）によっても行われる予定。

d. 現在のモニタリング内容・体制について

- 排水処理後の POME 中の BOD（生物化学的酸素要求量）濃度、POME の流量をモニターしていることが確認された。
- サンプルを TQCC に送り、中央ラボでデータ管理を行うシステムは現在も同じ。

2. 第二次現地調査（2005 年 11 月 14 日～25 日実施）

KLK 社を訪問し、本プロジェクトのベースライン、追加性、資金調達方法等の確認を行うとともに、KLK の中央品質管理センターである TQCC を訪問し、本プロジェクトのモニタリング実施体制および実施能力の確認を行った。また、MPOB にてマレーシアのパームオイル産業における排水処理システムの現状および今後の展望についてヒアリングを行った。

① KLK 本社

a. ベースラインについて

- オープンラグーン方式はマレーシアのパームオイル産業で最も一般的に行われている手法であり、技術、投資の障壁は一切無い。
- 閉鎖式タンク嫌気性処理については、マレーシアのパームオイル業界でも過去に 2 件ほど導入事例があるが、技術は先進国からの輸入であり、技術の障壁がある上、投資コストがかかりすぎる。
- 本 CDM プロジェクトが無かった場合、KLK 社はオープンラグーン処理を採用する。
- CPO の単価は将来的な予測を行うのではなく、より現実に近い過去 10 年間（1994 年～2004 年）までの平均値（アジア通貨危機後の価格変動で高騰した 1998 年を除く）である RM1,316 を採用する。
- KLK 社の本プロジェクトへの投資基準を確認した。

b. モニタリングについて

- 本プロジェクトのモニタリング体制は、KLK 本社、TQCC/KDC、そして 13 パームオイル工場の 3 部門によるクロスチェック体制の下に行う。
- 3 部門の本プロジェクトにおける役割を確認した。
- 各工場内の役割として、Laboratory Chief による工場スタッフへのトレーニングの実施、Mill Manager および Assistant Manager による品質のクロスチェックシステムがある。
- また、各工場のラボは TQCC の監査を年 2 回受ける。監査の目的は工場が効率的に運転されていることをチェックする。監査の時に工場スタッフのトレーニングも合わせて実施する。
- プロジェクト排出量が無いことを確認した（バイオマスボイラーの使用および既存システムを使用した肥料運搬）。
- 処理前の COD 濃度、処理前の POME 量、法規制・インセンティブの有無に関するモニタリング方法、データ管理、モニタリング頻度、クロスチェック体制、QA/QC 等を確認した。

c. 環境影響

- 本プロジェクトの実施による環境影響を確認した。
- 水質に関して、POME は排出基準地以下に処理され、さらに処理された POME は全て農園に撒かれ、水域への直接流入はない。
- 新プラントで再利用された POME は最終的には irrigation trench を介して農園に撒かれ、プロジェクト実施後も排水が水域へ直接流れることはない。
- 新プラントはスペック上、運転中に GHG および大気汚染物質は一切排出しない。
- 肥料として利用されるスラッジの環境影響について、スラッジは加工せずにそのまま肥料として使用され、環境への影響も無い。
- 現在はEFB を肥料として撒いているが、そのEFB と一緒にスラッジを運搬し、散布することになる。したがって、新プラントから発生するスラッジの運搬に関わる新たな GHG 排出量はない。

d. 利害関係者への説明

- 必要に応じて本プロジェクトに関して今後説明会を開催する予定であり、時期は 2006 年半ばを目処に行う。

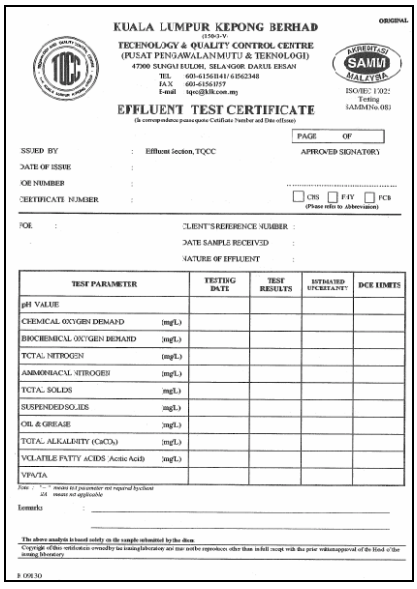
写真 7　KLK における協議風景

② TQCC（KLK Technology and Quality Control Center）

- 本プロジェクトにおける TQCC の役割に関する確認。
- KDC に関する情報および本プロジェクトにおける KDC の役割に関する確認。
- TQCC/KDC が所有する ISO/IEC 17025 の認定証の確認。
- 現在およびプロジェクト実施後に採用されるモニタリング体制の確認。
- データ報告方法、マニュアル、トレーニング、キャリブレーション、内部・外部監査、データ管理の確認。

写真 8　TQCC 試験室（1）

写真 9　TQCC 試験室（2）



KUALA LUMPUR KEPONG BERHAD

TECHNOLOGY & QUALITY CONTROL CENTRE
(PUSAT PENGAWALAN MUTU & TEKNOLOGI)

EFFLUENT TEST CERTIFICATE

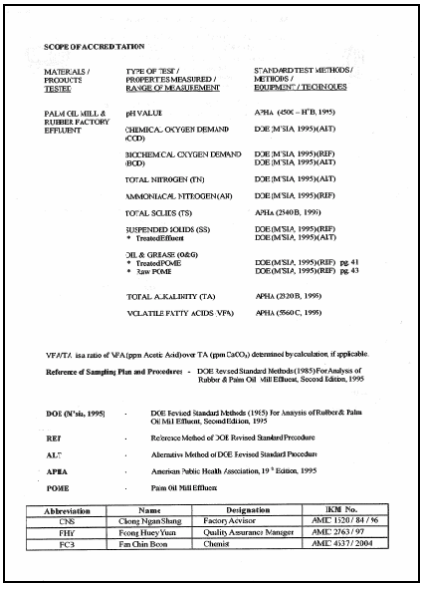
TEST PARAMETER	TESTING DATE	TEST RESULTS	ESTIMATED UNCERTAINTY	DOE LIMITS
pH VALUE				
CHEMICAL OXYGEN DEMAND (mg/L)				
BIOCHEMICAL OXYGEN DEMAND (mg/L)				
TOTAL NITROGEN (mg/L)				
AMMONIACAL NITROGEN (mg/L)				
TOTAL SOLIDS (mg/L)				
SUSPENDED SOLIDS (mg/L)				
OIL & GREASE (mg/L)				
TOTAL ALKALINITY ($CaCO_3$) (mg/L)				
VOLATILE FATTY ACIDS (Acetic Acid) (mg/L)				
VFA/TA				

Remarks :

The above analysis is based solely on the sample submitted by the client.

Copyright of this certificate is owned by the issuing laboratory and may not be reproduced other than in full except with the prior written approval of the Head of the issuing laboratory.

図 1　排水試験検定証（1）



SCOPE OF ACCREDITATION

MATERIALS / PRODUCTS TESTED	TYPE OF TEST / PROPERTIES MEASURED / RANGE OF MEASUREMENT	STANDARD/TEST METHODS / METHODS / EQUIPMENT / TECHNIQUES
PALM OIL MILL & RUBBER FACTORY EFFLUENT	pH VALUE	APHA (450 – H+B, 1995)
	CHEMICAL OXYGEN DEMAND (COD)	DOE (M'SIA, 1995)(AIT)
	BIOCHEMICAL OXYGEN DEMAND (BOD)	DOE (M'SIA, 1995)(RIF) DOE (M'SIA, 1995)(AIT)
	TOTAL NITROGEN (TN)	DOE (M'SIA, 1995)(AIT)
	AMMONIACAL NITROGEN (AN)	DOE (M'SIA, 1995)(RIF)
	TOTAL SOLIDS (TS)	APHA (2540 B, 1995)
	SUSPENDED SOLIDS (SS) * Treated Effluent	DOE (M'SIA, 1995)(RIF) DOE (M'SIA, 1995)(AIT)
	OIL & GREASE (O&G) * Treated POME * Raw POME	DOE (M'SIA, 1995)(RIF) pg. 41 DOE (M'SIA, 1995)(RIF) pg. 43
	TOTAL ALKALINITY (TA)	APHA (2320 B, 1995)
	VOLATILE FATTY ACIDS (VFA)	APHA (5560 C, 1995)

VFA/TA is a ratio of VFA (ppm Acetic Acid) over TA (ppm $CaCO_3$) determined by calculation, if applicable.

Reference of Sampling Plan and Procedures - DOE Revised Standard Methods (1985) For Analysis of Rubber & Palm Oil Mill Effluent, Second Edition, 1995

DOE (M'sia, 1995) - DOE Revised Standard Methods (1985) For Analysis of Rubber & Palm Oil Mill Effluent, Second Edition, 1995

REF - Reference Method of DOE Revised Standard Procedure

ALT - Alternative Method of DOE Revised Standard Procedure

APHA - American Public Health Association, 19th Edition, 1995

POME - Palm Oil Mill Effluent

Abbreviation	Name	Designation	IKM No.
CNS	Cheong Ngan Shung	Factory Advisor	AMEC 1120 / 84 / 96
FHY	Foong Huey Yuan	Quality Assurance Manager	AMEC 2763 / 97
FCS	Fan Chin Boon	Chemist	AMEC 4137 / 2004

図 2　排水試験検定証（2）

③　MPOB（Malaysia Palm Oil Board）

- 　POME 処理の専門家より、マレーシアにおける POME の処理方法についてヒアリングを行なった。
- 　下表のとおり、現在 95%が開放型ラグーンを使用して POME を処理している。

処理方法	件数	%
オープンラグーン方式	360	95%
開放型タンク処理方式	17	4%
閉鎖型タンク処理方式	3	1%
合計	380 件	

- 　閉鎖タンク式のうち 1 件は電力・熱供給を同時に行っている。使用用途は全て自社用。
- 　閉鎖タンク式の残り 2 件はバイオガスをフレア処理している。
- 　オープンラグーン方式以外の処理法はコストが高く、導入は進んでいない。
- 　近い将来マレーシア政府がオープンラグーンを規制するということはない。
- 　上記 3 方式に関する技術的な内容、障壁の確認。
- 　より効率的に水処理を行えるような技術革新ではなく、如何に上流で POME の量を削減し、環境への影響を最小に抑えるかが今後の課題。

3. 第三次現地調査（2006 年 2 月 22 日～25 日実施）

KLK 社を訪問し、DOE によるデスクレビューの結果を KLK に説明するとともに、今後の対応について協議を行った。また、最新の COD 等の関連データを入手、モニタリング手法の確認もあわせて行った。主な協議内容は以下のとおり。

b. DOE によるデスクレビューの結果に対する今後の対応

- DNV より提示された 6 つの request for clarification（CL）の確認。
- バウンダリーの定義、感度分析、排水のモニタリング手法の確認。
- 投資障壁の分析に用いる KLK のベンチマークの確認。
- 協議の結果、KLK 社側から、より幅を持たせた 20～30%の IRR を使用することとした。
- 新規プラントから排出され、肥料として利用される固形廃棄物の運搬システムの確認。
- 対象廃棄物のために新たに運搬システムを構築する必要はなく、新たな車両の調達の必要がないことを確認。
- 最新の COD 値の入手。
- 利害関係者からのコメント収集の計画を確認。
- 上記の情報・データを用いてバリデーションに対応する。

c. モニタリング手法の確認

- プロジェクト実施後のモニタリング体制・手法の確認。
- 排水中の油分濃度の測定は、以下のとおり実施していることを確認。
    - 500ml のサンプルを 1 時間毎に一回、同じサンプルポイントから POME を採取している。
    - 1 日に採取された全てのサンプルを、1 日に 1 回ホモジナイザーで混合する。
    - 各工場にあるラボでサンプル中の油分濃度を測定し、データを KLK の CDM 室に送付する。
- 対象となる 13 のパームオイル工場が本プロジェクトにおいて採用する QA/QC システムを確認。

d. その他

- 対象工場における高効率排水処理プラントの設置状況の確認。
- 今後のスケジュールの確認。

以上

添付資料 7

CDM/JI プロジェクト支援委員会からのコメントへの見解

CDM/JI プロジェクト支援委員会からのコメントへの見解

本報告書素案に対して、2005 年 3 月に CDM/JI プロジェクト支援委員会から以下の 2 つのコメントが出された。

F/S 調査段階でのこれらコメントに対する見解を以下の表に示す。

番号	CDM/JI 支援委員会からのコメント	見解
1	POMEについて実測値が記載されていない。実測値と文献値との比較検討が必要である。これらに乖離があった場合の事業のフィージビリティについて解析すること。	マレーシア側の事業実施者であるKLK社はラグーンに流入する処理後のPOMEの量およびPOME中の油分濃度に関してはモニタリングを以前より実施していたが、処理前のPOMEの組成に関するモニタリングは行っておらず、CODデータは入手できなかった。そのため、本調査中に、KLK社に対して処理前のPOME中に含まれるCOD値を計測するように依頼した。 事業開始後は、各工場で計測されたCODの値がベースライン排出量の計算に使用されるため、2005年12月より、新方法論に示すとおりのモニタリングを全工場で実施し、現在データを集めている。 現段階で集められたデータによると、CODはおよそ40,000ppmから60,000ppmの範囲に集中しており、文献（MPOB）データと非常に近い値が得られている。 本報告書では、まだ十分な期間のデータが蓄積されていないため、文献（MPOB）データを使用するが、登録前に行うバリデーション時には、対象工場で実測されたPOMEの年間COD平均値を用いて、GHG削減量の計算を行う予定である。
2	方法論については、承認方法論のリビジョンをするという方法もありうると考える。	2005年3月現在、排水処理に関する方法論は2件承認を受けている（AM0013/ Version 02およびAM0022/ Version 02）。両者とも、メタン排出回避の他に、排水から出るバイオガスを利用して発電／熱利用を行うことを目的としているが、本プロジェクトはメタンガスを発生させない排水処理システムを導入するのみであり、電力や熱エネルギーを発生させるものではない。したがって、承認方法論と本プロジェクトの内容は一部重複するが、メインとなるGHG排出削減のプロセスは別のものである。

番号	CDM/JI 支援委員会からのコメント	見解
		また、承認方法論の適用条件（applicability condition）に「回収したメタンを発電／熱利用すること」が含まれており、本プロジェクトはこの条件を満たしていないため、承認方法論を適用することはできない。 デスクレビューを依頼したDNVによると、承認方法論の適用条件を一部変更し、それを提案CDMプロジェクトに適用することは原則認められていない。 また、本調査では、承認されたAM0013からメタン排出回避の箇所のみを抜き出して使用することを検討したが、この手法をとるとしても、承認方法論の適用条件を全て満たしていないことに変わりはないため、この手法を採用することも原則認められないとのことである。 このため、本プロジェクトでは、新たに新方法論を提出し、承認を受けることを選択した。