Tambun LPG Associated Gas Recovery and Utilization Project

Clean Development Mechanism (CDM)

CER Monitoring Report

(Certified) Emission Reductions

Monitoring Period: 1 October 2009 – 31 October 2009

CDM Registration No: 1144

Date: 16 November 2009
Version 1

A project designed to meet the baseline and monitoring requirements of UN CDM Approved Methodology

AM0009 Version 2
"Recovery and Utilization of Gas from Oil Wells that would otherwise be flared"

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1. General Project Activity Information

1.1 Title of Project Activity

Project 1144 : Tambun LPG Associated Gas Recovery and Utilization Project - Indonesia.

1.2 CDM Registration date and crediting period

Registration Date: 01 Feb 2008.
Crediting Period: 01 Feb 2008 – 31 Jan 2018 (fixed)

1.3 Contact Details

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1.4 Short Description of the project activity

The purpose of the project activity is the recovery and utilization of gases produced as a by-product of oil production activities at the Tambun and Pondok Tengah Oil fields.

The Tambun Oil Field is located about 40 km west of Jakarta in West Java Province. This field started production in 2003 at 4,000 barrels per day. Associated gas was flared, initially at 6 to 7 mmscfd (millions of standard cubic feet per day); increasing to 12 to 15 mmscfd as oil production increased to 8,000 barrels per day in 2006. The Pondok Tengah Oil field (PDT), located about 10 km North of Tambun, has recently come on stream at a faster rate than planned. A geographical overview of the project location is provided overleaf.

The technology consists of a mini Liquefied Petroleum Gas (LPG) plant with a designed input capacity of 15 mmscfd, condensate removal facilities, a 35 km 8" diameter steel pipeline and associated auxiliary equipment including compressors, metering stations and safety valves.

The processing plant and pipeline is constructed in full compliance with the local environmental regulations and was subject to environmental appraisals as per Indonesian environmental regulations. The processing plant is powered by the gas supply, with back-up diesel for generators and fire pumps. The supply pipeline runs 35 km to the main east -west supply line. The pipeline is constructed from carbon steel, with a mid-wall diameter of 8 inches.

Emergency shutdown valves are located at the start and finish of the pipeline and two line break control valves (LBCV) installed at approximately 12km and 24km from the start.
In December 2006 the back-up generators have been converted to run on gas. No diesel has been used for on-site power generation since then.

Location of the project activity

The LPG plant is located at 107 01' 40" E, 06 07' 55" S. Tambun Oil Field comprises several wells, located within a few km of the LPG plant. Pondok Tengah Oil Field is located at adjacent to, and to the north of Tambun Oil Field.

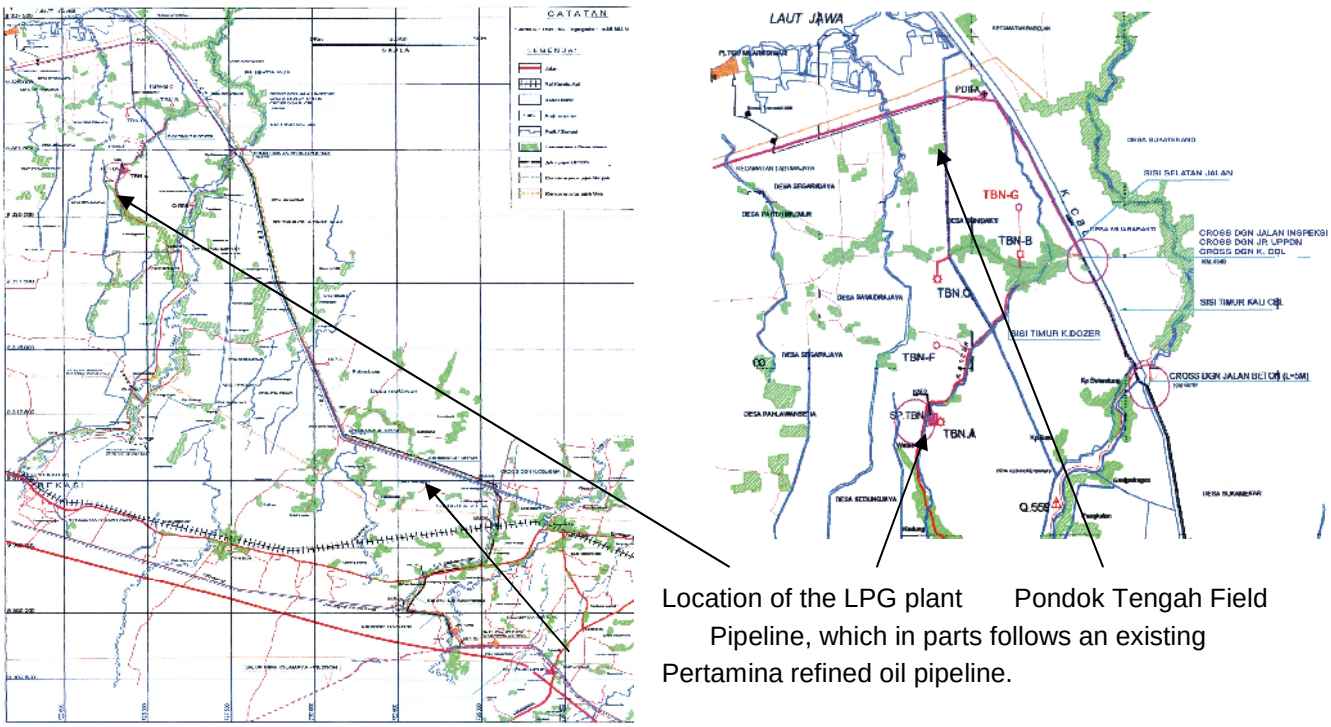


Figure 1 Location of the project activity

The project participants are:

PT. Odira Energy Persada, an Indonesian private gas company which was established under the laws of Indonesia and having its registered office at Jl. Patal Senayan No.38, Jakarta 12210, Indonesia (hereinafter referred to as "Odira").

Sindicatum Carbon Capital Ltd, a company incorporated under the laws of England and having its registered office at 33 Duke Street, London, W1U 1JY, United Kingdom (hereinafter referred to as "SCC").

1.5 Monitoring Period Covered

The monitoring period covered by this monitoring report: 1 October 2009 – 31 October 2009 (inclusive).

1.6 Methodology Applied to the Project Activity

AM0009 ver. 2 - Recovery and utilization of gas from oil wells that would otherwise be flared.

1.7 Deviations or Revisions to the Registered PDD or Monitoring Plan

N/A

1.8 Special (Accidental) Events occurred during this reporting period

During the monitoring period, no accidental events occurred.

1.9 Changes Since Last CER Verification

No changes.

2. Monitoring Plan

2.1 Parameters Monitored

The parameters monitored and the monitoring procedure applied for determination of the emission reductions is described in detail in section B.6.1 of the Project Design Document v3.12 dated 13th December 2007, and available upon the UNFCCC website (http://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1180000727.07/view).
As described in the registered PDD , associated gas feed the Tambun LPG plant originates from 2 separate oil fields, a permanent associated gas feed from the Tambun oil field and an additional temporary associated gas feed from the Pondok Tengah oil field.

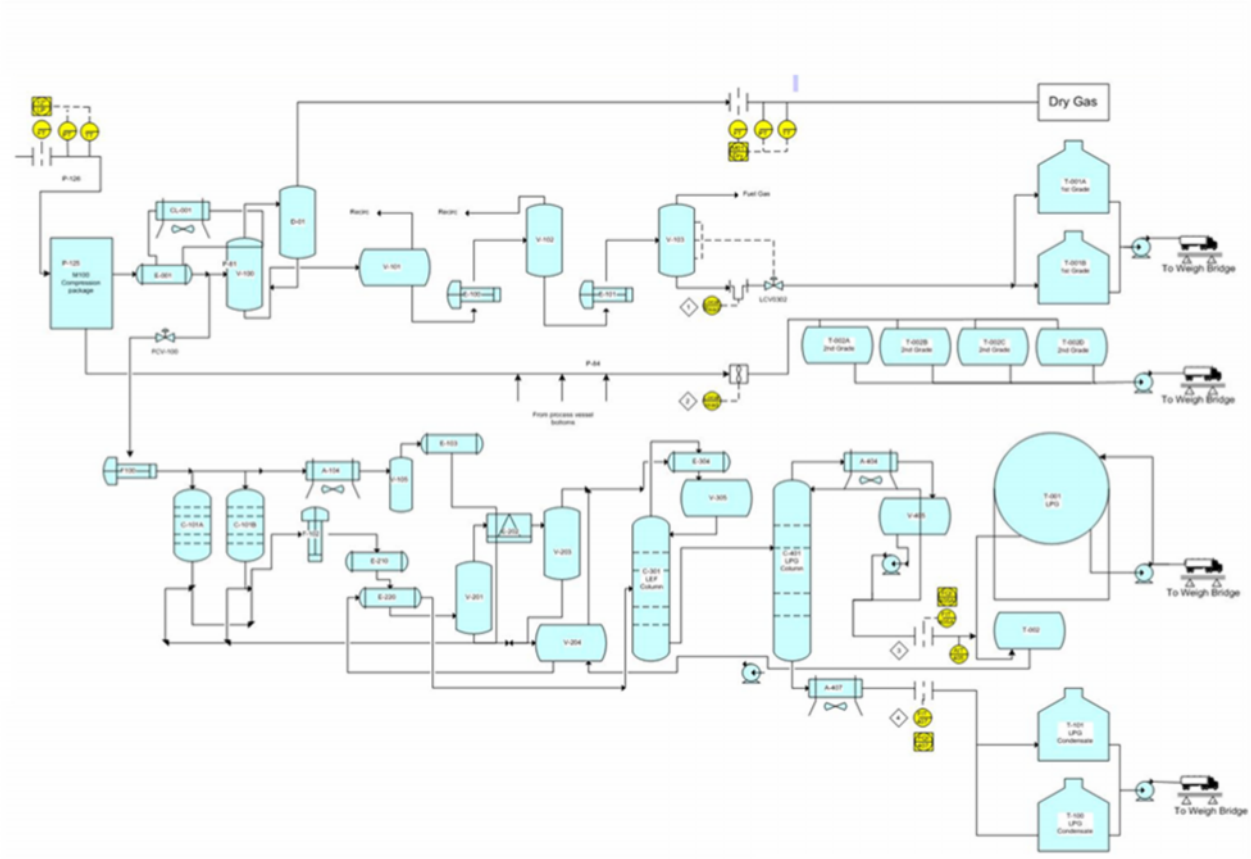
At the time of project registration (1 February 2008) , the Pondok Tengah associated gas feed supply was expected to continue until year 3, however the contract terms for this supply allowed for early termination and for reasons out of project control, the contract and associated gas supply has now terminated (31 March 2008). Monitoring of the 6" supply from Pondok Tengah is therefore no longer required since the pipeline has been decommissioned and the measurement device has been removed. Despite these changes, a similar volume of gas is still being supplied so the estimates of total gas flow remain the same as in the original PDD, but all gas is routed through the Tambun pipelines.

The LPG and condensate monitoring methodology is described in the registered PDD as using flow meters. The installation of these flow meters was implemented post plant design and construction in an attempt to exactly follow the interpretation of the description 'continuous' measurement required by AM0009 v2. However process conditions at the Tambun LPG Plant involve pressure drop between upstream pressure vessels and the stock tanks which result in gas break-out in the meter flow lines. This results in unacceptable errors in metered flows. These errors were captured within the installed QA/QC system (eg. by comparison with the daily production determined across the calibrated weighbridge and calibrated road tankers).
The fall-back approaches have therefore been implemented as per the registered PDD, where calibrated weighbridge data is currently used for determination of mass of LPG and condensates produced. In addition the site has implemented custody transfer methods applying use of calibrated weighbridge and calibrated road tanker data for determination of volumes of LPG and condensates produced. These custody transfers and the weighbridge are subject to government inspection and calibration by the 'Department Metrologi.

Uncertainty in these methodologies are as per the weighbridge load cell technology is less than 1%. The continuous measurement systems currently installed on LPG and condensates remain in place. For LPG and Condensate product monitoring the most accurate data (lowest level of uncertainty) is been used.

An overview of the parameters monitored is provided in section 3 (and Annex A). The location of measurement devices installed is presented in figure 2 below:

Figure 2 Location of the measurement devices



Remark:
On 31 March 2008 the contract for PDT previously flared gas ended and no further gas has been supplied through the 6" pipeline since then.
On 17 October 2008, the 4 inch line gas input to Odira has been shut off.
At the site one weighbridge is installed.

2.2 Quality Assurance /Quality Control

In order to guarantee the quality of the data and data collection system, a detailed monitoring manual has been developed and implemented. This quality manual or monitoring plan (available for verification by a designated operational entity (DOE)) is based upon the requirements set in the registered PDD and addresses as a minimum the items listed below.

All data is compared from month to month using trend analysis to show where parameters have deviated significantly from preceding values. Any values identified as being unusual in this manner are re-checked and corrected if necessary, following the procedures in the monitoring plan.

Fugitive emissions of methane from the processing plant and pipelines and from accidental releases of methane from the transmission pipelines are calculated using the EPA approach[1] as per AM0009v2.

Any significant differences between daily / weekly / monthly or periodic values will be reviewed. An overview of the data collection process is provided in table 1 underneath. Detailed formulas for the calculation of emissions are presented in Section 3 below.

Table 1 Data collection process

Parameter	Reference	Procedure / Frequency	Registration	Check and correct primary measurements
Baseline Emissions	The baseline emissions are calculated using the formulae described in the PDD, section B6.1 - using the CDM spreadsheet	Primary data (weekly reports) are entered by the SCC officer in the CDM spreadsheet at the start of each month	CDM spreadsheet stored at SCC Project File S-Server	The SCC project officer performs a consistency check based upon previous months. In case of irregularities data is double checked with Odira and if needed corrected
Leakage	Leakage is calculated using the formulae described in the PDD, section B6.1 - using the CDM spreadsheet	Primary data (weekly reports) are entered by the SCC officer in the CDM spreadsheet at the start of each month	CDM spreadsheet stored at SCC Project File S-Server	The SCC project officer performs a consistency check based upon previous months. In case of irregularities data is double checked with Odira and if needed corrected
Project Emissions	The project emissions are calculated using the formulae described in the PDD, section B6.1 - using the CDM spreadsheet	Primary data (weekly reports) are entered by the SCC officer in the CDM spreadsheet at the start of each month	CDM spreadsheet stored at SCC Project File S-Server	The SCC project officer performs a consistency check based upon previous months. In case of irregularities data is double checked with Odira and if needed corrected

[1] Document EPA-453/R-95-017 available at http://www.epa.gov/ttnchie1/publications.html.

Emissions Reductions	The emission reductions are calculated using the formulae described in the PDD, section B6.1 - using the CDM spreadsheet	Primary data (weekly reports) are entered by the SCC officer in the CDM spreadsheet at start of each month	CDM spreadsheet stored at SCC Project File S-Server	The SCC project officer performs a consistency check based upon previous months. In case of irregularities data is double checked with Odira and if needed corrected

Accuracy and calibration of instruments

All measurement devices are maintained to ensure a high level of accuracy. All meters are subject to a quality control regime that include a regular maintenance and calibration according to manufacturer's instructions.
A record is available showing the location and unique identification number of each meter, the calibration status of that meter (when last calibrated, when next due for calibration).
Annual calibrations of continuous flow meters and weighbridge are performed (as locally required) by the Indonesian 'Directorat Metrologi' (State organization). All calibration records are retained for until two years after the end of the crediting period and are available for verification by the DOE. Additional instrument verification, flow calculation and configuration checks are carried out periodically by SCC staff.

Archiving of data

Data is archived periodically to a secure and retrievable storage format for a period 2 years after crediting period (see also Annex A).

Document Control

A document control system has been introduced ensuring that the current versions of necessary documents are available at the point of use.

Treatment of missing or corrupted data

Where data in the on-line system are corrupted or missing whilst the plant is operating, the corrupt or missing data can be corrected using the installed back-up metering devices (e.g. Barton Chart, calibrated weighbridge, manual daily recordings).
In case errors are identified, both corrective and preventive actions are taken.

Internal Audit

An audit of the data collection and QC/QA system is performed periodically, at least once per year.

Internal Training

Relevant process operators have received training to ensure compliance with the tasks and procedures set out in the monitoring plan.

3. Formulas Utilized to calculate Emission Reductions

The formulas used for calculation are in accordance with the approved methodology CDM-EB AM0009 version 2 “recovery and utilization of gas from oil wells that would otherwise be flared”.

3.1 Baseline Emissions

The formula used for determination of the baseline emissions are described in section B.7.1 of the Project Design Document v3.12 dated 13th December 2007, and available upon the UNFCCC website (http://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1180000727.07/view

Baseline emissions are calculated as follows:

$$BL_y = V_{A,y} \cdot W_{carbon,A,y} \cdot \frac{44}{12} \cdot \frac{1}{1000}$$

where:
BL_y Are the baseline emissions during the period y in tons of CO_2 equivalents.
$V_{A,y}$ Is the volume of gas recovered from the oil field during the period y in m^3.
$w_{carbon,A,y}$ Is the average content of carbon in the gas recovered during the period y in kg-C/m^3.

The average methane content in the gas $w_{CH4,A,y}$ is determined from regular measurements of the composition of the gas, taking into account the molecular weight of all fractions of the gas.

3.2 Project Emissions

The formulas used for determination of the project emissions are described in section B.7.1 of the Project Design Document v3.12 dated 13th December 2007, and available upon the UNFCCC website (http://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1180000727.07/view

Project emissions are calculated as follows:

$$PE_{CO2,gas,y} = \frac{m_{carbon,A,y}}{m_{carbon,A,y} + m_{carbon,X,y}} \cdot \left(m_{carbon,A,y} + m_{carbon,X,y} - m_{carbon,B,y}\right) \cdot \frac{44}{12} \cdot \frac{1}{1000}$$

with

$$m_{carbon,A,y} = V_{A,y} \cdot w_{Carbon,A,y}$$

$$m_{carbon,B,y} = V_{B,dry\ gas,y} \cdot w_{carbon,dry\ gas,B,y} + m_{LPG,B,y} \cdot w_{carbon,LPG,B,y} + m_{condensate,B,y} \cdot w_{carbon,condensate,B,y}$$

$$m_{carbon,X,y} = \sum_{i} V_{Xi,y} \cdot w_{Carbon,Xi,y}$$

where:

$PE_{CO2,gas,y}$	Are the CO_2 emissions from the project activity due to combustion, flaring or venting of recovered gas during the period y in tons of CO_2.
$m_{carbon,A,y}$	Is the quantity of carbon in the recovered gas from the project area in during the period y in kg.
$m_{carbon,B,y}$	Is the quantity of carbon in the products (dry gas, LPG, condensate) leaving the gas processing plant during the period y in kg.
$m_{carbon,X,y}$	Is the quantity of carbon in recovered gas from other oil wells at all points Xi during the period y in kg.
$V_{B,dry\ gas,y}$	Is the quantity of dry gas that is produced in the gas processing plant during the period y in m^3.
$m_{LPG,B,y}$	Is the quantity of LPG that is produced in the gas processing plant during the period y in kg.
$m_{condensate,B,y}$	Is the quantity of condensate that is produced in the gas processing plant during the period y in kg.
$V_{A,y}$	Is the volume of gas recovered during the period y in m^3.
$V_{Xi,y}$	Is the volume of gas recovered from oil well i during the period y in m^3.
$w_{carbon,A,y}$	Is the average content of carbon in the gas recovered during the period y in kg-C/m^3.
$w_{carbon,dry\ gas,B,y}$	Is the average content of carbon in dry gas during the period y in kg-C/m^3.
$w_{carbon,LPG,B,y}$	Is the average content of carbon in LPG during the period y in kg-C/kg.
$w_{carbon,condensate,B,y}$	Is the average content of carbon in condensate during the period y in kg-C/kg.
$w_{carbon,Xi,y}$	Is the average content of carbon in the gas recovered from oil well i during the period y in kg-C/m^3.

If other fossil fuels than the recovered gas are consumed at the oil well and if this consumption is a result of the project activity (e.g. substitution of gas for on-site generation or use in the compressor station), CO_2 emissions from combustion of these fuels should also be accounted.

$$PE_{CO2,other\ fuels,y} = \frac{1}{1000} \cdot \sum_{Fuels} m_{fuel,y} \cdot NCV_{fuel} \cdot EF_{CO2,fuel}$$

where:

$PE_{CO2,other\ fuels,y}$	Are the CO_2 emissions due to consumption of other fuels than the recovered gas due to the project activity during the period y in tons of CO_2.
$m_{fuel,y}$	Is the quantity of a specific fuel type that is consumed due to the project activity during the period y in kg.
NCV_{fuel}	Is the net calorific value of the respective fuel type in kJ/kg.
$EF_{CO2,fuel}$	Is the CO_2 emission factor of the respective fuel type in kg CO_2/kJ.

During the monitoring period no other fossil fuels have been consumed.

CH_4 emissions from recovery and processing the gas

Fugitive CH_4 emissions occurring during the recovery and processing of gas may in some projects be small, but should be estimated as a conservative approach. Emission factors are taken from the IPCC Good Practice Guidance and/or from the 1995 Protocol for Equipment Leak

Emission Estimates, published by EPA2. Emissions are determined for all relevant activities and all equipment (such as valves, pump seals, connectors, flanges, open-ended lines, etc.)

Methane emissions are calculated for each single equipment by multiplying the CH_4 concentration in the respective stream with the appropriate emission factor as indicated in Table 1 of AM0009/version02.1.

$$PE_{CH4,plants,y} = GWP_{CH4} \cdot \frac{1}{1000} \cdot \sum_{equipment} w_{CH4,stream} \cdot EF_{equipment} \cdot T_{equipment}$$

where:

$PE_{CH4,plants,y}$	Are the $_{CH4}$ emissions from the project activity at the gas recovery facility and the gas processing plant during the period y in tons of CO_2 equivalents.
GWP_{CH4}	Is the approved Global Warming Potential for methane.
$T_{equipment}$	Is the operation time of the equipment in hours (in absence of further information, the monitoring period could be considered as a conservative approach).
$w_{CH4,A,y}$	Is the average methane weight fraction in the respective stream in kg-CH_4/kg.
$EF_{equipment}$	Is the appropriate emission factor from Table 1 (AM0009/version02.1) in kg/hour/equipment.

CH_4 emissions from transport of the gas in pipelines under the normal operation condition

Fugitive CH4 emissions occurring during the transport of the gas in pipelines are estimated as the same approach as "CH_4 emissions from recovery and processing the gas", explained above.

$$PE_{CH4,pipeline,y} = GWP_{CH4} \cdot \frac{1}{1000} \sum_{equipment} w_{CH4,pipeline} \cdot EF_{pipeline} \cdot T_{equipment}$$

where:

$PE_{CH4,pipeline,y}$	Are the CH_4 emissions from the project activity during the transport of the gas in pipelines under the normal operation during the period y in tons of CO_2 equivalents.
GWP_{CH4}	Is the approved Global Warming Potential for methane.

$w_{CH4,pipeline}$ Is the average methane weight fraction in the pipeline in kg-CH_4/kg.

$EF_{pipeline}$ Is the appropriate emission factor from Table 1 (AM0009/version02.1) in kg/hour/pipeline

$T_{equipment}$ Is the operation time of the equipment in hours (in absence of further information, the monitoring period could be considered as a conservative approach)

CH_4 emissions from transport of the gas in pipelines when accidental event occurred

When an accident causes gas leakage from a pipeline, the gas leakage volume is less than the sum of (1) the total amount of gas that flowed during the time the accident occurred until the gas flow is shut and (2) the total amount of gas remaining in the pipeline. In the interest of conservativeness, the volume set out above should be estimated as the gas leakage from a pipeline caused by an accident.

CH_4 emissions from the transport of the gas in pipelines when accidental event occurred can be calculated as:

$$PE_{CH4,pipeline,accident} = GWP_{CH4} \cdot \frac{1}{1000}(V_{A,accident} + V_{remain,accident}) \cdot W_{CH4,pipeline,accident}$$

with:

$$V_{A,accident} = t_{accicdent} \cdot F = (t_2 - t_1) \cdot F$$

$$V_{remain,accident} = d^2 \cdot \pi \cdot L \cdot \frac{P_p}{P_s} \cdot \frac{T_s}{T_p} \cdot \frac{V_{A,d,accident}}{\sum_i V_{Xi,d,accident}}$$

where:

$PE_{CH4, pipeline, accident}$ Are the CH_4 emissions from the project activity due to transport of the recovered gas in the pipeline when the accidental event happens in tons of CO_2 equivalent.

GWP_{CH4} Is the approved Global Warming Potential for methane.

$VA_{,t, accident}$ Is the volume of gas supplied from the oil well from the time the gas leakage started until the shutdown valves closed the pipeline in m^3.

$V_{remain,accident}$ Is the volume of gas remaining in the pipeline after the shutdown valves close the pipeline in m^3.

$W_{CH4, pipeline, accident}$ Is the average methane weight fraction in the gas recovered in kg-CH_4/m^3

$t_{accident}$ Is the time difference between t1 and t2 determined as “retention time” in seconds.

t1 Is the time the gas leakage caused by the accident occurred. “t1” is determined based on the continuous monitoring data such as pressure etc.

t2 Is the time that the shutdown valves closed both the upstream and downstream pipeline. “t2” is determined based on the operation data.

F Is the flow rate of gas supplied from the oil well

d Is the radius of the pipeline in meters. The data is derived from P & I (Piping and Instrument).

π Is the ratio of the circumference of a circle to its diameter.

L Is the length of the pipeline in meters. The data is derived from P & I (Piping and Instrument).

Pp Is the pressure in the pipeline when the shutdown valves close both the upstream and downstream of the pipeline in atmospheres (atm).

Ps Is the standard pressure in atm.

Tp Is the temperature in the pipeline when the shutdown valves close both the upstream and downstream of the pipeline in degrees Centigrade.

Ts Is the standard temperature in Centigrade.

$VA_{d, accident}$ Is the volume of gas supplied to the pipeline from oil well before the accident occurs during the period day in m^3.

$V_{xi, d, accident}$ Is the volume of gas supplied to the pipeline from oil well i before the accident occurs during the period day in m^3.

During the monitoring period no accidental events occurred.

3.3 Leakage

No leakage reported (see section B.6.1 of the Project Design Document v3.12 dated 13th December 2007, and available upon the UNFCCC website) (http://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1180000727.07/view)

3.4 Emission Reductions

The formula used for determination of the emission reductions is described in section B.7.1 of the Project Design Document v3.12 dated 13th December 2007, and available upon the UNFCCC website (http://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1180000727.07/view).

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

$$EF_y = BL_y - PE_{CO2,\,other\ fuels,\,y} - PE_{CH4,\,plants,\,y} - PE_{CH4,\,pipeline,\,y} - PE_{CH4,\,pipeline,\,accident} - L_y \cdots\cdots$$

where:

EF_y Are the emissions reductions of the project activity, adjusted for leakage, during the period y in tons of CO_2 equivalent.

BL_y Are the baseline emissions during the period y in tons of CO_2 equivalent.

$PE_{CO2,gas,y}$ Are the CO_2 emissions from the project activity due to combustion, flaring or venting of recovered gas during the period y in tons of CO_2 .

$PE_{CO2,other\ fuels,y}$ Are the CO_2 emissions due to consumption of other fuels than the recovered gas due to the project activity during the period y in tons of CO_2.

$PE_{CH4,plants,y}$ Are the CH_4 emissions from the project activity at the gas recovery facility and the gas processing plant during the period y in tons of CO_2 equivalent.

$PE_{CH4,pipeline,y}$ Are the CH_4 emissions from the project activity due to transport of the recovered gas in the pipeline during the period y in tons of CO_2 equivalent.

$PE_{CH4, pipeline, accident}$ Are the CH_4 emissions from the project activity due to transport of the recovered gas in the pipeline when the accidental event occurs in tons of CO_2 equivalent.

L_y Are any leakage emissions during the period y in tons of CO_2 equivalent.

4. Calculation of Emission Reductions

The data required to calculate baseline emissions, project emissions and leakage emissions is transferred into a protected spreadsheet which will calculate the emission reductions according to the formulae described in previous section. The CDM spreadsheet has been provided to the DOE for verification purposes.

Sections below provide results of the monitoring process for the monitoring period stated.

4.1 Baseline Emissions

4.1.1 Input Parameters

1 October 2009 – 31 October 2009

Date								Condensate		
From	To	Month	12" LP Gas	4" HP Gas	6" PTD Gas	M01 Dry Gas	LPG	LPG	1st Grad	2nd Grad
			mmscf	mmscf	mmscf	mmscf	t	Sm3	Sm3	Sm3
		August								
		September								
1	31	October	580.9460	0.0000	0.0000	454.5018	2,560.253	1,029.874	727.852	682.258
		November								
		December								
Total			**580.9460**	**0.000000**	**0.0000**	**454.5018**	**2,560.253**	**1,029.874**	**727.852**	**682.258**

Remarks:

- There are 28316.8466 standard cubic meters in one million standard cubic feet (source: API "Compendium for Greenhouse Gas Emission Methodologies for the Oil and Gas Industry', Feb 2004, American Petroleum Institute).
- On 31 March 2008 the contract PDT ended and no gas was supplied through the 6" pipeline since then.
- On 17 October 2008, the 4 inch line gas input to Odira has been shut off.

4.1.2 Baseline

1 October 2009 – 31 October 2009

Date		Month	12" LP Gas			4" HP Gas			6" PTD Gas		
From	To		Sm3	kgCO2/Sm3	tCO2	Sm3	kgCO2/Sm3	tCO2	Sm3	kgCO2/Sm3	tCO2
		August									
		September									
1	31	October	16,450,560.740	3.012	49,545.026	-	-	-	-	-	-
		November									
		December									
Total			**16,450,560.740**		**49,545.026**	**-**		**-**	**-**		**-**

Remarks:

- There are 28316.8466 standard cubic meters in one million standard cubic feet (source: API “Compendium for Greenhouse Gas Emission Methodologies for the Oil and Gas Industry’, Feb 2004, American Petroleum Institute).
- On 31 March 2008 the contract PDT ended and no gas was supplied through the 6” pipeline since then.
- On 17 October 2008, the 4 inch line gas input to Odira has been shut off.

4.2 Project Emissions (PE)

4.2.1 PE CO_2 gas

1 October 2009 – 31 October 2009

Date			V_A	$W_{carbonA}$	$M_{carbonA}$	V_{drygas}	$W_{carbondrygas}$	$M_{carbondrygas}$	M_{LPG}	$W_{carbonLPG}$	$M_{carbonLPG}$
			(Import)	(CO2)		Dry Gas	Dry Gas	Dry Gas	LPG	LPG	LPG
From	To	Month	Sm3	kgC/Sm3	tCO2	Sm3	kgCO2/Sm3	tCO2	t	tCO2/t	tCO2
		August									
		September									
1	31	October	16,450,560.740	3.012	49,545.026	12,870,059.864	2.521	32,439.409	2,560.253	3.011	7,708.215
		November									
		December									
Total			**16,450,560.740**		**-**	**12,870,059.864**		**32,439.409**	**2,560.253**		**7,708.215**

Date			$V_{condensate}$	$SG_{Condensate}$	$M_{condensate}$	$W_{carboncondens}$	$M_{carboncondensa}$	$M_{carbonB}$
			Cond	Cond	Cond	Cond	Cond	
From	To	Month	Sm3	kg/lit	t	tCO2/t	tCO2	tCO2
		August						
		September						
1	31	October	2,439.984	0.675	1,647.184	3.054	5,029.830	45,177.454
		November						
		December						
Total			**2,439.984**		**1,647.184**		**5,029.830**	**45,177.454**

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1 October 2009 – 31 October 2009

Date			$V_{condLPG}$	$SG_{CondLPG}$	$M_{condLPG}$	$W_{carboncondLPG}$	$M_{carboncondLPG}$	$V_{conde1stGrad}$	$SG_{Cond1stGrad}$	$M_{cond1stGrad}$
			Cond	Cond	Cond	Cond	Cond	Cond	Cond	Cond
From	To	Month	Sm3	kg/lit	t	tCO2/t	tCO2	Sm3	kg/lit	t
		August								
		September								
1	31	October	1,029.87	0.65	669.42	3.05	2,041.49	727.85	0.68	491.47
		November								
		December								
Total			**1,029.87**		**669.42**		**2,041.49**	**727.85**		**491.47**

Date			$W_{carboncond1st}$	$M_{carboncond1st}$	$V_{cond2ndGrad}$	$SG_{Cond2ndGrad}$	$M_{cond2ndGrad}$	$W_{carboncond2nd}$	$M_{carboncond2ndGrad}$
			Cond	Cond	Cond	Cond	Cond	Cond	Cond
From	To	Month	tCO2/t	tCO2	Sm3	kg/lit	t	tCO2/t	tCO2
		August							
		September							
1	31	October	3.05	1,499.99	682.26	0.70	477.58	3.06	1,460.97
		November							
		December							
Total				**1,499.99**	**682.26**		**477.58**		**1,460.97**

4.2.2 Project Emissions (PE) Other fossil fuels

During the reporting period no other fossil fuels have been used.

4.2.3 Fugitive LPG Plant Emissions ($PECH_4$ Plant)

1 October 2009 – 31 October 2009

Fugitive LPG plant emissions (PECH4Plant)

Equipment Type	Factor kg/hr	Number	CH4 ton	CO2e ton
Valves	4.50E-03	215	3.53	74.10
Pump seals	2.40E-03	0	0.00	0.00
Other	8.80E-03	229	7.35	154.34
Connectors	2.00E-04	0	0.00	0.00
Flanges	3.90E-04	64	0.09	1.91
Open ended lines	2.00E-03	0	0.00	0.00
Valves (light oil)	2.50E-03	444	4.05	85.01
Pump seals (light oil)	1.30E-02	0	0.00	0.00
Other (light oil)	7.50E-03	0	0.00	0.00
Connectors (light oil)	2.10E-04	0	0.00	0.00
Flanges (light oil)	1.10E-04	481	0.19	4.05
Open ended lines	1.40E-03	0	0.00	0.00
Total			15.21	319.42
Fugitive Emission for the Current Monitoring Period				26.619

Notes	
Annual Op Hc	8592
Wt CH4 %	42.4480948
Equipment inventory spreadsheet	
CH4 - average wet gas HP and LP	
Time assumes one week TAR	
CH4 GWP - 21	

$PE_{CH4Plant}$	319.42	tCO2

(*) source: US EPA-453/R-95-017 Table 2.4,page 2-15.

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4.2.4 Fugitive Emissions from Pipeline (PE CH_4 Pipeline)

1 October 2009 – 31 October 2009

Fugitive emissions from pipeline (PECH4Pipeline)

Equipment Type	Factor	Number	CH4	CO2e
	kg/hr		ton	ton
Valves	4.50E-03	4	0.09	1.79
Pump seals	2.40E-03	0	0.00	0.00
Other	8.80E-03	2	0.08	1.75
Connectors	2.00E-04	0	0.00	0.00
Flanges	3.90E-04	20	0.04	0.77
Open ended lines	2.00E-03	0	0.00	0.00
Total			0.21	4.31
Fugitive Emission for the Current Monitoring Period				0.359

Notes		
Annual Op Hc	8592	
Wt CH4 %	55.0082788	
Source - Equipment inventory s/s		
CH4 - average dry gas analysis		
Time assumes one week TAR		
CH4 GWP - 21		
$PE_{CH4Pipeline}$	4.31	tCO2

(*) source: US EPA-453/R-95-017 Table 2.4,page 2-15.

4.2.5 Project Emissions Pipeline Accident (PE CH_4 pipeline accident)

During the reporting period no accidental events occurred.

4.3 Leakage

N/A.

4.4 Emission Reductions (tCO_2eq)

1 October 2009 – 31 October 2009

Date		Month	BL	PECO2gas	PECO2Other	PECH4Plant	PECH4Pipelin	ECH4Accide	CER
From	To								
		August							
		September							
1	31	October	49,545.026	4,367.572	0.000	26.619	0.359	0.000	45,150.476
		November							
		December							
Total			**49,545.026**	**4,367.572**	**0.000**	**26.619**	**0.359**	**0.000**	**45,150**

Total 1 October 2009 – 31 October 2009 (inclusive) = 45,150 tCO2eq.

4.5 Comparison Actual Emission Reductions with PDD estimate (tCO_2eq)

PDD Estimate			Actual Achieved				Difference PDD/Actual Achieved(%)		
Year		CER PDD	Monitoring Period Begin Date	End Date	Days	CERs	Difference PDD / Actual	Report	Comment
3	2009	**531683**[1)]	01/01/2009	15/02/2009	47	65,549		MR4	
			16/02/2009	30/09/2009	226	342,441		MR5	
			01/10/2009	31/10/2009	31	45,150		MR6	
			01/11/2009	31/12/2009	61	88,752			Estimate
			Total 2009		365	**541,892**	1.92%		

[1)] PDD Tambun LPG Associated Gas Recovery and Utilization Project, Version 4, Updated on 9 September 2009

Annex A Monitored Parameters

Parameter	Data Set / Document	Data		Storage	Soft Copies		Retention Time
		Output	Format	Location	Transcribed to	Location	Crediting Period +2 year
$V_{A,y}$	Flow Meter 12" (Orifice Meter)	Hourly data, Flow Computer Pertamina	Soft/Hard copy (print out)	Pertamina Control Room /	Morning and Monthly Report	Odira Office, SCC Office	Crediting Period +2 year
		Barton charts	Hard copy (card read out)	Pertamina Control Room	Morning reports back-up	Odira Office, SCC Office	Crediting Period +2 year
	Flow Meter 4" (Orifice Meter)	Hourly data, Flow Computer Pertamina	Soft/Hard copy (print out)	Pertamina Control Room / Odira Plant	Morning and Monthly Report	Odira Office, SCC Office	Crediting Period +2 year
		Barton charts	Hard copy (card read out)	Pertamina Control Room	Morning reports back-up	Odira Office, SCC Office	Crediting Period +2 year
$W_{carbon,A,y}$	Pertamina Tegal Gede Gas Chromatograph (GC)	Weekly Composition	Hard copy	Pertamina Lab/ Odira Plant	CDM Monitoring Report Spreadsheet	Odira Office, SCC Office	Crediting Period +2 year
$V_{B,dry\ gas,y}$	Flow Meter M-01 (Orifice Meter)	Hourly data, Flow computer	Soft/Hard copy (print out)	Odira Plant	Morning and Monthly Report	Odira Office, SCC Office	Crediting Period +2 year
		Barton charts	Hard copy (card read out)	Odira Plant	Morning reports back-up	Odira Office, SCC Office	Crediting Period +2 year
$W_{carbon,dry\ gas,B,y}$	Pertamina GC	Weekly Composition	Hard copy	Pertamina Lab/ Odira Plant	CDM Monitoring Report Spreadsheet	Odira Office, SCC Office	Crediting Period +2 year
$M_{LPG,B,y}$	Orifice meter	Continuous Recording, Daily Aggregation	Hard copy	Odira Plant	Morning and Monthly Report	Odira Office, SCC Office	Crediting Period +2 year
$W_{carbon,LPG,B,y}$	Odira Gas Chromatograph	Weekly Composition	Hard copy	Odira Plant	CDM Monitoring Report Spreadsheet	Odira Office, SCC Office	Crediting Period +2 year
$M_{Condensate,B,y}$	Orifice meter, Micro meter, Turbine meter, weighbridge, roadtankers	Continuous Recording, Daily Aggregation	Hard copy	Odira Plant	Morning and Monthly Report	Odira Office, SCC Office	Crediting Period +2 year

Parameter	Data Set / Document	Data		Storage	Soft Copies		Retention Time
		Output	Format	Location	Transcribed to	Location	
W $c_{arbon, Condensate, B, y}$	Lemigas Lab Instruments	Monthly Composition	Hard copy	Lemigas/ Odira Plant	CDM Monitoring Report Spreadsheet	Odira Office, SCC Office	Crediting Period +2 year
M fuel, y	Not applicable						
$W_{carbon, IPCC}$	Not applicable						
Fugitive Emissions	Plant Survey	Survey Report	Hard/Soft Copy	SCC Office (S server)	CDM Monitoring Report Spreadsheet	Odira Office, SCC Office	Crediting Period +2 year
$T_{equipment}$	Time recording	Operation Data	Hard Copy	Odira Operational Control Room	CDM Monitoring Report Spreadsheet	Odira Office, SCC Office	Crediting Period +2 year
$W_{CH4,A,y}$	Plant Survey	Survey Report	Hard/Soft Copy	SCC Office (S server)	CDM Monitoring Report Spreadsheet	Odira Office, SCC Office	Crediting Period +2 year
Fugitive Emissions	Plant Survey	Survey Report	Hard/Soft Copy	SCC Office (S server)	CDM Monitoring Report Spreadsheet	Odira Office, SCC Office	Crediting Period +2 year
$T_{equipment, pipeline}$	Time recording	Operation Data	Hard Copy	Odira Operational Control Room	CDM Monitoring Report Spreadsheet	Odira Office, SCC Office	Crediting Period +2 year
$W_{CH4, pipeline}$	Plant Survey	Survey Report	Hard/Soft Copy	SCC Office (S server)	CDM Monitoring Report Spreadsheet	Odira Office, SCC Office	Crediting Period +2 year
T1, T2	Time recording	Operation Data	Hard Copy	Odira Operational Control Room	CDM Monitoring Report Spreadsheet	Odira Office, SCC Office	Crediting Period +2 year
P	Pressure Pipeline	Operation Data	Hard Copy	Odira Operational Control Room	CDM Monitoring Report Spreadsheet	Odira Office, SCC Office	Crediting Period +2 year
T	Temperature Pipeline	Operation Data	Hard Copy	Odira Operational Control Room	CDM Monitoring Report Spreadsheet	Odira Office, SCC Office	Crediting Period +2 year
CER Calculation	CDM Monitoring Spreadsheet	Emission reduction data	Xls format	SCC Office (S-server)			Crediting Period +2 year
CDM Monitoring Report		Emission reduction data	Soft/hard Copy	SCC Office (S server)			Crediting Period +2 year
Internal Audit Report(s)		QC/QA	Soft Copy	SCC Office (S server)			Crediting Period +2 year
Maintenance Reports		QC/QA	Hard/soft copy	Odira Plant (Maintenance Dept)			Crediting Period +2 year
Calibration Records		QC/QA	Hard/soft copy	Odira Plant (Maintenance Dept)/SCC Office (S-server)			Crediting Period +2 year
Project Design Document				UNFCC Website / SCC Office (S server)			Crediting Period +2 year
Approved Methodology				UNFCC Website / SCC Office (S server)			Crediting Period +2 year
DOE verification reports				SCC Office (S server)			Crediting Period +2 year

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