Monitoring report form (Version 03.2)

Monitoring report

Title of the project activity	Tambun LPG Associated Gas Recovery and Utilization Project
Reference number of the project activity	1144
Version number of the monitoring report	01
Completion date of the monitoring report	11/04/2014
Registration date of the project activity	01/02/ 2008
Monitoring period number and duration of this monitoring period	Monitoring period number 15. Duration of this monitoring period (first and last days included): 01/01/13 – 31/03/14
Project participant(s)	PT. Odira Energy Persada Sindicatum Carbon Capital Ltd
Host Party(ies)	Republic of Indonesia
Sectoral scope(s) and applied methodology(ies)	Sectoral scope: 10 - Recovery and Utilization of Gas from Oil Wells That Would Otherwise be Flared (AM0009 version 02)
Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD	725,523 tCO_2e
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period	473,847 tCO_2e
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period up to 31 December 2012(if applicable)	Not applicable
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period from 1 January 2013 onwards (if applicable).	473,847 tCO_2e

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

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The purpose of the project activity is to reduce the greenhouse gas emissions by the recovery and utilization of gases produced as a by-product of oil production activities at the Tambun Fields. The project activity is the construction of the processing and transport infrastructure to take gas that would otherwise have been flared to the Cirebon to Cilegon pipeline.

The technology consists of a mini LPG extraction plant; condensate removal facilities and a 35 km 8" diameter steel pipeline, with associated compressors, metering stations and safety valves. The processing plant and pipeline were constructed in full compliance with environmental regulations and was subject to environmental appraisals as per Indonesian environmental regulations.

Tambun plant started its operation on 27 December 2006. This project was registered as a UNFCCC CDM Project (Reference No. 1144) on 1 February 2008 (http://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1180000727.07/view) and subsequent Project Activity changes were validated and approved by the UNFCCC at EB54 on 28th May 2010.

This Monitoring Report 15 covers the monitoring period of 1 January 2013 – 31 March 2014 (inclusive of both days).

The total emission reductions achieved in this monitoring period is 473,847 tCO2e

A.2. Location of project activity

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The LPG plant is located at 107º 01' 40" E, 06º 07' 55"S. It is about 40 km west of Jakarta in Bekasi District, West Java Province, Indonesia.

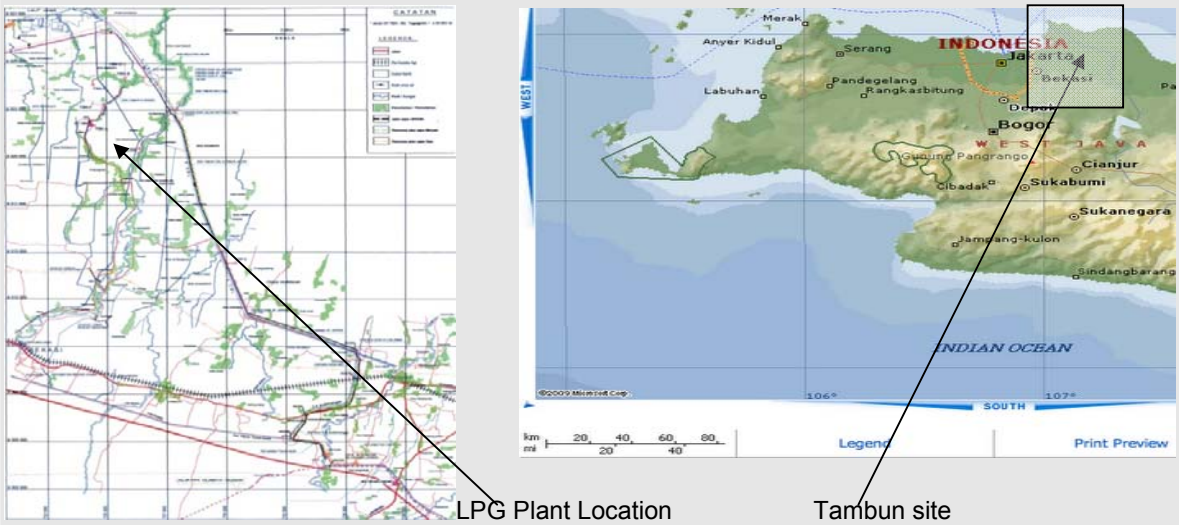

Figure 1 Location of Tambun Site

A.3. Parties and project participant(s)

Party involved ((host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Republic of Indonesia (host)	Private entity: PT. Odira Energy Persada	No
United Kingdom of Great Britain and Northern Ireland	Private entity: Sindicatum Carbon Capital Ltd	No

A.4. Reference of applied methodology

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The applied methodology: Recovery and Utilization of Gas from Oil Wells That Would Otherwise Be Flared (AM0009 version 02)

More information can be found on the UNFCCC CDM website: (http://cdm.unfccc.int/methodologies/DB/ET4NXMVXFQ5C2EJ5L1OF8YZIEVLVDA)

A.5. Crediting period of project activity

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Crediting Period: Fixed (10 years) 01 Feb 2008 – 31 Jan 2018 (fixed) including first and last days.

SECTION B. Implementation of project activity

B.1. Description of implemented registered project activity

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Tambun Plant started operation on 27th December 2006 and the project activity was registered on 1 February 2008. The project activity has been implemented in accordance to registered PDD version 4.3.The technology consists of a mini LPG plant with a design input capacity of 15 mmscf per day; condensate removal facilities and a 35 km 8 inch diameter steel pipeline, with associated compressors, metering stations and safety valves. The LPG production plant is designed to produce 151 tonnes of LPG per day generating 12 mmscfd lean gas. The processing plant and pipeline were constructed in full compliance with 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 35km 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.

Metering points are present for the import of wet gas and the export of dry gas. LPG and condensates are sold by weight via a weighbridge. Condensates are sold by volume via calibrated tankers. An additional metering point is located at Tegal Gede where the pipeline joins the main transmission line, but this is under the control of Pertamina.

The processing plant is powered by gas supply, with a back-up diesel for generators and fire pumps.

Special events that impacted on CDM data during this monitoring period can be seen in Annex A.

B.2. Post registration changes

B.2.1. Temporary deviations from registered monitoring plan or applied methodology

>>
No temporary deviations from the registered monitoring plan or applied methodology have been applied for this monitoring period.

B.2.2. Corrections

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No corrections to project information or parameters fixed at validation for this monitoring period

B.2.3. Permanent changes from registered monitoring plan or applied methodology

>>
The monitoring plan was revised prior to this monitoring period with approval of a revised monitoring plan being approved by the CDM EB on 8th June 2009. The revised monitoring plan is available at http://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1180000727.07/view

B.2.4. Changes to project design of registered project activity

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The initially registered PDD has been revised following the procedures for notifying and requesting approval of changes from the project activity as described in the registered PDD (version 3.12) (Annex 66, at meeting EB48) and the guidelines on assessment of different types of changes from the project activity as described in the registered PDD (annex 67,EB 48.).The revised PDD (PDD version 4.3) is available at http://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1180000727.07/view.

The project activity change has been approved at EB54 on 28th May 2010.
The validation of project activity changes was carried out by TUV Nord and the report is available at http://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1180000727.07/view

B.2.5. Changes to start date of crediting period

>>
There have been no changes to the start date of crediting period submitted or approved during this monitoring period with this monitoring report.

B.2.6. Types of changes specific to afforestation or reforestation project activity

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Not applicable

SECTION C. Description of monitoring system

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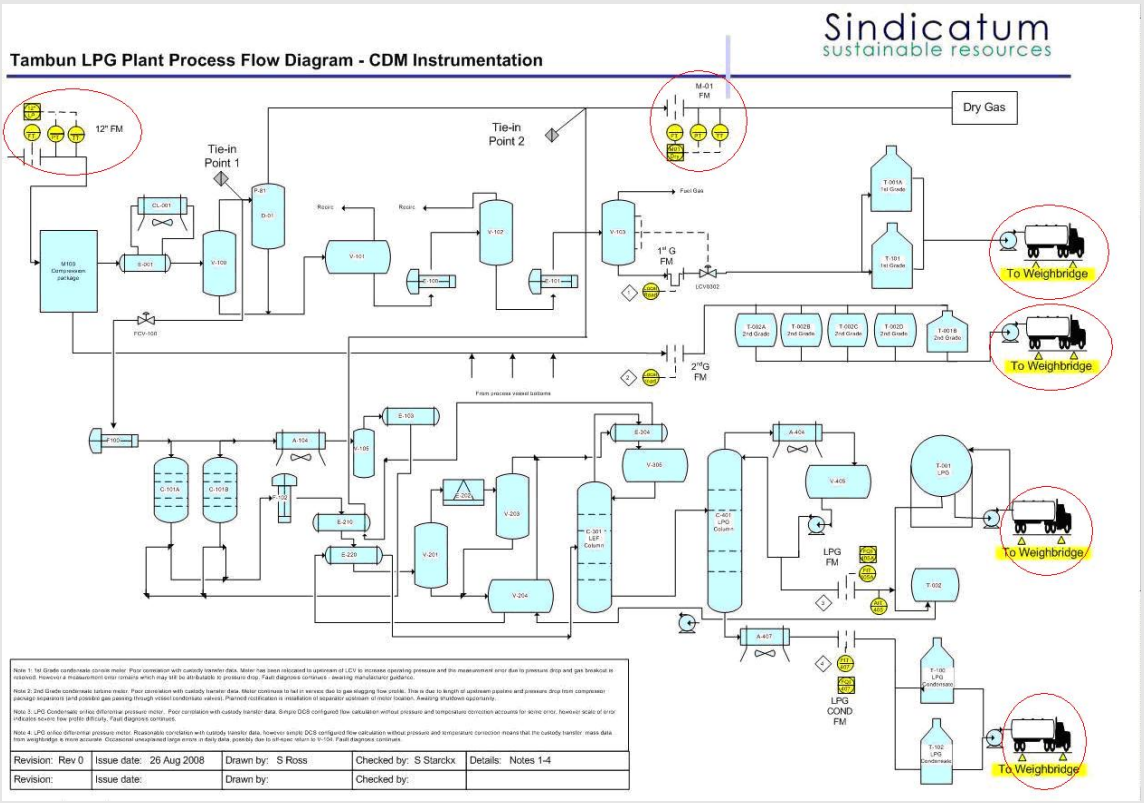
The parameters monitored and the monitoring procedure applied for determination of the emission reductions is described in section B.7.1 and more specific in section B.7.2 of the Project Design Document v4.3 dated 6 November 2009, and available upon the UNFCCC website (http://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1180000727.07/view

The location of measurement devices installed is presented in figure 2 below:

The monitoring is carried out according the accepted revised monitoring plan in the Project Design Document v4.3. The PDD is validated by TUV Nord. The validation of project activity changes was carried out by TUV Nord and the report is available at http://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1180000727.07/view

Figure 2 Location of the CDM measurement devices



Remark:
No gas has been provided through the 4" pipeline from 18th Oct 2008 onward
At the site one weighbridge is installed.

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	CER 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
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	CER 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

Calculation of emissions reduction:
The data required to calculate baseline emissions and project emissions are fed into a protected spreadsheet which calculates the emission reductions according to the formulae described in section E. Access to the spreadsheet is controlled. The spreadsheet is regularly audited to ensure it is operating correctly.

Quality control
Data is compared from month to month using trend analysis to show where parameters have deviated significantly from preceding or following values. Any values identified as being unusual in this manner is

rechecked. Where preceding or following values are not available, references values may be taken from published data as appropriate such as 2006 IPCC guideline.

Preparation of monitoring report
The data is used to prepare a periodic monitoring report to be submitted to the CDM EB for verification and issuance of CERs. A standard format for the monitoring report is prepared. Prior to the submission of the first monitoring report, an internal technical review process was conducted and documented before the report was submitted for verification.

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 includes 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 maintenance/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. An overview of type of data, location and storage means is provided in the table included in Annex A.

Treatment of missing or corrupted data

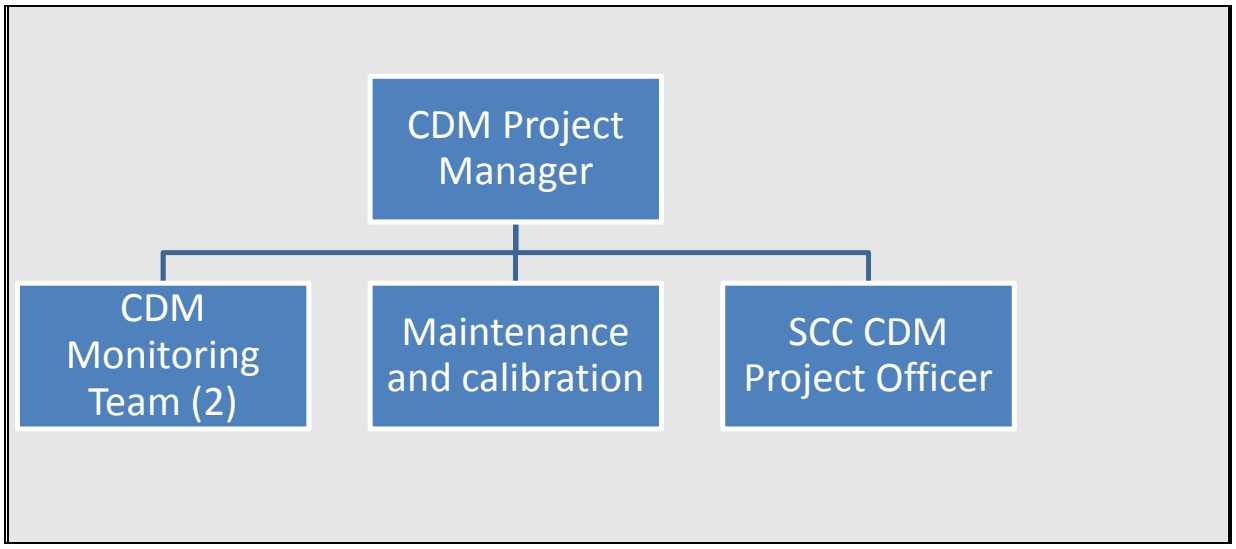
Where data in the on-line system are corrupted or missing whilst the plant is operating the missing data can be estimated by taking the lower of the average value for the parameter in question in the hour before the error arose or the hour immediately after the system came on-line again. If there is evidence to suggest that both of these values are un-representative, the average from the previous 24 hours will be used.
The error will be recorded in the daily log sheet and the occurrence of the error will be investigated and rectified as soon as possible. If the on-line system is compromised for more than 24 hours, data will be manually recorded.

Audit function and management review
The Project Manager arranges for an audit of the management system periodically and at least once per year. The auditor is not involved in the daily operation of the project and if necessary, may be sourced from a third party. The auditor assesses the implementation of the monitoring procedure and the preparation of the monitoring report. Audit findings, and steps taken to address findings are recorded and reviewed by the management, which also reviews the effectiveness of these procedures and necessary changes implemented.
The internal audit was conducted on 4 April 2013. The audit report is made available to the DOE

Organisation & Responsibilities

The CDM Project Manager is responsible for overseeing the implementation of this procedure. The CDM Project Manager will closely work with CDM Monitoring team, maintenance and calibration team and SCC CDM project officer. The CDM project manager will ensure that the data monitored are accurately recorded, properly archived, QA/QC procedure was timely carried out and the entire monitoring process is strictly in line with the CDM requirements

The organizational structure will be as follows:


CDM Project Manager
CDM Monitoring Team (2)
Maintenance and calibration
SCC CDM Project Officer

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante or at renewal of crediting period

(Copy this table for each piece of data and parameter.)

Data / Parameter:	**$EF_{CO2, fuel, y}$**
Unit:	Tonnes CO2 per tonne
Description:	Default factor for gas oil / diesel
Source of data:	2006 IPCC Guidelines for National Greenhouse Gas Inventories
Value(s) applied):	3.186 tCO2 per tonne
Purpose of data:	Typical default value
Additional comment:	tCO2/t EF negates the requirement for NCV and energy conversion

Data / Parameter:	**GWP_{CH4}**
Unit:	T CO2e
Description:	Global warming potential of methane
Source of data:	2013 IPCC Guidelines for National Greenhouse Gas Inventories
Value(s) applied):	25
Purpose of data:	This is the default value applied under the Kyoto Protocol
Additional comment:	No comment

Data / Parameter:	**$EF_{equipment,plant}$**
Unit:	kg CH4 per hour
Description:	Emission rates from leakage of methane from processing plant
Source of data:	Processing plant design drawings and source list. AM0009 ver. 02 default emission factors
Value(s) applied):	Equip / $kgCH_4/hr$ / Number Valves 0.0045 215 Pump seals 0.0024 0 Other 0.0088 229 Connectors 0.002 0 Flanges 0.0004 64 Open ended lines 0.002 0 Valves (light oil) 0.0025 444 Pump seals (light oil) 0.013 0 Other (light oil) 0.0075 0 Connectors (light oil) 0.00021 0 Flanges (light oil) 0.0001 481 Open ended lines 0.0014 0
Purpose of data:	Calculated as the sum of methane emissions from all of the flanges, valves etc in the processing plant.
Additional comment:	No comment

Data / Parameter:	$EF_{equipment,pipeline}$
Unit:	kg CH4 per hour leaking from pipelines
Description:	Summation of emissions from leakage of methane from pipeline
Source of data:	Pipeline design drawings and AM0009 ver. 02 default emission factors
Value(s) applied):	Equip / $kgCH_4/hr$ / Number Valves 0.0045 4 Pump seals 0.0024 0 Other 0.0088 2 Connectors 0.0002 0 Flanges 0.0004 20 Open ended lines 0.002 0
Purpose of data:	Calculated as the sum of methane emissions from all of the flanges, valves etc in the pipeline. The design drawings show the following numbers of flanges, valves etc:
Additional comment:	No comment

D.2. Data and parameters monitored

(Copy this table for each piece of data and parameter.)

Data / Parameter:	V_{Ay}
Unit:	mmscf
Description:	The volume of gas recovered from the oil field at point A in Figure 1 in AM0009 ver2 during the period y in mmscf
Measured/ Calculated /Default:	Measured
Source of data:	Continuous measurements at metering points 12". No gas has been provided through the 4" pipeline from 18th Oct 2008 onwards. Readings from Barton Chart were used on the following dates due to some problems in the Flow Comp system: On 01 January 2013 Flow comp transmitter error, no readings were obtained On 18 June 2013 Flowcomp calibration On 17 – 31 January 2014 Flow comp transmitter error, no readings were obtained All continuous flow meters recording input of associated gas are in addition to computer registration equipped with continuous Barton chart recorders
Value(s) of monitored parameter:	6,156.6307 mmscf

Monitoring equipment:	Orifice Plate Flow Meter Accuracy : +/- 1% Serial Number : 91F637499/ 2006 CD 0004/05.07 Calibration Frequency : Annually Date of Calibration: 14 June 2012, 13 June 13 Validity: 14 June 2013, 13 June 2014
Measuring/ Reading/ Recording frequency:	Continuously, recorded hourly
Calculation method (if applicable):	N/A
QA/QC procedures:	Ensure annual calibration is maintained throughout life of project. Request calibration 'as found' status to allow calibration errors to be assessed for materiality Ensure flow computer configured gas composition and or density values are updated monthly. Data trend to be analysed. Maintain calculation cell protection
Purpose of data:	Baseline & project emission calculations
Additional comment:	-

Data / Parameter:	**$W_{A,carbon,y}$**
Unit:	$kgCO_2/m^3$
Description:	Average content of carbon in the gas recovered at point A in figure 1 during the period y in $kgCO_2/m^3$
Measured/ Calculated / Default:	Measured
Source of data:	Pertamina Laboratory test result (External Laboratory)
Value(s) of monitored parameter:	
Monitoring equipment:	Gas Chromatograph

Month/Year	**$W_{A,carbon,y}$ kg CO_2/m^3**
January-13	3.117
February-13	3.017
March-13	3.062
April-13	3.033
May-13	2.776
June-13	2.732
July-13	2.914
August-13	2.807
September-13	2.780
October-13	2.758
November-13	2.750
December-13	2.723
January-14	2.983
February-14	2.989
March-14	3.002

Measuring/ Reading/ Recording frequency:	Weekly
Calculation method (if applicable):	N/A
QA/QC procedures:	Ensure sampling and analysis continues to be carried out in accordance to the ASTM or equivalent standards. Data trend to be analysed. Maintain calculation cell protection
Purpose of data:	Baseline & Project emission calculation
Additional comment:	-

Data / Parameter:	**$V_{B,drygas,}$**
Unit:	Mmscf
Description:	Quantity of dry gas that is produced in the gas processing plant (point B figure 1 in AM0009 ver2) during the period y in Mmscf
Measured/ Calculated / Default:	Measured
Source of data:	Continuous measuring at the measuring point. All continuous flow meters recording input of associated gas are in addition to computer registration equipped with continuous Barton chart recorders Readings from Barton Chart were used on the following dates due to some problems in the Flow Comp system: On 3 October 2013: Calibration on M-01 dry gas meter
Value(s) of monitored parameter:	5,010.7609 Mmscf
Monitoring equipment:	Orifice Plate Flow meter Accuracy : +/- 1% Serial Number : USMMN-0509-0041/98.10 Calibration frequency : annually Date of Last Calibration: 9 October 2012, 3 October 2013 Validity : 9 October 2013, 3 October 2014
Measuring/ Reading/ Recording frequency:	Weekly
Calculation method (if applicable):	N/A
QA/QC procedures:	Ensure sampling and analysis continues to be carried out in accordance to the ASTM or equivalent standards. Data trend to be analysed. Maintain calculation cell protection
Purpose of data:	Baseline & Project emission calculation

Additional comment:	-

Data / Parameter:	$W_{B,carbon,drygas,y}$
Unit:	$kgCO_2/Sm^3$
Description:	Average content of carbon in the gas recovered at point B in figure 1 during the period y in $kgCO_2/Sm^3$
Measured/ Calculated / Default:	Measured
Source of data:	Pertamina Laboratory test result (External Laboratory)
Value(s) of monitored parameter:	
Monitoring equipment:	Gas Chromatograph
Measuring/ Reading/ Recording frequency:	Weekly
Calculation method (if applicable):	N/A
QA/QC procedures:	Ensure sampling and analysis continues to be carried out in accordance to the ASTM or equivalent standards. Data trend to be analysed. Maintain calculation cell protection
Purpose of data:	Baseline & Project emission calculation
Additional comment:	-

Month/Year	$W_{B,carbon,drygas,y}$ **kg** CO_2/m^3
January-13	2.577
February-13	2.571
March-13	2.596
April-13	2.531
May-13	2.494
June-13	2.500
July-13	2.612
August-13	2.591
September-13	2.613
October-13	2.455
November-13	2.517
December-13	2.545
January-14	2.545
February-14	2.447
March-14	2.492

Data / Parameter:	$M_{LPG,B,y}$
Data unit:	**kg or tonnes**
Description:	The quantity of LPG that is produced in the gas processing plant (point B Figure 1) during the period y in kg
Measured /Calculated /Default:	Measured
Source of data:	Measurement by calibrated weighbridge

Value(s) of monitored parameter:	22,220.725 tonnes
Monitoring equipment:	Weighbridge Mettler Toledo Type IND310 Accuracy: +/- 10 kg Serial Number : 0029136-6DH Calibration frequency: annually Date of last calibration:, 20 March 2013 Validity: 20 March 2014
Measuring/ Reading/ Recording frequency:	Daily
Calculation method (if applicable):	N/A
QA/QC procedures applied:	Ensure weighbridge remains calibrated through life of project. Data trend to be analysed. Maintain calculation cell protection
Purpose of data	Project emission calculations
Additional Comments:	-

Data / Parameter:	$W_{B,carbon,LPG,y}$	
Data unit:	tCO_2/tonne	
Description:	Carbon composition of LPG	
Measured /Calculated /Default:	Measured	
Source of data:	Lemigas Laboratory test result (External lab)	
Value(s) of monitored parameter:	**Month/Year**	**$W_{A,carbon,y}$ kg CO_2/m^3**
	January-13	3.008
	February-13	3.009
	March-13	3.011
	April-13	3.011
	May-13	3.010
	June-13	3.011
	July-13	3.010
	August-13	3.012
	September-13	3.010
	October-13	3.010
	November-13	3.011
	December-13	3.011
	January-14	3.014
	February-14	2.958
	March-14	3.012
Monitoring equipment:	Gas Chromatograph	
Measuring/ Reading/ Recording frequency:	Monthly	
Calculation method (if applicable):	N/A	
QA/QC procedures	Following ASTM D 2163: 2007	

applied:	Data trend to be analysed. Maintain calculation cell protection
Purpose of data	Project emission calculations
Additional comments:	-

Data / Parameter:	**$M_{B,condensate,y}$**
Data unit:	**kg or tonnes (**As the data from weighbridge has the lowest level of uncertainty during this monitoring period the unit for quantity of condensate is kg or tonne).
Description:	The quantity of condensate that is produced in the gas processing plant (point B figure 1) during the period y in kg.
Measured /Calculated /Default:	Measured
Source of data:	Calibrated weighbridge. All 3 quantification results (continuous flow metered data, calibrated weighbridge and calibrated road tanker information) are assessed (comparative analysis). In accordance with the revised monitoring plan, most accurate (lowest level of uncertainty) data set is used for reporting purposes.
Value(s) of monitored parameter:	Condensate : 6,990.994 tonnes 1st Grade Condensate: 5,764.575 tonnes 2nd Grade Condensate: 3,018.014 tonnes
Monitoring equipment :	Weighbridge Mettler Toledo Type IND310 Accuracy: +/- 10 kg Serial Number : 0029136-6DH Calibration frequency: annually Date of last calibration: 20 March 2013 Validity: 20 March 2014
Measuring/ Reading/ Recording frequency:	Daily
Calculation method (if applicable):	N/A
QA/QC procedures applied:	Ensure weighbridge remains calibrated through life of project. Data trend to be analysed. Maintain calculation cell protection
Purpose of data:	Project emission calculations
Additional comments:	-

Data / Parameter:	**$W_{B,carbon,condensate,y}$**
Data unit:	tCO_2/tonne
Description:	Carbon composition of condensates
Measured /Calculated /Default:	Measured
Source of data:	Lemigas Laboratory (external) analysis results
Value(s) of monitored parameter:	

Month	Condensate (tCO2/tonne)	1st Grade (tCO2/tonne)	2nd Grade (tCO2/tonne)

January-13	3.05	3.06	3.07	
February-13	3.06	3.07	3.07	
March-13	3.06	3.07	3.07	
April-13	3.06	3.07	3.07	
May-13	3.06	3.07	3.08	
June-13	3.07	3.07	3.08	
July-13	3.07	3.07	3.07	
August-13	3.07	3.07	3.07	
September-13	3.07	3.07	3.08	
October-13	3.07	3.08	3.09	
November-13	3.07	3.07	3.08	
December-13	3.07	3.06	3.10	
January-14	3.07	3.05	3.07	
February-14	3.07	3.05	3.07	
March-14	3.07	3.05	3.07	

Monitoring equipment:	N/A
Measuring/ Reading/ Recording frequency:	Monthly
Calculation method (if applicable):	N/A
QA/QC procedures applied:	Ensure sampling and analysis continues to be carried out in accordance to the ASTM or equivalent standards. Data trend to be analysed. Maintain calculation cell protection
Purpose of data:	Project emission calculations
Additional comments:	-

Data / Parameter:	**$W_{CH4,plant}$**
Data unit:	kg CH_4 / kg
Description:	The average methane weight fraction in the respective stream in kg CH_4/kg
Measured /Calculated /Default:	Calculated
Source of data:	Flow weighted average CH_4 of all feed and dry gas streams derived from CH_4 content of each of the following streams:- • 12" LP Input • M01 Dry gas Data are taken from Pertamina laboratory (external) analysis result

Value(s) of monitored parameter:

Month/Year	**$W_{CH4,plant}$** kg CH_4 / kg
January-13	40.57269836
February-13	42.686418
March-13	41.54161466
April-13	42.08277298
May-13	50.13354447
June-13	51.19629705
July-13	46.59985635
August-13	49.23018406
September-13	49.74326975

		October-13	50.21014932
		November-13	50.52769657
		December-13	51.09678249
		January-14	42.99070472
		February-14	42.66992823
		March-14	42.81368913
Monitoring equipment:	N/A		
Measuring/ Reading/ Recording frequency:	The AM0009/Version 02 (DD. 13 MAY 2005) is not specific on frequency of calculation. Monthly sampling, analysis calculation and application of emission factor is applied.		
Calculation method (if applicable):	CH_4 emission factor is calculated using the stoichiometric (vol) equation within the CER spreadsheet		
QA/QC procedures applied:	Ensure sampling and analysis continues to be carried out in accordance to the ASTM or equivalent standards. Data trend to be analysed. Maintain calculation cell protection		
Purpose of data:	Project emission calculations		
Additional comments:	-		

Data / Parameter:	$\mathbf{W_{CH4,pipeline}}$		
Data unit:	kg CH_4 / kg		
Description:	The average methane weight fraction in the pipeline in kg-CH_4/kg		
Measured /Calculated /Default:	Calculated		
Source of data:	CH_4 content of the M01 flow to pipeline Pertamina laboratory (external) results		
Value(s) of monitored parameter:		**Month/Year**	$\mathbf{W_{CH4,plant}}$ kg CH_4 / kg
		January-13	52.91193096
		February-13	53.43760847
		March-13	53.06024798
		April-13	55.17277009
		May-13	55.78962056
		June-13	56.05341379
		July-13	52.3970188
		August-13	53.2542909
		September-13	52.25283609
		October-13	57.67718756
		November-13	55.53484886
		December-13	54.16627132
		January-14	54.60592506
		February-14	57.29540957
		March-14	56.30956347
Monitoring equipment :	Gas Chromatograph		
Measuring/ Reading/ Recording	The AM0009/Version 02 (DD. 13 MAY 2005) is not specific on frequency of calculation. Monthly sampling, analysis calculation and application of emission		

frequency:	factor is applied.
Calculation method (if applicable):	CH_4 emission factor is calculated using the stoichiometric (vol) equation within the CER Spreadsheet
QA/QC procedures applied:	Ensure sampling and analysis continues to be carried out in accordance to the ASTM or equivalent standards. Data trend to be analysed. Maintain calculation cell protection.
Purpose of data:	Project Emission calculations
Additional comments:	-

Data / Parameter:	**$M_{fuel,,y}$**
Data unit:	kg
Description:	Consumption of diesel by LPG plant. During this monitoring period the diesel has been consumed for testing of fire pumps and emergency gensets
Measured /Calculated /Default:	Measured
Source of data:	Monthly diesel (gas oil) deliveries plus opening stock less closing stock from tank dips * Standard density (0.842459983 kg/litre)
Value(s) of monitored parameter:	1,247.68 kg
Monitoring equipment:	Stock measurement (tank dips) and delivery.
Measuring/ Reading/ Recording frequency:	Every delivery/consumption – stock begin and end period.
Calculation method (if applicable):	-
QA/QC procedures applied:	Stock take carried out to recognised standard Monthly Diesel Report total transcribed correctly to Monitoring Report
Purpose of data:	Project Emission calculations
Additional comments:	-

Data / Parameter:	**$T_{equipment}$**
Data unit:	Hours
Description:	Operation time of equipment
Measured/ Calculated/ Default	Measured
Source of data used:	Operational data
Value(s) of monitored parameter :	10920 hours (no shutdown during monitoring period)
Monitoring equipment:	N/A

Measuring/ Reading/ Recording frequency:	Continuous
Calculation method (if applicable):	N/A
QA/QC procedures applied	SCC Project officer will double check with the Odira Plant Manager for any planned and unplanned shutdown and update the operation time accordingly
Purpose of data:	Project Emission calculations
Additional comments:	-

Parameters to be monitored specifically when accidental event occurred:

Data / Parameter:	**T_1 and T_2**
Data unit:	Time
Description:	Time between 1st evidence of leak and shutdown valves closing
Measured/ Calculated/ Default	Measured
Source of data used:	Pressure, temperature and flow rate
Value(s) of monitored parameter :	Not applicable. During this monitoring period no accidental event occurred.
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project Emission (Calculation of $V_{A,accident}$)
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	N/A
Measuring/ Reading/ Recording frequency:	Continuous
Calculation method (if applicable):	N/A
QA/QC procedures applied	SCC Project officer will double check with the Odira Plant Manager

Data / Parameter:	F
Data unit:	Sm^3 per hour
Description:	Pipeline entry flow rate
Measured/ Calculated/ Default	Measured
Source of data used:	Sum of M-01 and 4' HP bypass metered data No gas has been provided through the 4" pipeline from 18th Oct 2008 onward
Value(s) of monitored parameter :	Not applicable. During this monitoring period no accidental event occurred.
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project Emission (Calculation of $V_{A,accident}$)
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	N/A
Measuring/ Reading/ Recording frequency:	Continuous
Calculation method (if applicable):	N/A
QA/QC procedures applied	SCC Project officer will double check with the Odira Plant Manager Meters used as per baseline determination. Metering QA/QC assured through calibration program

Data / Parameter:	F
Data unit:	Sm^3 per hour
Description:	Pipeline entry flow rate
Measured/ Calculated/ Default	Measured
Source of data used:	Sum of M-01 and 4' HP bypass metered data No gas has been provided through the 4" pipeline from 18th Oct 2008 onward

Value(s) of monitored parameter :	Not applicable. During this monitoring period no accidental event occurred.
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project Emission (Calculation of $V_{A,accident}$)
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	N/A
Measuring/ Reading/ Recording frequency:	Continuous
Calculation method (if applicable):	N/A
QA/QC procedures applied	SCC Project officer will double check with the Odira Plant Manager Meters used as per baseline determination. Metering QA/QC assured through calibration program

Data / Parameter:	**$T_{pipeline}$**
Data unit:	Degrees centigrade
Description:	Temperature in pipeline at time of valve closure
Measured/ Calculated/ Default	Measured
Source of data used:	Pipeline section temperature transmitter
Value(s) of monitored parameter :	Not applicable. During this monitoring period no accidental event occurred.
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project Emission (Calculation of $V_{remain,,accident}$)
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	N/A

Measuring/ Reading/ Recording frequency:	Continuous
Calculation method (if applicable):	N/A
QA/QC procedures applied	SCC Project officer will double check with the Odira Plant Manager

D.3. Implementation of sampling plan

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Not applicable for this project activity

SECTION E. Calculation of emission reductions or GHG removals by sinks

E.1. Calculation of baseline emissions or baseline net GHG removals by sinks

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The formula used for determination of the baseline emissions are described in section B.6.1 of the Project Design Document v4.3 dated 6 November 2009, 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 m³.

$w_{carbon,A,y}$ Is the average content of carbon in the gas recovered during the period y in kg-C/m³.

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.

The input parameters are summarized in the following table

Data Input

							Condensate		
Date			12" LP Gas	4" HP Gas	M01 Dry Gas	LPG	LPG	1st Grad	2nd Grad
From	To	Month	mmscf	mmscf	mmscf	t	t	t	t
1	31	Jan-13	460.216	0.0000	373.961	1495.682	519.906	434.246	440.990
1	28	Feb-13	458.827	0.0000	380.746	1602.578	546.753	450.917	203.696
1	31	Mar-13	536.077	0.0000	438.985	1885.488	573.312	642.283	383.641
1	30	Apr-13	454.982	0.0000	371.318	1573.668	510.719	546.047	265.849
1	31	May-13	468.033	0.0000	386.035	1695.372	568.998	459.941	167.190
1	30	Jun-13	402.175	0.0000	327.124	1591.709	523.092	278.921	150.117
1	31	Jul-13	416.732	0.0000	346.886	1694.571	553.859	406.896	93.390
1	31	Aug-13	340.234	0.0000	291.903	946.120	306.122	305.163	69.240
1	30	Sep-13	413.322	0.0000	360.310	980.813	328.716	307.752	72.180
1	31	Oct-13	437.006	0.0000	345.783	1778.890	551.689	467.710	126.070
1	30	Nov-13	388.482	0.0000	309.986	1499.306	424.423	311.610	99.771
1	31	Dec-13	374.103	0.0000	304.997	1,384.404	376.082	205.102	68.229
1	31	Jan-14	340.813	0.0000	265.317	1329.602	372.740	348.876	284.138
1	28	Feb-14	321.078	0.0000	243.204	1360.591	427.602	285.533	325.872
1	31	Mar-14	344.549	0.0000	264.206	1401.932	406.981	313.578	267.642
Total			**6,156.6307**	**0.000000**	**5,010.7609**	**22,220.725**	**6,990.994**	**5,764.575**	**3,018.014**

Remarks

No gas has been provided through the 4" pipeline from 18th Oct 2008 onward

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Baseline Emission Calculations

Date			12" LP Gas			4" HP Gas		
From	To	Month	Sm3	kgCO2/Sm3	tCO2	Sm3	kgCO2/Sm3	tCO2
1	31	Jan-13	13,031,879	3.117	40,614	-	-	-
1	28	Feb-13	12,992,525	3.017	39,199	-	-	-
1	31	Mar-13	15,180,019	3.062	46,477	-	-	-
1	30	Apr-13	12,883,664	3.033	39,077	-	-	-
1	31	May-13	13,253,231	2.776	36,791	-	-	-
1	30	Jun-13	11,388,318	2.732	31,113	-	-	-
1	31	Jul-13	11,800,547	2.914	34,390	-	-	-
1	31	Aug-13	9,634,364	2.807	27,047	-	-	-
1	30	Sep-13	11,703,970	2.780	32,533	-	-	-
1	31	Oct-13	12,374,634	2.758	34,135	-	-	-
1	30	Nov-13	11,000,600	2.750	30,252	-	-	-
1	31	Dec-13	10,593,421	2.723	28,842	-	-	-
1	31	Jan-14	9,650,743	2.983	28,789	-	-	-
1	28	Feb-14	9,091,919	2.989	27,175	-	-	-
1	31	Mar-14	9,756,555	3.002	29,286	-	-	-
Total			**174,336,388**		**505,720**	**-**		**-**

No gas has been provided through the 4" pipeline from 18th Oct 2008 onward

Total baseline emissions for the monitoring period are 577,164.111 t CO_2

E.2. Calculation of project emissions or actual net GHG removals by sinks

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The formulas used for determination of the project emissions are described in section B.6.1 of the Project Design Document v4.3 dated 6 November 2009 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 m³.
$MLPG_{,B,y}$	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 m³.
$V_{Xi,y}$	Is the volume of gas recovered from oil well I during the period y in m³.
$w_{carbon,A,y}$	Is the average content of carbon in the gas recovered during the period y in kg-C/m³.
$w_{carbon,dry\ gas,B,y}$	Is the average content of carbon in dry gas during the period y in kg-C/m³.
$w_{carbon,LPG,B,y}$	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/m³.

The calculations are summarized in the tables below:

Project Emission Calculation

Date			V_A	$W_{carbonA}$	$M_{carbonA}$	V_{drygas}	$W_{carbondrygas}$	$M_{carbondrygas}$
From	To	Month	Sm3	kgC/Sm3	tCO2	Sm3	kgCO2/Sm3	tCO2
1	31	Jan-13	13,031,879	3.117	40,614	10,589,398	2.577	27,290
1	28	Feb-13	12,992,525	3.017	39,199	10,781,525	2.571	27,719
1	31	Mar-13	15,180,019	3.062	46,477	12,430,670	2.596	32,266
1	30	Apr-13	12,883,664	3.033	39,077	10,514,553	2.531	26,617
1	31	May-13	13,253,231	2.776	36,791	10,931,290	2.494	27,260
1	30	Jun-13	11,388,318	2.732	31,113	9,263,130	2.500	23,160

1	31	Jul-13	11,800,547	2.914	34,390	9,822,708	2.612	25,658
1	31	Aug-13	9,634,364	2.807	27,047	8,265,782	2.591	21,413
1	30	Sep-13	11,703,970	2.780	32,533	10,202,853	2.613	26,658
1	31	Oct-13	12,374,634	2.758	34,135	9,791,477	2.455	24,043
1	30	Nov-13	11,000,600	2.750	30,252	8,777,830	2.517	22,092
1	31	Dec-13	10,593,421	2.723	28,842	8,636,557	2.545	21,984
1	31	Jan-14	9,650,743	2.983	28,789	7,512,950	2.545	19,119
1	28	Feb-14	9,091,919	2.989	27,175	6,886,768	2.447	16,852
1	31	Mar-14	9,756,555	3.002	29,286	7,481,477	2.492	18,642
Total			**174,336,338**		**505,720**	**141,888,966**		**360,773**

Date			M_{LPG}	$W_{carbonLPG}$	$M_{carbonLPG}$	$M_{condLPG}$	$W_{carboncondLPG}$	$M_{carboncondLPG}$
From	To	Month	t	tCO2/t	tCO2	t	tCO2/t	tCO2
1	31	Jan-13	1,496	3.008	4,499	225	3.05	688
1	28	Feb-13	1,603	3.009	4,823	547	3.06	1,672
1	31	Mar-13	1,885	3.011	5,677	573	3.06	1,752
1	30	Apr-13	1,574	3.011	4,739	511	3.06	1,562
1	31	May-13	1,695	3.010	5,104	569	3.06	1,739
1	30	Jun-13	1,592	3.011	4,792	523	3.07	1,604
1	31	Jul-13	1,695	3.010	5,100	554	3.07	1,698
1	31	Aug-13	946.	3.012	2,850	306	3.07	939
1	30	Sep-13	981	3.010	2,952	328	3.07	1,008
1	31	Oct-13	1,779	3.010	5,354	552	3.07	1,692
1	30	Nov-13	1,499	3.011	4,514	424	3.07	1,302
1	31	Dec-13	1,384	3.011	4,169	376	3.07	1,156
1	31	Jan-14	1,330	3.014	4,008	373	3.07	1,143
1	28	Feb-14	1,361	2.958	4,024	428	3.06	1,307
1	31	Mar-14	1,402	3.012	4,223	407	3.06	1,244
Total			**22,221**		**66,828**	**6,696**		**20,507**

Date			$M_{cond1stGrad}$	$W_{carboncond1stGrad}$	$M_{carboncond1stGrad}$	$M_{cond2ndGrad}$	$W_{carbonco nd2ndGrad}$	$M_{carboncond2ndGrad}$	$M_{carbonB}$
From	To	Month	t	tCO2/t	tCO2	t	tCO2/t	tCO2	tCO2
1	31	Jan-13	434	3.06	1,330	218	3.07	671	34,478
1	28	Feb-13	451	3.07	1,383	204	3.07	628	36,225
1	31	Mar-13	642	3.07	1,970	384	3.07	1,180	42,844
1	30	Apr-13	546	3.07	1,675	263	3.07	809	35,401
1	31	May-13						514	36,028

			460	3.07	1,411	167	3.08		
1	30	Jun-13	279	3.07	857	150	3.08	462	30,874
1	31	Jul-13	407	3.07	1,248	95	3.07	292	33,996
1	31	Aug-13	305	3.07	937	69	3.07	213	26,352
1	30	Sep-13	307	3.07	944	72	3.08	221	31,785
1	31	Oct-13	468	3.08	1,438	126	3.09	389	32,916
1	30	Nov-13	312	3.07	959	100	3.08	307	29,174
1	31	Dec-13	205	3.06	627	68	3.10	211	28,148
1	31	Jan-14	349	3.05	1,066	284	3.07	874	26,210
1	28	Feb-14	286	3.07	876	326	3.07	1,000	24,060
1	31	Mar-14	313	3.07	962	268	3.08	823	25,894
Total			**5,764**		**17,684**	**2,794**		**8,594**	**474,386**

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.

Project Emission Other(diesel oil consumption for emergency genset & fire pumps)

Period	Volume liter	Mass kg	Mass kgCO2	Mass tCO2e
January-13	200.00	168.49	536.87	0.54
February-13	330.00	278.01	885.83	0.89
March-13	60.00	50.55	161.06	0.16
April-13	60.00	50.55	161.06	0.16
May-13	65.00	54.76	174.48	0.17
June-13	90.00	75.82	241.59	0.24
July-13	100.00	84.25	268.43	0.27
August-13	20.00	16.85	53.69	0.05
September-13	70.00	58.97	187.90	0.19
October-13	140.00	117.94	375.81	0.38
November-13	70.00	58.97	187.90	0.19
December-13	65.00	54.76	174.48	0.17

January-14	67.00	56.44	179.85	0.18
February-14	130.00	109.52	348.96	0.35
March-14	14.00	11.79	37.58	0.04
Total	**1,481.00**	**1,247.68**	**3,975.49**	**3.98**

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.

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

where:

$PE_{CH4,plants,y}$ Are the 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 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) in kg/hour/equipment.

Equipment Type	Factor kg/hr	Number	CH4 ton	CO2e ton
Valves	0.0045	215	4.89	122.22
Pump seals	0.0023	0	0.00	0.00
Other	0.0088	229	10.18	254.57
Connectors	0.0002	0	0.00	0.00
Flanges	0.0004	64	0.13	3.15
Open ended lines	0.002	0	0.00	0.00
Valves (light oil)	0.0025	444	5.61	140.22
Pump seals (light oil)	0.013	0	0.00	0.00
Other (light oil)	0.0075	0	0.00	0.00
Connectors (light oil)	0.0002	0	0.00	0.00
Flanges (light oil)	0.0001	481	0.27	6.68
Open ended lines	0.0014	0	0.00	0.00
Total			**21.07**	**526.85**

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

Fugitive CH_4 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) 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)

Fugitive emission from pipeline ($PECH_4Pipeline$)

Equipment Type	Factor kg/hr	Number	CH4 ton	CO2e ton
Valves	0.0045	4	0.11	2.69
Pump seals	0.0024	0	0.00	0.00
Other	0.0088	2	0.11	2.63
Connectors	0.0002	0	0.00	0.00
Flanges	0.0004	20	0.05	1.16
Open ended lines	0.002	0	0.00	0.00
Total			**0.26**	**6.48**

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.
$V_{remain,accident}$	¡s 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/m³
$t_{accident}$	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.

Total project emissions during the monitoring period were 49,297 tCO_2

During the monitoring period no accidental events occurred.

E.3. Calculation of leakage

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Since ACM0009 version 2 does not consider the emission due to power plant construction and fuel handlings, no leakage is considered (L_v = 0).

E.4. Summary of calculation of emission reductions or net anthropogenic GHG removals by sinks

Item	Baseline emissions or baseline net GHG removals by sinks (t CO_2e)	Project emissions or actual net GHG removals by sinks (t CO_2e)	Leakage (t CO_2e)	Emission reductions or net anthropogenic GHG removals by sinks (t CO_2e)
Total	505,720	31,873	0	473,847

E.5. Comparison of actual emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD

Item	Values estimated in ex-ante calculation of registered PDD	Actual values achieved during this monitoring period
Emission reductions or GHG removals by sinks (t CO_2e)	725,523	473,847

E.6. Remarks on difference from estimated value in registered PDD

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The maximum emission reduction generated by this project activity within the proposed Monitoring period is 725,523 tones of CO_2e and the actual emission reduction is 473,847, tones of CO_2e. The actual CER generation is 35% lower than the values applied in ex-ante estimation of the registered PDD.

E.7. Actual emission reductions or net anthropogenic GHG removals by sinks during the first commitment period and the period from 1 January 2013 onwards

Item	Actual values achieved up to 31 December 2012	Actual values achieved from 1 January 2013 onwards
Emission reductions or GHG removals by sinks (t CO_2e)	Not applicable	473,847

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Annex A. Irregularities over the monitoring period

Area	Date	Problems
12 Inch Flow Meter	01 January 2013	Flow comp transmitter error, no readings were obtained
	18 June 2013	Flowcomp calibration
	17 – 31 January 2014	Flow comp transmitter error, no readings were obtained
	During these periods back-up recording (Barton-Chart) were used.	
M-O1 Dry Gas Flow Meter	03 Oct 2013	Flowcomp calibration
	During these periods back-up recording (Barton-Chart) were used.	

Annex B. Monitored Parameters

Parameter	Data Set / Document	Data		Storage	Soft Copies		Retention Time
		Output	Format	Location	Transcribed to	Location	Crediting Period +2 year
VA,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, weighbridge	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
W carbon, 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						

Continuation monitored parameters

Parameter	Data Set / Document	Data	Storage	Soft Copies			Retention Time
		Output	Format	Location	Transcribed to	Location	
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

Annex C. Monitoring Instruments

Meter and its Location	Name of Instrument	Instrument Serial No./ Orifice Plate#/ Tag #	Measuring	Calibration Frequency	Remarks	Calibration Date	Next Calibration
12" LP Wet Gas Input Flow Meter	Orifice Plate Flow Meter	91F637499//05.07	Wet Gas Input	Yearly	This meter is subject to government regulation and Metrology Department inspection & calibration	14 June 2012 13 June 2013	14 June 2013 13 June 2014
M-01 Dry Gas Flow Meter	Orifice Plate Flow Meter	USMMN-0509-0041/ 98.10	Dry Gas	Yearly	This meter is subject to government regulation and Metrology Department inspection & calibration	9 Oct 2012 3 Oct 2013	9 Oct 2013 3 Oct 2014
Weighbridge at Tambun Plant	Weighbridge	0029136-6DH	LPG, Condensate, 1st Grade Condensate, 2nd Grade Condensate	Yearly	The weighbridge is subject to government regulation and Metrology Department inspection & calibration	28 March 2012 20 March 2013	28 March 2013 20 march 2014
LPG Line Gas Chromatography	Gas Chromatography	SN0622GC2115	LPG composition	Monthly	Sampling is carried out in accordance to ASTM or equivalent standards. Calibration is done using certified standard gas.		

Document information

Version	*Date*	*Description*
03.2	5 November 2013	Editorial revision to correct table in page 1.
03.1	2 January 2013	Editorial revision to correct table in section E.5.
03.0	3 December 2012	Revision required to introduce a provision on reporting actual emission reductions or net anthropogenic GHG removals by sinks for the period up to 31 December 2012 and the period from 1 January 2013 onwards (EB70, Annex 11).
02.0	13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).
01	28 May 2010	EB 54, Annex 34. Initial adoption.

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