



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 14. Duration of this monitoring period (first and last days included): 01/12/11 – 31/12/12
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	687,631 tCO ₂ e
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period	527,867 tCO ₂ e
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period up to 31 December 2012(if applicable)	527,867 tCO ₂ e
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period from 1 January 2013 onwards (if applicable).	Not applicable

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 14 covers the monitoring period of 1 December 2011 – 31 December 2012 (inclusive of both days).

The total emission reductions achieved in this monitoring period is 527,867 tCO₂e

A.2. Location of project activity

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

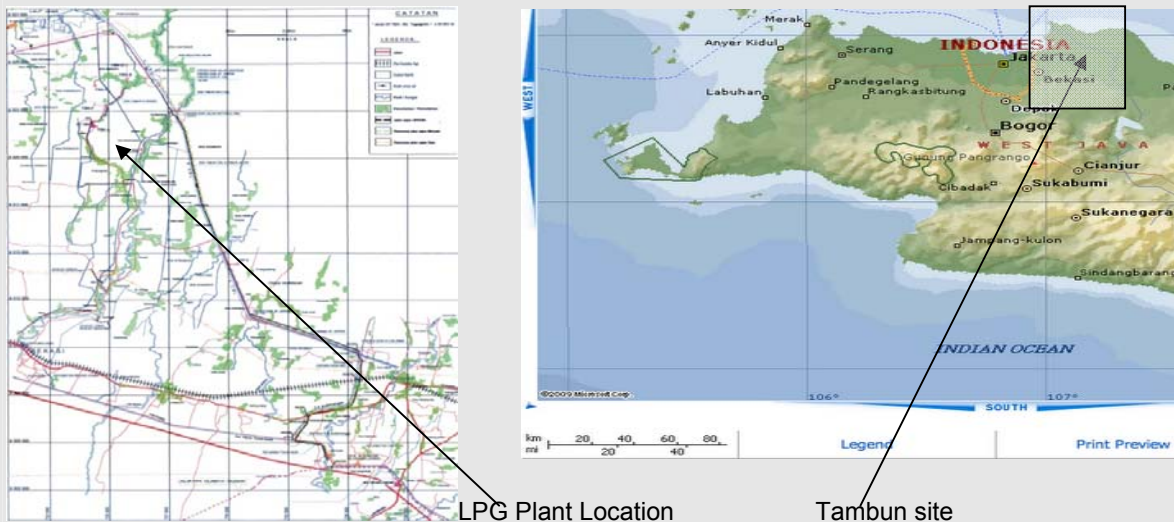


Figure 1 Location of Tambun Site

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 : 01 Feb 2008 – 31 Jan 2018 (10 years 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 mmscf 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.

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**

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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

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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

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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

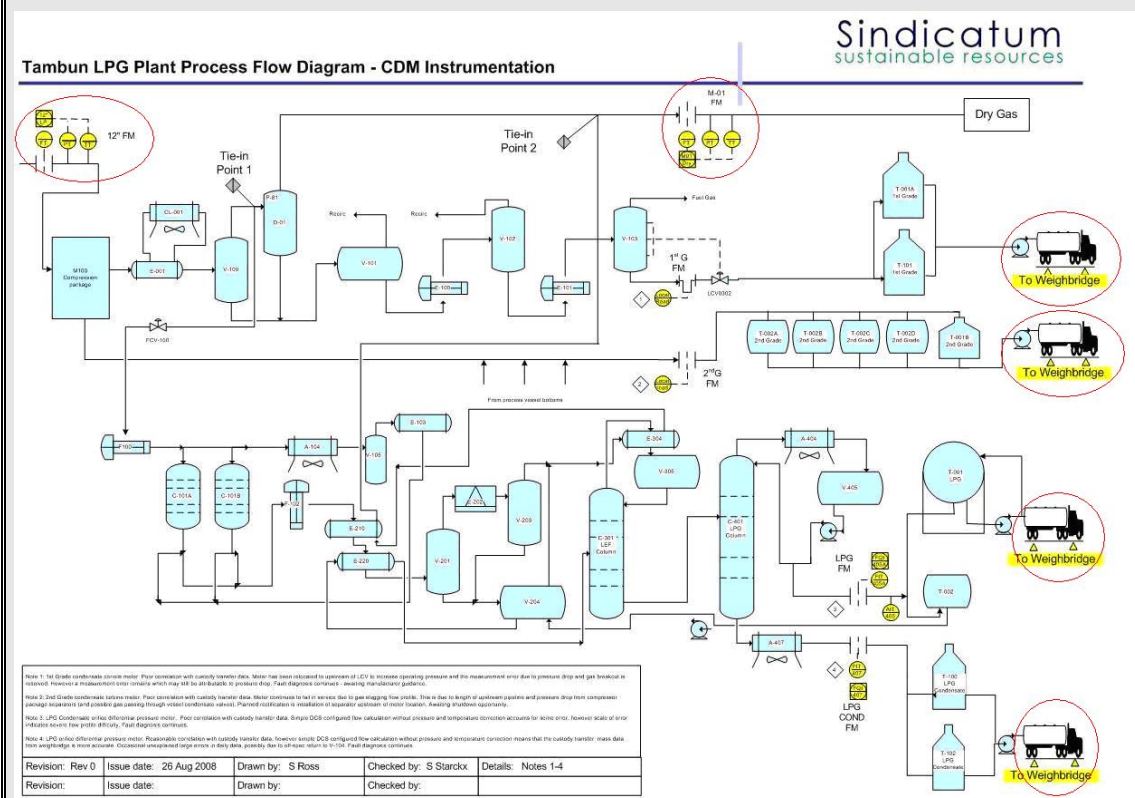
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The parameters monitored and the monitoring procedure applied for determination of the emission reductions is described in section B.7.1 and more specific in section B.7.2 of the Project Design Document v4.3 dated 6 November 2009, and available upon 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
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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 'Direktorat 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

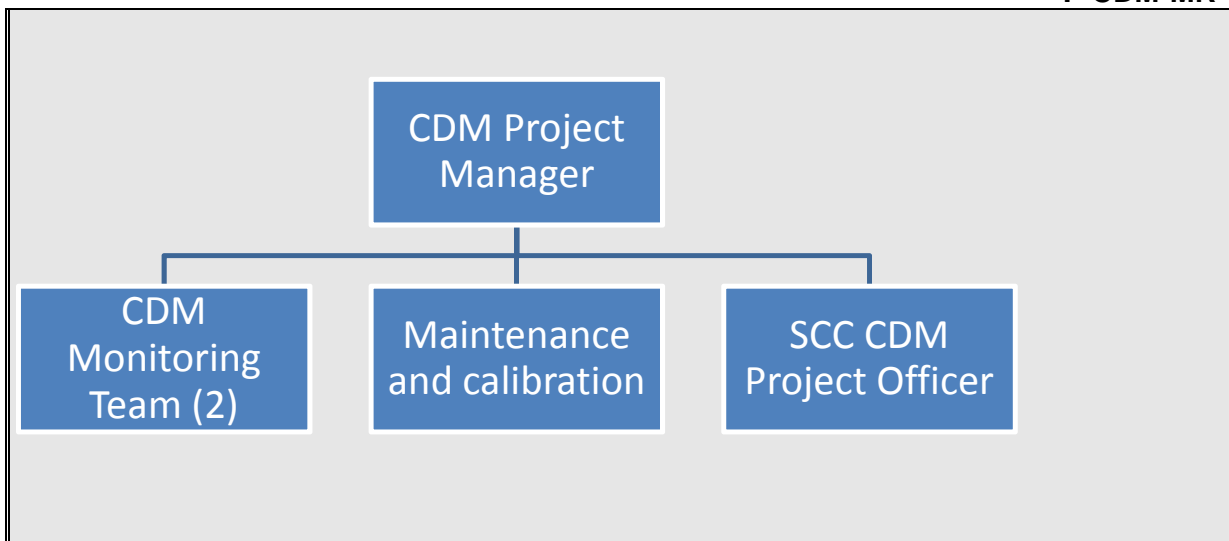
The Project Manager arranges for an audit of the management system periodically and at least once per year. The auditor is not involved in the daily operation of the project and if necessary, may be sourced from a third party. The auditor assesses the implementation of the monitoring procedure and the 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 2nd March 2011 and 6th Aug 2012 . The audit reports are made available to the DOE.

Organization & 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:



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 CO ₂ 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 tCO ₂ per tonne
Purpose of data:	Typical default value
Additional comment:	tCO ₂ /t EF negates the requirement for NCV and energy conversion

Data / Parameter:	GWP_{CH₄}
Unit:	T CO ₂ e
Description:	Global warming potential of methane
Source of data:	2006 IPCC Guidelines for National Greenhouse Gas Inventories
Value(s) applied:	21
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:	<table><tr><td>Equip</td><td>kgCH₄/hr</td><td>Number</td></tr><tr><td>Valves</td><td>0.0045</td><td>215</td></tr><tr><td>Pump seals</td><td>0.0024</td><td>0</td></tr><tr><td>Other</td><td>0.0088</td><td>229</td></tr><tr><td>Connectors</td><td>0.0002</td><td>0</td></tr><tr><td>Flanges</td><td>0.0004</td><td>64</td></tr><tr><td>Open ended lines</td><td>0.002</td><td>0</td></tr><tr><td>Valves (light oil)</td><td>0.0025</td><td>444</td></tr><tr><td>Pump seals (light oil)</td><td>0.013</td><td>0</td></tr><tr><td>Other (light oil)</td><td>0.0075</td><td>0</td></tr><tr><td>Connectors (light oil)</td><td>0.00021</td><td>0</td></tr><tr><td>Flanges (light oil)</td><td>0.00011</td><td>481</td></tr><tr><td>Open ended lines</td><td>0.0014</td><td>0</td></tr></table>			Equip	kgCH ₄ /hr	Number	Valves	0.0045	215	Pump seals	0.0024	0	Other	0.0088	229	Connectors	0.0002	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)	0.00011	481	Open ended lines	0.0014	0
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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:	<p>Continuous measurements at metering points 12". No gas has been provided through the 4" pipeline from 18th Oct 2008 onwards.</p> <p>Readings from Barton Chart were used on the following dates due to some problems in the Flow Comp system:</p> <p>On 1 January - 18 March 2012: flow comp transmitter error. 14 June 2012: Flowcomp calibration 6 August 2012: Flow comp transmitter error, no readings were obtained 01 - 19 Sept 2012: Flow comp transmitter error, no readings were obtained 31 Dec 2012: Flow comp transmitter error, no readings were obtained</p> <p>All continuous flow meters recording input of associated gas are in addition to computer registration equipped with continuous Barton chart recorders</p>
Value(s) of monitored parameter:	6,810.7593 mmscf

Monitoring equipment:	Orifice Plate Flow Meter Accuracy : +/- 1% Serial Number : 91F637499/ 2006 CD 0004/05.07 Calibration Frequency : Annually Date of Calibration: 16 May 2011, 14 June 2012 Validity: 16 May 2012, 14 June 2013	
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:	<table border="1"> <thead> <tr> <th>Month/Year</th> <th>W_{A,carbon,y} kg CO₂/m³</th> </tr> </thead> <tbody> <tr><td>Dec 2011</td><td>3.019</td></tr> <tr><td>Jan 2012</td><td>3.014</td></tr> <tr><td>Feb 2012</td><td>3.013</td></tr> <tr><td>Mar 2012</td><td>2.989</td></tr> <tr><td>Apr 2012</td><td>3.046</td></tr> <tr><td>May 2012</td><td>2.857</td></tr> <tr><td>Jun 2012</td><td>2.959</td></tr> <tr><td>Jul 2012</td><td>2.967</td></tr> <tr><td>Aug 2012</td><td>2.955</td></tr> <tr><td>Sep 2012</td><td>2.872</td></tr> <tr><td>Oct 2012</td><td>3.037</td></tr> <tr><td>Nov 2012</td><td>3.127</td></tr> <tr><td>Dec 2012</td><td>3.065</td></tr> </tbody> </table>		Month/Year	W _{A,carbon,y} kg CO ₂ /m ³	Dec 2011	3.019	Jan 2012	3.014	Feb 2012	3.013	Mar 2012	2.989	Apr 2012	3.046	May 2012	2.857	Jun 2012	2.959	Jul 2012	2.967	Aug 2012	2.955	Sep 2012	2.872	Oct 2012	3.037	Nov 2012	3.127	Dec 2012	3.065
Month/Year	W _{A,carbon,y} kg CO ₂ /m ³																													
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Aug 2012	2.955																													
Sep 2012	2.872																													
Oct 2012	3.037																													
Nov 2012	3.127																													
Dec 2012	3.065																													
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:	-

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 09 - 10 October 2012: Calibration on M-01 dry gas meter
Value(s) of monitored parameter:	5,393.8649 Mmscf
Monitoring equipment:	Orifice Plate Flow meter Accuracy : +/- 1% Serial Number : USMMN-0509-0041/98.10 Calibration frequency : annually Date of Last Calibration: 7 October 2011, 9 October 2012 Validity : 7 October 2012, 9 October 2013
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 calculations

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:	<table border="1"> <thead> <tr> <th>Month/Year</th> <th>W_{B,carbon,drygas,y} kg CO₂/m³</th> </tr> </thead> <tbody> <tr><td>Dec 2011</td><td>2.506</td></tr> <tr><td>Jan 2012</td><td>2.541</td></tr> <tr><td>Feb 2012</td><td>2.525</td></tr> <tr><td>Mar 2012</td><td>2.511</td></tr> <tr><td>Apr 2012</td><td>2.535</td></tr> <tr><td>May 2012</td><td>2.476</td></tr> <tr><td>Jun 2012</td><td>2.500</td></tr> <tr><td>Jul 2012</td><td>2.533</td></tr> <tr><td>Aug 2012</td><td>2.505</td></tr> <tr><td>Sep 2012</td><td>2.502</td></tr> <tr><td>Oct 2012</td><td>2.562</td></tr> <tr><td>Nov 2012</td><td>2.521</td></tr> <tr><td>Dec 2012</td><td>2.565</td></tr> </tbody> </table>	Month/Year	W _{B,carbon,drygas,y} kg CO ₂ /m ³	Dec 2011	2.506	Jan 2012	2.541	Feb 2012	2.525	Mar 2012	2.511	Apr 2012	2.535	May 2012	2.476	Jun 2012	2.500	Jul 2012	2.533	Aug 2012	2.505	Sep 2012	2.502	Oct 2012	2.562	Nov 2012	2.521	Dec 2012	2.565		
Month/Year	W _{B,carbon,drygas,y} kg CO ₂ /m ³																														
Dec 2011	2.506																														
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Jul 2012	2.533																														
Aug 2012	2.505																														
Sep 2012	2.502																														
Oct 2012	2.562																														
Nov 2012	2.521																														
Dec 2012	2.565																														
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 calculations																														
Additional comment:	-																														
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	24,917.202 tonnes																														

parameter:			
Monitoring equipment:	Weighbridge Mettler Toledo Type IND310 Accuracy: +/- 10 kg Serial Number : 0029136-6DH Calibration frequency: annually Date of last calibration:, 28 March 2012 Validity: 28 March 2013		
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:	<table border="1"> <thead> <tr> <th>Month/Year</th> <th>$W_{A,carbon,y}$ kg CO₂/m³</th> </tr> </thead> <tbody> <tr><td>Dec 2011</td><td>3.010</td></tr> <tr><td>Jan 2012</td><td>3.012</td></tr> <tr><td>Feb 2012</td><td>3.013</td></tr> <tr><td>Mar 2012</td><td>3.015</td></tr> <tr><td>Apr 2012</td><td>3.013</td></tr> <tr><td>May 2012</td><td>3.015</td></tr> <tr><td>Jun 2012</td><td>3.014</td></tr> <tr><td>Jul 2012</td><td>3.012</td></tr> <tr><td>Aug 2012</td><td>3.012</td></tr> <tr><td>Sep 2012</td><td>3.010</td></tr> <tr><td>Oct 2012</td><td>3.008</td></tr> <tr><td>Nov 2012</td><td>3.011</td></tr> <tr><td>Dec 2012</td><td>3.011</td></tr> </tbody> </table>	Month/Year	$W_{A,carbon,y}$ kg CO₂/m³	Dec 2011	3.010	Jan 2012	3.012	Feb 2012	3.013	Mar 2012	3.015	Apr 2012	3.013	May 2012	3.015	Jun 2012	3.014	Jul 2012	3.012	Aug 2012	3.012	Sep 2012	3.010	Oct 2012	3.008	Nov 2012	3.011	Dec 2012	3.011		
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Aug 2012	3.012																														
Sep 2012	3.010																														
Oct 2012	3.008																														
Nov 2012	3.011																														
Dec 2012	3.011																														
Monitoring equipment:	Gas Chromatograph																														
Measuring/ Reading/ Recording frequency:	Monthly																														
Calculation method (if applicable):	N/A																														
QA/QC procedures applied:	Following ASTM D 2163: 2007 Data trend to be analysed. Maintain calculation cell protection																														
Purpose of data	Project emission calculations																														
Additional	-																														

comments:			
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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 : 7,912.310 tonnes 1 st Grade Condensate: 6,312.621 tonnes 2 nd Grade Condensate: 7,767.194 tonnes		
Monitoring equipment :	Weighbridge Mettler Toledo Type IND310 Accuracy: +/- 10 kg Serial Number : 0029136-6DH Calibration frequency: annually Date of last calibration: 28 March 2012 Validity: 28 March 2013		
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:	<table border="1"> <thead> <tr> <th>Month</th> <th>Condensate (tCO₂/tonne)</th> <th>1st Grade (tCO₂/tonne)</th> <th>2nd Grade (tCO₂/tonne)</th> </tr> </thead> <tbody> <tr> <td>Dec '11</td> <td>3.07</td> <td>3.06</td> <td>3.07</td> </tr> <tr> <td>Jan '12</td> <td>3.05</td> <td>3.07</td> <td>3.07</td> </tr> <tr> <td>Feb '12</td> <td>3.06</td> <td>3.07</td> <td>3.07</td> </tr> <tr> <td>Mar '12</td> <td>3.06</td> <td>3.07</td> <td>3.08</td> </tr> </tbody> </table>				Month	Condensate (tCO ₂ /tonne)	1 st Grade (tCO ₂ /tonne)	2 nd Grade (tCO ₂ /tonne)	Dec '11	3.07	3.06	3.07	Jan '12	3.05	3.07	3.07	Feb '12	3.06	3.07	3.07	Mar '12	3.06	3.07	3.08
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Dec '11	3.07	3.06	3.07																					
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Feb '12	3.06	3.07	3.07																					
Mar '12	3.06	3.07	3.08																					

	Apr '12	3.08	3.07	3.07
	May '12	3.06	3.07	3.08
	Jun '12	3.07	3.07	3.08
	Jul '12	3.07	3.07	3.08
	Aug '12	3.07	3.06	3.08
	Sep '12	3.07	3.07	3.08
	Oct '12	3.07	3.07	3.08
	Nov '12	3.07	3.07	3.08
	Dec '12	3.06	3.07	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:- <ul style="list-style-type: none">• 12” LP Input• M01 Dry gas Data are taken from Pertamina laboratory (external) analysis result																												
Value(s) of monitored parameter:	<table><tr><th>Month/Year</th><th>W_{CH₄,plant} kg CH₄ / kg</th></tr><tr><td>Dec 2011</td><td>42.56920789</td></tr><tr><td>Jan 2012</td><td>42.43797722</td></tr><tr><td>Feb 2012</td><td>42.44430336</td></tr><tr><td>Mar 2012</td><td>42.81819141</td></tr><tr><td>Apr 2012</td><td>41.85802881</td></tr><tr><td>May 2012</td><td>47.69731117</td></tr><tr><td>Jun 2012</td><td>45.78913504</td></tr><tr><td>Jul 2012</td><td>45.22759146</td></tr><tr><td>Aug 2012</td><td>45.93754024</td></tr><tr><td>Sep 2012</td><td>47.95031497</td></tr><tr><td>Oct 2012</td><td>44.17153087</td></tr><tr><td>Nov 2012</td><td>42.36405636</td></tr><tr><td>Dec 2012</td><td>43.51011519</td></tr></table>	Month/Year	W _{CH₄,plant} kg CH ₄ / kg	Dec 2011	42.56920789	Jan 2012	42.43797722	Feb 2012	42.44430336	Mar 2012	42.81819141	Apr 2012	41.85802881	May 2012	47.69731117	Jun 2012	45.78913504	Jul 2012	45.22759146	Aug 2012	45.93754024	Sep 2012	47.95031497	Oct 2012	44.17153087	Nov 2012	42.36405636	Dec 2012	43.51011519
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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:	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:	<table> <tr> <th>Month/Year</th><th>W_{CH₄,plant} kg CH₄ / kg</th></tr> <tr><td>Dec 2011</td><td>55.94929343</td></tr> <tr><td>Jan 2012</td><td>54.77014627</td></tr> <tr><td>Feb 2012</td><td>54.60824978</td></tr> <tr><td>Mar 2012</td><td>55.15965934</td></tr> <tr><td>Apr 2012</td><td>54.9572735</td></tr> <tr><td>May 2012</td><td>56.9308382</td></tr> <tr><td>Jun 2012</td><td>55.64605789</td></tr> <tr><td>Jul 2012</td><td>54.71220945</td></tr> <tr><td>Aug 2012</td><td>55.3340775</td></tr> <tr><td>Sep 2012</td><td>55.19708209</td></tr> <tr><td>Oct 2012</td><td>53.69777324</td></tr> <tr><td>Nov 2012</td><td>55.2363475</td></tr> <tr><td>Dec 2012</td><td>54.20771143</td></tr> </table>	Month/Year	W _{CH₄,plant} kg CH ₄ / kg	Dec 2011	55.94929343	Jan 2012	54.77014627	Feb 2012	54.60824978	Mar 2012	55.15965934	Apr 2012	54.9572735	May 2012	56.9308382	Jun 2012	55.64605789	Jul 2012	54.71220945	Aug 2012	55.3340775	Sep 2012	55.19708209	Oct 2012	53.69777324	Nov 2012	55.2363475	Dec 2012	54.20771143
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Monitoring equipment :	Gas Chromatograph																												
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:	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/liter)
Value(s) of monitored parameter:	2,424.60 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 recognized 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 :	9,528 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:	T₁ and T₂
Data unit:	Time
Description:	Time between 1 st 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 18 th 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 18 th 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	Project Emission (Calculation of $V_{A,accident}$)

calculations)	
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 $V_{\text{remain, accident}}$)
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

>>

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**

>>

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 CO₂ 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 $w_{CH_4,A,y}$ 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-12	512.177	0.0000	399.080	1,972.221	656.465	531.637	517.933
1	29	Feb-12	487.460	0.0000	360.041	1,923.183	655.089	498.606	563.774
1	31	Mar-12	613.690	0.0000	474.821	2,336.270	708.310	598.549	794.927
1	30	Apr-12	575.243	0.0000	451.476	2,061.941	592.403	574.643	804.855
1	31	May-12	585.471	0.0000	453.371	2,272.594	683.045	538.801	657.058
1	30	Jun-12	607.256	0.0000	480.869	2,277.798	687.639	527.204	613.574
1	31	Jul-12	519.032	0.0000	423.646	1,778.243	556.857	395.177	648.786
1	31	Aug-12	378.176	0.0000	307.131	1,381.937	472.260	302.733	365.909
1	30	Sep-12	476.198	0.0000	406.251	1,675.576	557.782	367.549	300.463
1	31	Oct-12	509.948	0.0000	413.432	1,507.588	448.570	527.692	645.084
1	30	Nov-12	471.130	0.0000	379.079	1,860.806	633.608	447.458	545.013
1	30	Dec-12	498.165	0.0000	403.228	1,747.741	588.147	459.365	756.179
1	31	Dec-11	565.959	0.0000	441.442	2,121.305	672.135	543.206	553.639
Total			6,810.7593	0.00000 0	5,394.3488	24,917.202	7,912.310	6,312.621	7,767.194

Remarks

No gas has been provided through the 4" pipeline during this monitoring period

Baseline Emission Calculations

Date		Month	12" LP Gas			4" HP Gas		
From	To		Sm3	kgCO2/Sm3	tCO2	Sm3	kgCO2/Sm3	tCO2
1	31	Jan-12	14,503,245	3.014	43,712	-	-	-
1	29	Feb-12	13,803,338	3.013	41,588	-	-	-
1	31	Mar-12	17,377,756	2.989	51,946	-	-	-
1	30	Apr-12	16,289,078	3.046	49,613	-	-	-
1	31	May-12	16,744,718	2.857	47,838	-	-	-
1	30	Jun-12	17,336,917	2.959	51,304	-	-	-
1	31	Jul-12	14,697,360	2.967	43,600	-	-	-
1	31	Aug-12	10,708,745	2.955	31,645	-	-	-
1	30	Sep-12	13,484,415	2.872	38,730	-	-	-
1	31	Oct-12	14,440,118	3.037	43,855	-	-	-
1	30	Nov-12	13,340,924	3.127	41,713	-	-	-
1	30	Dec-12	14,106,460	3.065	43,242	-	-	-
1	31	Dec-11	16,026,176	3.019	48,378	-	-	-
Total			192,859,250		361,246			

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 CO₂

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

>>

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:

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

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:

$PE_{CO_2,gas,y}$	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 .
$MLPG_{B,y}$	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 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 .

The calculations are summarized in the tables below:

Project Emission Calculation

			V_A	$W_{carbonA}$	$M_{carbonA}$	V_{drygas}	$W_{carbondr ygas}$	$M_{carbondrygas}$
Date			(Import)	(CO2)		Dry Gas	Dry Gas	Dry Gas
From	To	Month	Sm3	kgC/Sm3	tCO2	Sm3	kgCO2/Sm3	tCO2
1	31	Jan-12	14,503,245	3.014	43,712	11,300,697	2.541	28,717
1	29	Feb-12	13,803,338	3.013	41,588	10,195,235	2.525	25,744
1	31	Mar-12	17,377,756	2.989	51,946	13,445,438	2.511	33,766
1	30	Apr-12	16,289,078	3.046	49,613	12,784,367	2.535	32,405
1	31	May-12	16,744,718	2.857	47,838	12,838,036	2.476	31,784
1	30	Jun-12	17,336,917	2.959	51,304	13,616,690	2.500	34,039
1	31	Jul-12	14,697,360	2.967	43,600	11,996,309	2.533	30,385
1	31	Aug-12	10,708,745	2.955	31,645	8,696,971	2.505	21,784
1	30	Sep-12	13,484,415	2.872	38,730	11,503,740	2.502	28,786
1	31	Oct-12	14,440,118	3.037	43,855	11,720,792	2.562	30,029
1	30	Nov-12	13,340,924	3.127	41,713	10,734,312	2.521	27,058
1	30	Dec-12	14,106,460	3.065	43,242	11,418,133	2.565	29,288
1	31	Dec-11	16,026,176	3.019	48,378	12,500,247	2.506	31,326
Total			192,859,250		361,246	152,750,967		385,111

			M _{LPG}	W _{carbonLPG}	M _{carbonLPG}	M _{carboncondensate}	M _{carbonB}
Date		Month	(Import)	LPG	LPG	LPG	Cond
From	To		T	tCO2/t	tCO2	tCO2	tCO2
1	31	Jan-12	1,972	3.011	5,938	5,225	39,879
1	29	Feb-12	1,923	3.011	5,790	5,264	36,798
1	31	Mar-12	2,336	3.011	7,034	6,445	47,245
1	30	Apr-12	2,062	3.014	6,214	6,058	44,678
1	31	May-12	2,273	3.011	6,844	5,761	44,388
1	30	Jun-12	2,278	3.011	6,858	5,618	46,515
1	31	Jul-12	1,778	3.011	5,355	4,917	40,657
1	31	Aug-12	1,382	3.011	4,161	3,501	29,446
1	30	Sep-12	1,676	3.011	5,045	3,767	37,599
1	31	Oct-12	1,508	3.013	4,542	4,985	39,520
1	30	Nov-12	1,861	3.011	5,603	5,581	38,242
1	30	Dec-12	1,748	3.011	5,263	5,535	40,086
1	31	Dec-11	2,121	3.010	6,386	5,426	43,138
Total			24,917		75,033	68,083	528,192

			M _{condLPG}	W _{carboncondLPG}	M _{carboncondLPG}
Date		Month	(Import)	Cond	Cond
From	To		t	tCO2/t	tCO2
1	31	Jan-12	656	3.05	2,002
1	29	Feb-12	655	3.06	2,002
1	31	Mar-12	708	3.06	2,165
1	30	Apr-12	592	3.08	1,823
1	31	May-12	683	3.06	2,087
1	30	Jun-12	688	3.07	2,109
1	31	Jul-12	557	3.07	1,708
1	31	Aug-12	472	3.07	1,450
1	30	Sep-12	558	3.07	1,711
1	31	Oct-12	449	3.07	1,376
1	30	Nov-12	634	3.07	1,943
1	30	Dec-12	588	3.06	1,803
1	31	Dec-11	672	3.07	2,063
Total			24,917		7,912

Date		Month	1 st grade	ond 1 st grade	1 st grade
From	To		t	tCO ₂ /t	tCO ₂
1	31	Jan-12	532	3.07	1,630
1	29	Feb-12	499	3.07	1,529
1	31	Mar-12	599	3.07	1,836
1	30	Apr-12	575	3.07	1,761
1	31	May-12	539	3.07	1,653
1	30	Jun-12	527	3.07	1,618
1	31	Jul-12	395	3.07	1,213
1	31	Aug-12	303	3.06	925
1	30	Sep-12	368	3.07	1,130
1	31	Oct-12	528	3.07	1,622
1	30	Nov-12	533	3.07	1,633
1	30	Dec-12	459	3.07	1,409
1	31	Dec-11	543	3.06	1,662
Total			6,398		19,621

Date		Month	Mcond 2 nd grade	Wcarbnc ond 2 nd grade	Mcarboncond 2 nd grade
From	To		t	tCO ₂ /t	tCO ₂
1	31	Jan-12	519	3.07	1,593
1	29	Feb-12	564	3.07	1,733
1	31	Mar-12	795	3.08	2,444
1	30	Apr-12	805	3.07	2,473
1	31	May-12	657	3.08	2,021
1	30	Jun-12	614	3.08	1,891
1	31	Jul-12	649	3.08	1,997
1	31	Aug-12	366	3.08	1,126
1	30	Sep-12	300	3.08	927
1	31	Oct-12	645	3.08	1,987
1	30	Nov-12	652	3.08	2,005
1	30	Dec-12	756	3.07	2,323
1	31	Dec-11	554	3.07	1,701
Total			7,874		24,221

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), CO₂ emissions from combustion of these fuels should also be accounted.

$$PE_{CO_2, other\ fuels, y} = \frac{1}{1000} \cdot \sum_{Fuels} m_{fuel, y} \cdot NCV_{fuel} \cdot EF_{CO_2, fuel}$$

where:

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

$m_{fuel, y}$ 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.

$EF_{CO_2, fuel}$ Is the CO₂ emission factor of the respective fuel type in kg CO₂/kJ.

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

Diesel Oil Usage	Volume	Mass	Mass	Mass
Period	liter	kg	kgCO ₂	tCO ₂
January	190.00	160.07	510.02	0.51
February	200.00	168.49	536.87	0.54
March	60.00	50.55	161.06	0.16
April	25.00	21.06	67.11	0.07
May	35.00	29.49	93.95	0.09
June	80.00	67.40	214.75	0.21
July	80.00	67.40	214.75	0.21
August	50.00	42.12	134.22	0.13
September	120.00	101.10	322.12	0.32
October	1,918.00	1,615.84	5,148.55	5.15
November	60.00	50.55	161.06	0.16
December	60.00	50.55	161.06	0.16
December 2011	325.00	273.80	872.41	0.87
Total	3,203.00	2,424.60	7,725.50	7.73

CH₄ emissions from recovery and processing the gas

Fugitive CH₄ 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 CH₄ concentration in the respective stream with the appropriate emission factor as indicated in Table 1 of AM0009/version02.

$$PE_{CH_4, plants, y} = GWP_{CH_4} \cdot \frac{1}{1000} \cdot \sum_{equipment} w_{CH_4, stream} \cdot EF_{equipment} \cdot T_{equipment}$$

where:

- $PE_{CH_4, plants, y}$ 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 CO₂ equivalents.
- GWP_{CH_4} 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).
- $w_{CH_4, A, y}$ Is the average methane weight fraction in the respective stream in kg-CH₄/kg.
- $EF_{equipment}$ Is the appropriate emission factor from Table 1 (AM0009/version02) in kg/hour/equipment.

Equipment Type	Factor kg/hr	Number	CH ₄ ton	CO _{2e} ton
Valves	0.0045	215	4.08	85.59
Pump seals	0.0024	0	0.00	0.00
Other	0.0088	229	8.49	178.28
Connectors	0.0002	0	0.00	0.00
Flanges	0.004	64	0.11	2.21
Open ended lines	0.002	0	0.00	0.00
Valves (light oil)	0.0025	444	4.68	98.20
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	0.22	4.68
Open ended lines	0.0014	0	0.00	0.00
Total			17.57	368.95

CH₄ 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 “CH₄ emissions from recovery and processing the gas”, explained above.

$$PE_{CH_4, pipeline, y} = GWP_{CH_4} \cdot \frac{1}{1000} \sum_{equipment} w_{CH_4, pipeline} \cdot EF_{pipeline} \cdot T_{equipment}$$

where:

- PE_{CH₄, pipeline, y} Are the CH₄ emissions from the project activity during the transport of the gas in pipelines under the normal operation during the period y in tons of CO₂ 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-CH₄/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 (PECH₄Pipeline)

Equipment Type	Factor	Number	CH ₄	CO _{2e}
	kg/hr		ton	ton
Valves	0.0045	4	0.09	1.98
Pump Seals	0.0024	0	0.00	0.00
Other	0.0088	2	0.09	1.94
Connectors	0.0002	0	0.00	0.00
Flanges	0.0004	20	0.04	0.86
Open ended lines	0.002	0	0.00	0.00
Total			0.23	4.79

CH₄ 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.

CH₄ emissions from the transport of the gas in pipelines when accidental event occurred can be calculated as:

$$PE_{CH_4, pipeline, accident} = GWP_{CH_4} \cdot \frac{1}{1000} (V_{A, accident} + V_{remain, accident}) \cdot W_{CH_4, pipeline, accident}$$

with:

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

$$V_{remain, accident} = d^3 \cdot \pi \cdot L \cdot \frac{P_p}{P_s} \cdot \frac{T_s}{T_p} \cdot \frac{V_{A, d, accident}}{\sum_i V_{xi, d, accident}}$$

where:

$PE_{CH_4, pipeline, accident}$	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_{CH_4}	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 .
$W_{CH_4, pipeline, accident}$	Is the average methane weight fraction in the gas recovered in $kg-CH_4/m^3$
$t_{accident}$	Is the time difference between t_1 and t_2 determined as "retention time" in seconds.
t_1	Is the time the gas leakage caused by the accident occurred. "t1" is determined based on the continuous monitoring data such as pressure etc.
t_2	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).
P_p	Is the pressure in the pipeline when the shutdown valves close both the upstream and downstream of the pipeline in atmospheres (atm).
P_s	Is the standard pressure in atm.
T_p	Is the temperature in the pipeline when the shutdown valves close both the upstream and downstream of the pipeline in degrees Centigrade.
T_s	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 tCO₂

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 ₂ e)	Project emissions or actual net GHG removals by sinks (t CO ₂ e)	Leakage (t CO ₂ e)	Emission reductions or net anthropogenic GHG removals by sinks (t CO ₂ e)
Total	577,164	49,297	0	527,867

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 CO₂e)	687,631	527,867

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 687,631 tones of CO₂e and the actual emission reduction is 527,867, tones of CO₂e. The actual CER generation is 23% 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 CO₂e)	527,867	Not applicable

Annex A. Special CDM data events

Area	Date	Problems
12 Inch Flow Meter	01/01/12 - 18/03/12	Flow comp transmitter error, no readings were obtained
	14 June 2012	Flowcomp calibration
	6 August 2012	Flow comp transmitter error, no readings were obtained
	01 - 19 Sept 2012	Flow comp transmitter error, no readings were obtained
	31 Dec 2012	Flow comp transmitter error, no readings were obtained
	During these periods back-up recording (Barton-Chart) were used.	
M-O1 Dry Gas Flow Meter	09-10 Oct 2012	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 CH ₄ , A ₂	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 CH ₄ , pipeline	Plant Survey	Survey Report	Hard/Soft Copy	SCC Office (S server)	CDM Monitoring Report Spreadsheet	Odira Office, SCC Office	Crediting Period +2 year
T ₁ , T ₂	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			UNFCCC Website / SCC Office (S server)				Crediting Period +2 year
Approved Methodology			UNFCCC 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	16 May 2011 14 June 2012	16 May 2012 14 June 2013
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	7 Oct 2011 9 Oct 2012	7 Oct 2012 9 Oct 2013
Weighbridge at Tambun Plant	Weighbridge	0029136-6DH	LPG, Condensate, 1 st Grade Condensate, 2 nd Grade Condensate	Yearly	The weighbridge is subject to government regulation and Metrology Department inspection & calibration	1 April 2011 28 March 2012	31 March 2012 28 March 2013
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

<i>Version</i>	<i>Date</i>	<i>Description</i>
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.
Decision Class: Regulatory Document Type: Form Business Function: issuance Keywords: monitoring report, performance monitoring		