VALIDATION OPINION FOR REVISION OF REGISTERED MONITORING PLAN

Sindicatum Carbon Capital Limited & PT. Odira Energy Persada

Tambun LPG Associated Gas Recovery and Utilization Project

UNFCCC Ref. No. 1144

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Organisation:			**Client:**
SGS United Kingdom Limited			Sindicatum Carbon Capital Limited & Pt. Odira Energy Persada
Subject:			
Validation opinion for revision of Registered Monitoring Plan			
Validation Team:			
Sanjeev Kumar –Lead Assessor (Since 3rd July 2009) Pankaj Mohan – Lead Assessor(Till 2nd July 2009) Nitin Babber- Sectoral Scope Expert (Since 5th October 2009) Stephen Glynatsis – Sectoral Scope Expert(Till 4th October 2009)			☒ No Distribution (without permission from the Client or responsible organisational unit)
Technical Review:	**Trainee Technical Reviewer:**		
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1	02-02-2009	11	
2	16-03-2009	13	
3	24-04-2009	16	
4	06-10-2009	16	
5	17-10-2009	16	

Table of Content

1. Validation Opinion

Paragraph 57 of the Modalities and Procedures for the CDM allow project participants to revise monitoring plans in order to improve accuracy and/or completeness of information, subject to the revision being validated by a Designated Operational Entity.

SGS United Kingdom Ltd has been contracted by Sindicatum Carbon Capital Limited & PT. Odira Energy Persada to perform such a validation of the revision of monitoring plan according to the procedure detailed in Annex 34 to EB 26, the original monitoring plan is part of the PDD of registered CDM project: Tambun LPG Associated Gas Recovery and Utilization Project; UNFCCC ref. no. 1144. The purpose of a validation is to have an independent third party assessment of the revision of the monitoring plan. In particular, the level of accuracy or completeness in the proposed revision of the monitoring plan, and the conformity with approved monitoring methodology applicable to the project activity.

By applying the proposed revision of the monitoring plan, the LPG Production ($MLPG_{by}$) will be measured using calibrated weighbridge and data will be cross checked with the continuous flow meter. The data from both (weighbridge and continuous flow meter) measuring instruments will be assessed and most accurate data (lowest uncertainty) will be used for reporting. This will also be checked by stock verification.

This is carried out as per following formula: Total product sales – opening stock + closing stock. $M_{bcarbonlpgy}$ will be calculated using the annual sum of Monthly LPG production * Monthly CO2 content. Each of the condensate ($M_{bcondensatey}$) products i.e. LPG condensate, 1st Grade and 2nd Grade, production is monitored by measuring the quantities produced using the calibrated weighbridge under control of Indonesia's Department of Meteorology. The daily production is adjusted to take into account the change in stock tank volume at 00:00hrs each day.

Daily production is calculated as :- M condensate (t) = Total product sales – opening stock + closing stock. In addition the LPG Condensate, 1st Grade and 2nd Grade Condensate will also be measured using continuous flow meters. All three quantification results (continuous flow metered data, calibrated weighbridge and calibrated road tanker information) are assessed (comparative analysis). Most accurate (lowest level of uncertainty) data set will be used for reporting purposes.

The assessment of uncertainty for LPG production and condensate production quantification will be carried out as per the steps provided in revised monitoring plan (B.7.2 on page 47) and the steps (1 to 4) followed are found in accordance with ISO-5168:2005 "Measurement of fluid flow – Procedures for the evaluation of uncertainties" and "Guide to the Expression of uncertainty in measurement, ISO/TAG 4. Published by ISO (1993; improved reprint, 1995)." Therefore, the aforesaid approach is found scientific and appropriate and hence accepted.

The project design document is under assessment by the audit team as per guidance for project design change (EB 48 annex 67).

$M_{bcarboncondensatey}$ will be calculated using the Annual sum of:
Monthly LPG condensate production * Monthly LPG condensate CO2 content + Monthly 1st Grade condensate production * Monthly 1st Grade CO2 content + Monthly 2nd Grade condensate production * Monthly 2nd Grade CO2 content.

In the monitoring plan some minor changes are carried out in parameters V_{ay}, $W_{acarbony}$, $M_{acarbony}$, and $M_{bcarbondrygasy}$ by removing the 6'' line (Pondak Tengah) from the monitoring plan as the gas flow from this line was stopped from 1st April 2008 as mentioned in first verification report and verified from the confidential document (nr. 291/D-00/PO/OEP/III/2008) during site visit.

The other monitoring parameters in the original monitoring plan remain unchanged. This revision improves the accuracy of information.

Theoretically, there should be no impact on the calculation of the emissions reduction achieved by this project activity because the revision to the Monitoring Plan is aiming to fix the LPG Production, and condensates measurements and usage of most accurate data for emission reduction calculations. The

summary of revision to the monitoring plan is included in the validation opinion as annex 1 to this validation opinion.

Furthermore, we confirm that:

(a) the proposed revision of the monitoring plan ensures that the level of accuracy or completeness in the monitoring and verification process is not reduced as a result of the revisions;

(b) the proposed revision of the monitoring plan is in accordance with the approved monitoring methodology applicable to the project activity.

(c) the findings of previous verification reports have been taken into account, the project activity is undergoing second verification.

With respect to the request for clarifications received from the Secretariat:

"Clarifications on issues relating to the request for revision of registered monitoring plan for 1144 : Tambun LPG Associated Gas Recovery and Utilization Project.

The proposed revised monitoring plan states that no forecast changes need to be made to the initial forecast because the increased associated gas production at the Tambun field can now be processed at Tambun LPG due to the loss of the Pondok Tankah AG feed. It is however unclear whether the increased associated gas production comes from existing oil wells or newly added ones after the start of the CDM project activity.

Request for clarification from the PP/DOE:

The DOE/PP is requested to validate and clarify:

1. Where does the increased associated gas come from? (e.g. does it come from oil wells at Tambun field existing prior to the start of the CDM project, or from newly added ones after the start of the CDM project)

2. Whether the increased associated gas production is intentional or not."

RE 1: The increased supply in associated gas comes from the Tambun Oil field under the terms of the supply contract, which allows for Odira to purchase gas in excess of 12 mmscfd at a price premium. The question of whether it comes from oil wells existing prior to the start of the CDM project or from newly added ones after the start of the project activity is not relevant to this project because AM0009 Ver 2 does not restrict the application of the methodology to existing oil wells.

RE 2: The increase in associated gas production is not intentional. The associated gas is a by-product from the oil production at the Tambun Oil Field operated by Pertamina E&P. Pertamina flare the associated gas.

"Clarifications on issues relating to the request for revision of registered monitoring plan for 1144: Tambun LPG Associated Gas Recovery and Utilization Project.

The methodology requires that the project activity shall encompass the recovery of gas at oil fields, the transportation of the recovered gas to a gas processing plant and the production of the product dry gas, LPG and condensate in a gas processing plant. However, based on the additional information provided in the revised validation opinion, it appears that the project activity does not include the gas recovery at the oil fields.

Request for clarification from the PP/DOE on :

1. How the PP/DOE define the CDM project boundary. Please provide a schematic diagram.

2. How the DOE validated the increased associated gas of Tambun compared to the estimates

in the PDD (e.g. by checking the number of oil wells at Tambun fields before and after the start of the CDM project, as well as the increased production by existing wells).”

RE 1: The Project boundary displayed in Figure 4 of the section B3 in the registered PDD remains unchanged. The PP has clarified that the two oilfields are represented by the blue boxes labelled SPM (Tambun) and Pondok Tengah respectively. The figure is reproduced in section 4.2 below. The text immediately below figure 4 in the PDD states as follows:

“Project oil wells include Tambun Oil Field and Pondok Tengah Oil Field, both operated by Pertamina E&P.”

The Pondok Tengah supply was predicted to run until end of 2009 but for reasons beyond the PPs’ control it was terminated on 31st March 2008 and hence PP has requested a revision to the Monitoring plan to remove the references to the relevant metering systems. The same references will be removed from registered PDD as per new approved procedure EB48 Annex 66.

In addition, SGS would like to re-confirm that associated gas in the PDD is supplied from these two oil fields. These fields are the only fields which supply gas to the project activity and no other fields have been or will be connected to the project activity.

RE 2: The contract between Pertamina and Odira, reviewed by the validating DOE and by SGS during verification, provides for Pertamina to supply a minimum flow to PT Odira Energy Persada of 10 mmscfd and a maximum flow of 12 mmscfd at the contracted price. The contract also allows ‘excess gas’ to be purchased from Pertamina at a premium of 35% to the contracted price.

The estimated gas flows in the PDD were based on the maximum guaranteed gas flow from Pertamina (12 mmscfd) because this constitutes the most financially attractive scenario for the project which was used in the additionality analysis.

The increase in gas flow from the Tambun field is accepted and verified because:

a) it is processed within the existing plant, as described in the PDD; and
b) AM0009 ver 2 does not restrict the scope of the project activity or the applicability of the methodology to specific oil wells.

Signed on Behalf of the Validation Body by Authorized Signatory

Signature: 

Name: Siddharth Yadav

Date: 16.11.2009

2. Introduction

2.1 Objective

Paragraph 57 of the Modalities and Procedures for the CDM allow project participants to revise monitoring plans in order to improve accuracy and/or completeness of information, subject to the revision being validated by a Designated Operational Entity.

SGS United Kingdom Ltd has been contracted by Sindicatum Carbon Capital Limited & PT. Odira Energy Persada to perform such a validation of the revision of the monitoring plan according to the procedure detailed in Annex 34 to EB 26, the original monitoring plan is part of the PDD of registered CDM project: Tambun LPG Associated Gas Recovery and Utilization Project; UNFCCC ref. no. 1144. The purpose of a validation is to have an independent third party assessment of the revision of monitoring plan. In particular, the level of accuracy or completeness in the proposed revision of the monitoring plan, and the conformity with the approved monitoring methodology applicable to the project activity.

The Validation was performed in accordance with the UNFCCC criteria for the Clean Development Mechanism (CDM) and host country criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

SGS reviewed the project design documentation using a risk based approach and conducted follow-up interviews.

2.2 Scope

The scope of the validation is defined as an independent and objective review of the project design document, the project's baseline study and monitoring plan and other relevant documents. The information in these documents is reviewed against Kyoto Protocol requirements, UNFCCC rules and associated interpretations. SGS has employed a risk-based approach in the validation, focusing on the identification of significant risks for project implementation and the generation of CERs.

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

2.3 GHG Project Description

As per http://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1180000727.07/view web page there is no change in the project activity description. The project was registered on 1st February 2008 under UNFCCC reference number 1144.

2.4 The Names and Roles of the Validation Team Members

Name	Role	Affiliate
Sanjeev Kumar	Lead Assessor (Since 3rd July 2009)	SGS India
Pankaj Mohan	Lead Assessor (Till 2nd July 2009)	SGS India
Nitin Babber	Sectoral Scope Expert (Since 5th October 2009)	SGS India
Stephen Glynatsis	Sectoral Scope Expert (Till 4th October 2009)	SGS Australia

3. Methodology

3.1 Review of CDM-PDD and Additional Documentation

The validation is performed primarily as a document review of the publicly available project documents. The assessment is performed by trained assessors using a validation protocol.

A site visit is usually required to verify assumptions in the baseline.

3.2 Use of the Validation Protocol

The validation protocol used for the assessment is partly based on the templates of the IETA / World Bank Validation and Verification Manual and partly on the experience of SGS with the validation of CDM projects. It serves the following purposes:

- it organises, details and clarifies the requirements the project is expected to meet; and
- it documents both how a particular requirement has been validated and the result of the validation.

The validation protocol consists of several tables. The different columns in these tables are described below.

Checklist Question	Ref ID	Means of Verification (MoV)	Comment	Draft and/or Final Conclusion
The various requirements are linked to checklist questions the project should meet.	Lists any references and sources used in the validation process. Full details are provided in the table at the bottom of the checklist.	Explains how conformance with the checklist question is investigated. Examples of means of verification are document review (DR) or interview (I). N/A means not applicable.	The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is further used to explain the conclusions reached.	This is either acceptable based on evidence provided (Y), or a Corrective Action Request (CAR) due to non-compliance with the checklist question (See below). New Information Request (NIR) is used when the validation team has identified a need for further clarification.

3.3 Findings

As an outcome of the validation process, the team can raise different types of findings

In general, where insufficient or inaccurate information is available and clarification or new information is required the Assessor shall raise a **New Information Request (NIR)** specifying what additional information is required.

Where a non-conformance arises the Assessor shall raise a **Corrective Action Request (CAR).** A CAR

is issued, where:

I. mistakes have been made with a direct influence on project results;
II. validation protocol requirements have not been met; or
III. there is a risk that the project would not be accepted as a CDM project or that emission reductions will not be verified.

The validation process may be halted until this information has been made available to the assessors' satisfaction. Failure to address a NIR may result in a CAR. Information or clarifications provided as a result of an NIR may also lead to a CAR.

Observations may be raised which are for the benefit of future projects and future verification or validation actors. These have no impact upon the completion of the validation or verification activity.

Corrective Action Requests and New Information Requests are raised in the draft validation protocol and detailed in a separate form. In this form, the Project Developer is given the opportunity to "close" outstanding CARs and respond to NIRs and Observations.

3.4 Internal Quality Control

Following the completion of the assessment process and a recommendation by the Assessment team, all documentation will be forwarded to a Technical Reviewer. The task of the Technical Reviewer is to check that all procedures have been followed and all conclusions are justified. The Technical Reviewer will either accept or reject the recommendation made by the assessment team.

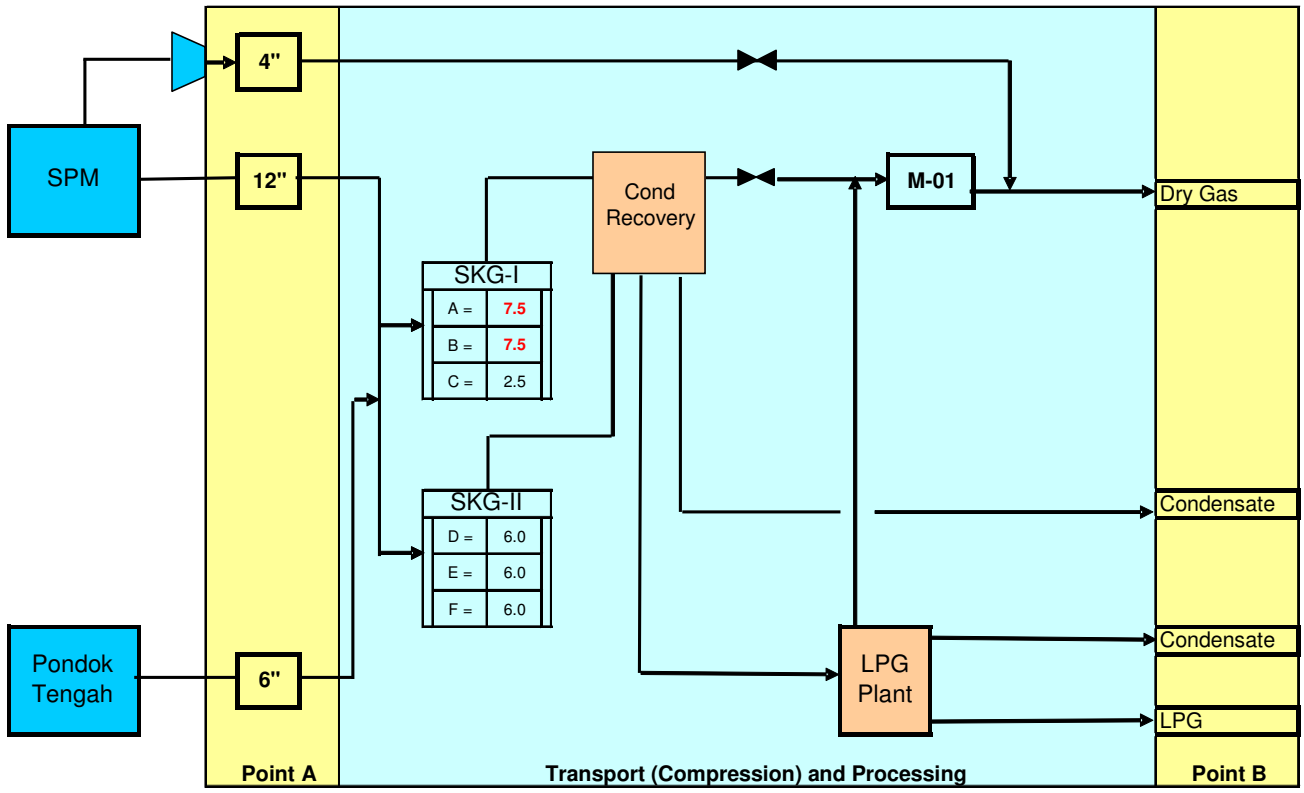
4. Validation Findings

4.1 Participation Requirements

As per the Validation Report by LRQA, dated 13th December 2007 available on UNFCCC webpage http://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1180000727.07/view No Change.

4.2 Project Design

The diagrammatic representation of project boundary is as shown in the PDD and is reproduced below. It also shows the AM0009 Measurement Points. The blue boxes labelled SPM and Pondok Tengah represent the two oil fields:



Note 1: - Fuel gas used for compression upstream of the 4" input measurement is from the condensate plant fuel gas header and is therefore accounted for within the PECO2 Point A-Point B balance.
Note 2: - PECO2 balance calculation uses measurement of Dry Gas from orifice meter M01, rather that total pipeline flow. As per Note 1, there are no PECO2 emissions associated with the 4" bypass

The text immediately below figure 4 in the PDD states as follows:

"Project oil wells include Tambun Oil Field and Pondok Tengah Oil Field, both operated by Pertamina E&P."

The project boundary is same as mentioned in registered PDD. The only change is as i.e. on 31 March 2008 the contract for gas from the Pondok Tengah field was terminated and no gas has been supplied through the 6" pipeline since then. This pipeline has been disconnected, and changes to the Monitoring Plan are requested accordingly. Due to this fact, Odira continued to process Tambun gas in the condensate plant under the "excess gas" clause of the contract. Despite this additional processing, Pertamina continues to flare untreated gas from the Tambun field since the beginning of the project. This activity is therefore only partially reducing flaring activities from oil fields that have already been in operation before registration of the CDM project.

In addition, SGS would like to re-confirm that associated gas in the PDD is supplied from these two oil fields. These fields are the only fields which supply gas to the project activity and no other fields have been or will be connected to the project activity.

In conclusion, the project boundary is as per the Validation Report by LRQA, dated 13th December 2007 available on UNFCCC webpage http://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1180000727.07/view No Change.

4.3 Eligibility as a Small Scale Project

As per the Validation Report by LRQA, dated 13th December 2007 available on UNFCCC webpage http://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1180000727.07/view No Change.

4.4 Baseline Selection and Additionality

As per the Validation Report by LRQA, dated 13th December 2007 available on UNFCCC webpage http://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1180000727.07/view No Change.

4.5 Application of Baseline Methodology and Calculation of Emission Factors

As per the Validation Report by LRQA, dated 13th December 2007 available on UNFCCC webpage http://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1180000727.07/view No Change.

4.6 Application of Monitoring Methodology and Monitoring Plan

The project is using AM0009 version 2. The project was registered on 1st February 2008.

By applying the proposed revision of the monitoring plan, the LPG Production (MLPGby) will be measured using calibrated weighbridge and data will be cross checked with the continuous flow meter. The data from both (weighbridge and continuous flow meter) measuring instruments will be assessed and most accurate data (lowest uncertainty) will be used for reporting. This will also be checked by stock verification.

The stock verification carried out as per following formula: Total product sales – opening stock + closing stock. Mbcarbonlpgy will be calculated using the annual sum of Monthly LPG production * Monthly CO2 content. Each of the condensate (Mbcondensatey) products i.e. LPG condensate, 1st Grade and 2nd Grade, production is monitored by measuring the quantities produced using the calibrated weighbridge under control of Indonesia's Department of Meteorology. The daily LPG production is adjusted to take into account the change in stock tank volume at 00:00hrs each day.

Daily condensate production is calculated as :- M condensate (t) = Total product sales – opening stock + closing stock. In addition the LPG Condensate, 1st Grade and 2nd Grade Condensate will also be measured using continuous flow meters, calibrated weighbridge & calibrated road tanker. All three quantification results (continuous flow metered data, calibrated weighbridge and calibrated road tanker information) are assessed (comparative analysis). Most accurate (lowest level of uncertainty) data set will be used for reporting purposes.

The assessment of uncertainty for LPG production and condensate production quantification will be carried out as per the steps provided in revised monitoring plan (B.7.2 on page 47) and the steps (1 to 4) followed are found in accordance with ISO-5168:2005 "Measurement of fluid flow – Procedures for the evaluation of uncertainties" and "Guide to the Expression of uncertainty in measurement, ISO/TAG 4. Published by ISO (1993; improved reprint, 1995)." Therefore, the aforesaid approach is found scientific and appropriate and accepted.

$M_{B,carbon,condensate,y}$ will be calculated using the Annual sum of:
Monthly LPG condensate production * Monthly LPG condensate CO2 content + Monthly 1st Grade condensate production * Monthly 1st Grade CO2 content + Monthly 2nd Grade condensate production * Monthly 2nd Grade CO2 content.

In the monitoring plan some minor changes are carried out in parameters Vay, Wacarbony, Macarbony, and Mbcarbondrygasy by removing the 6'' line (Pondak Tengah) from the monitoring plan as the gas flow from this line was stopped from 1st April 2008 as mentioned in first verification report and verified from the confidential document (nr. 291/D-00/PO/OEP/III/2008) during site visit.

As stated in the registered the PDD, the associated gas comes from the Tambun and Pondok Tengah oil fields and this fact has been verified on the basis of the contract between Pertamina and Odira (Pertamina Contract No. 900/C00000/2004-S1– highly confidential to Project Proponent).

This contract provides for Pertamina to supply a mandatory minimum flow to PT Odira Energy Persada of 10 mmscfd and a maximum flow of 12 mmscfd. This is a conservative figure which allows them to meet their obligations to Odira without defaulting. The maximum guaranteed flow of 12 mmscfd defined the size of the LPG processing plant. The contract also envisages the scenario that Pertamina's independent production activities will lead to additional volumes of flare gas above this amount. This is referred to as 'excess gases' in the contract (see: [1] Clause 1.6 of 'Definitions', [2] Clause 11 Gas Pricing and [3] Annex - 1). Odira has no control over where in the Tambun or Pondok Tengah oil fields this gas comes from or how and when it is produced but the contract allows them to process it. If Odira does not take this gas, it is flared by Pertamina.

The Tambun LPG facility was designed to use the gas from Tambun and (subsequently, prior to the validation of the PDD) Pondok Tengah Oil Fields. The LPG component has capacity for 12 mmscfd, but the gas cleaning facilities to remove condensate have a capacity of up to 20 mmscfd. This has allowed the facility to take either gas from Pondok Tengah field or gas under the "excess gas" agreement from the Tambun field (see registered PDD).

On 31 March 2008 the contract for gas from the Pondok Tengah field was terminated and no gas has been supplied through the 6" pipeline since then. This pipeline has been disconnected. Due to this fact, Odria proceeded to process gas from Tambun under the "excess gas" clause because the economic conditions made it financially viable to pay the higher price for the gas even though no LPG could be extracted. Pertamina has continued to flare untreated gas from the Tambun field since the beginning of the project. This activity is therefore only partially reducing flaring activities from oil fields that have already been in operation before registration of the CDM project.

Applicability criteria as per AM0009 version 02 and applied per registered PDD are met.

Pertamina is the state oil company whose activities in West Java focus on the production of oil and not gas. There is no relation between Pertamina's activities and those of PT Odira Energy Persada other than the purchase of flared associated gas (Pertamina Contract No. 900/C00000/2004-S1– highly confidential to Project Proponent).

Pertamina and PT Odira Energy Persada are two different entities and there is no relation between them. The increased gas production is not intentional as checked during the site visit and also mentioned in the first verification report.

The specific oil wells and the recovered gas volumes by Pertamina are not mentioned in the contract as this is not in preview of the PT. Odira Energy Persada. There is no relation between Pertamina's activities and those of PT Odira Energy Persada other than the purchase of flared associated gas (Pertamina Contract No. 900/C00000/2004-S1– highly confidential to Project Proponent). The contract also allows 'excess gas' to be purchased from Pertamina at a premium of 35% to the contracted price. The contract also does not mention about the specific oil wells. The increased gas production is not intentional as checked during the site visit and also mentioned in the first verification report as well. The increase in gas flow from the Tambun field is accepted because of following reasons:

a) it is processed within the existing plant, as described in the PDD; and

b) AM0009 ver 2 does not restrict the scope of the project activity or the applicability of the methodology to specific oil wells. Hence this was accepted by the verifier.

The other monitoring parameters in the original monitoring plan remain unchanged. This revision improves the accuracy of information.

Theoretically, there should be no impact on the calculation of the emissions reduction achieved by this project activity because the revision is aiming to fix the LPG Production, and condensates measurements and usage of most accurate data for emission reduction calculations. This is the second verification for the project activity. The DOE during the verification found that the changes in monitoring plan can be accepted as this has been mentioned as the fall back procedures in the registered PDD. Hence these were accepted. The summary of revision to monitoring plan is included in the validation opinion as annex 1 to this validation opinion.

Other parameters of the monitoring plan remain the same as mentioned in the registered PDD available at UNFCCC website http://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1180000727.07/view and revised monitoring plan is attached with the revised validation opinion.

There is no other change in the Validation Report by LRQA, dated 13th December 2007 available on UNFCCC webpage http://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1180000727.07/view .

This revision improves the accuracy of information provided and consistency in registered PDD and the monitoring plan.

4.7 Choice of the Crediting Period

As per the Validation Report by LRQA, dated 13th December 2007 available on UNFCCC webpage http://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1180000727.07/view No Change.

4.8 Environmental Impacts

As per the Validation Report by LRQA, dated 13th December 2007 available on UNFCCC webpage http://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1180000727.07/view No Change.

4.9 Local Stakeholder Comments

As per the Validation Report by LRQA, dated 13th December 2007 available on UNFCCC webpage http://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1180000727.07/view No Change.

5. List of Persons Interviewed

Date	Name	Position	Short Description of Subject Discussed
21/08/2008	Sven Starckx	Project Consultant	Monitoring practice adopted at plant site and requirement under registered PDD monitoring plan
21/08/2008	Steve Ross	Project Consultant	Monitoring practice adopted at plant site and requirement under registered PDD monitoring plan. Uncertainty and accuracy of data that has been provided during verification. Discussion on fall back procedures.

6. Document References

Category 1 Documents (documents provided by the Client that relate directly to the GHG components of the project, (i.e. the CDM Project Design Document, confirmation by the host Party on contribution to sustainable development and written approval of voluntary participation from the designated national authority):

/1/ Revised Monitoring Plan , dated 11th November 2008
/2/ Revised Monitoring Plan, dated 24th September 2009
/3/ Revised Monitoring Plan, dated 15th October 2009

Category 2 Documents (background documents used to check project assumptions and confirm the validity of information given in the Category 1 documents and in validation interviews):

/4/ Registered PDD version 3.12 dated 13th December 2007
/5/ Validation Report, dated 13th December 2007
/6/ AM0009 version 2
/7/ ISO-5168:2005 “Measurement of fluid flow – Procedures for the evaluation of uncertainties”
/8/ Guide to the Expression of uncertainty in measurement, ISO/TAG 4. Published by ISO (1993; improved reprint, 1995)

Annex 1 Summary of Revisions to the PDD Monitoring Plan.

Termination of Pondok Tengah Associated Gas Supply

As described in the registered PDD, associated gas feed the Tambun LPG plant originates from 2 separate oil fields, a permanent associated gas feed from the Tambun oil field and an additional temporary associated gas feed from the Pondok Tengah oil field. At the time of project registration (1 February 2008) , the Pondok Tengah associated gas feed supply was expected to continue until year 3, however the contract terms for this supply allowed for early termination and for reasons out of project control, the contract and associated gas supply has now terminated (01 April 2008). Monitoring of the 6" supply from Pondok Tengah is therefore no longer required since the pipeline has been decommissioned and the measurement device has been removed. Despite these changes, a similar volume of gas is still being supplied so the estimates of total gas flow remain the same as in the original PDD, but all gas is routed through the Tambun pipelines.

Improved Accuracy in LPG and Condensate Product Monitoring.

The LPG and condensate monitoring methodology is described in the registered PDD as using flow meters. The installation of these flow meters was implemented post plant design and construction in an attempt to exactly follow the interpretation of the description 'continuous' measurement required by AM0009 v2 However process conditions at the Tambun LPG Plant involve pressure drop between upstream pressure vessels and the stock tanks which result in gas break-out in the meter flow lines. This results in unacceptable errors in metered flows. These errors were captured within the installed QA/QC system (eg. by comparison with the daily production determined across the calibrated weighbridge). The fall-back approaches have therefore been implemented as per the registered PDD, where calibrated weighbridge data is currently used for determination of mass of LPG and condensates produced. In addition the site has implemented custody transfer methods applying use of calibrated weighbridge and calibrated road tanker data for determination of volumes of LPG and condensates produced. These custody transfers and the weighbridge are subject to government inspection and calibration by the 'Department Metrologi. Uncertainty in these methodologies are as per the weighbridge load cell technology < 1%. The continuous measurement systems currently installed on LPG and condensates remain in place. However for future reporting purposes most accurate data (lowest level of uncertainty) will be used. This revision of the monitoring plan is proposing to revert to the use of the most accurate (lowest level of uncertainty) data using calibrated weighbridge as the primary monitoring methodology for LPG and condensates. In addition cross-checks with continuous flow metered data and calibrated weighbridge / road tanker calibrated volumes for the condensates will be performed.

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