



Validation report form for post-registration changes for CDM project activities
(Version 01.0)

Complete this form in accordance with the "Attachment: Instructions for filling out the validation report form for post-registration changes for CDM project activities" at the end of this form.

VALIDATION REPORT ON POST-REGISTRATION CHANGES (PRCs)

Title and reference number of the project activity	Maesod Wastewater Treatment and Biogas Utilisation Project. 8712
Process track	<input type="checkbox"/> Prior approval <input checked="" type="checkbox"/> Issuance <input type="checkbox"/> Renewal of crediting period
Version number of the validation report on PRCs	01
Completion date of the validation report on PRCs	07/07/2017
Type(s) of PRCs	<input checked="" type="checkbox"/> Temporary deviations from the registered monitoring plan, monitoring methodology or standardized baseline <input type="checkbox"/> Corrections <input type="checkbox"/> Changes to the start date of the crediting period <input type="checkbox"/> Inclusion of a monitoring plan to a registered project activity <input type="checkbox"/> Permanent changes from registered monitoring plan, monitoring methodology or standardized baseline <input type="checkbox"/> Changes to the project design of a registered project activity <input type="checkbox"/> Types of changes specific to afforestation and reforestation project activities
Version number of PDD to which this report applies	Version 03
Project participant(s)	Maesod Biogas Company Limited Swiss Carbon Assets Ltd Swedish Energy Agency
Host Party	Thailand
Sectoral scope(s), selected methodology(ies), and where applicable, selected standardized baseline(s)	1: Energy Industries (renewable / non-renewable sources) 13: Waste handling and disposal AMS-III.H version 16 - Methane recovery in wastewater treatment AMS-I.C version 19 - Thermal energy for the user with or without electricity

	AMS-I.D version 17 - Grid connected renewable electricity generation
Name of DOE	RINA Services
Name, position and signature of the approver of the validation report on PRCs	<p>Laura SEVERINO – Sector Manager Sustainability, Environment & Climate Change</p> 

SECTION A. Executive summary**Objective**

RINA Services S.p.A. (RINA), commissioned by Pure Water Ltd, has performed the validation of post registration changes for the project “Maesod Wastewater Treatment and Biogas Utilisation Project”. The validation is based on the currently valid documentation of the United Nations Framework Convention on Climate Change (UNFCCC) viz. VVS 09 section 9.2.

Scope of Validation

The validation scope encompasses an independent and objective review to validate the proposed post-registration changes in the monitoring plan and project description of registered project activity titled “Maesod Wastewater Treatment and Biogas Utilisation Project”. The validation is based on the submitted MR, registered PDD, the applied monitoring methodology, relevant decisions, clarifications and guidance from the CMP and the EB and any other information and references relevant to the project activity's resulting emission reductions. These documents are reviewed against the requirements of the Kyoto Protocol, the CDM Modalities and Procedures and related rules and guidance.

The scope of any assessment is defined by the underlying legislation, regulation and guidance given by relevant entities or authorities. The core requirements on changes from the project activity as described in the registered project design document is referred from VVS 09 section 9.2.

Validation Process

The project assessment aims at being a risk based approach and is based on the requirements and guidelines provided in the latest version VVS and PS above. 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.

Based on the requirements in the VVS, RINA has applied a rule-based approach for the validation of the project. TÜV SÜD applied requirements in section 9.2 of VVS V09, mutatis mutandis, specific requirements on PRC, to validate the information provided by the project participant.

The information provided by the project participants is assessed by applying the means of validation specified in the “Clean Development Mechanism Validation and Verification Standard” and where appropriate standard auditing techniques. In the absence of specific means of validation specified in the VVS the standard auditing techniques are applied.

Brief Description of the project

The purpose of project activity is to treat the wastewater from the starch factory to generate biogas. The project activity entails the installation of an anaerobic wastewater treatment facility, based on an “Upflow Anaerobic Sludge Blanket” (UASB) system; to complement the existing open lagoon based system. The implementation of the project activity will enable the generation and capture of biogas which will be used for electricity and thermal energy generation. The electricity generated is supplied to the national grid. The thermal energy generated is utilized in the starch drying process and the excess biogas is flared.

SECTION B. Validation team, technical reviewer and approver

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B.1. Validation team member

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)	Involvement in			
						Desk review	On-site inspection	Interview(s)	Validation findings
1.	Team Leader	IR	Menon	Rekha	RINA India Pvt	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

	and Verifier				Ltd				
2.	Technical Expert	IR	Augustus	Cyril	RINA India Pvt Ltd	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

B.2. Technical reviewer and approver of the validation report on PRCs

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)
1.	Technical Reviewer	IR	Liu	Huifeng	RINA China
2.	Approver	IR	Severino	Laura	RINA Central Office

SECTION C. Means of validation**C.1. Desk review**

>> The monitoring report, version 01 of 13/10/2016 and version 02 of 28/02/2017, version 02.1 of 20/06/2017 /02/, the emission reduction calculations provided in the form of a spreadsheet (MBG_2nd ER calculation_v.1 131016.xlsx) version 01 of 13/10/2016 and MBG_2nd ER calculation_v.2 20022017_rev.xlsx, version 02 of 20/02/2017/03/ were assessed as part of the verification. In addition the Project Design Document (PDD) /01/ in particular the baseline estimations and the monitoring plan for the project were reviewed.

C.2. On-site inspection

Duration of on-site inspection: 08/11/2016 to 09/11/2016				
No.	Activity performed on-site	Site location	Date	Team member
1.	During the on-site assessment of the project RINA assessed the implementation and operation of the proposed project activity, the composting facility, reviewed the information flows for generating, aggregating and reporting the monitoring parameters, interviewed key personnel of the plant to confirm the operational and data collection procedures, cross-checked between information provided in the monitoring report and data plant. The values used in the ER calculations were confirmed by means of checking the records provided by the client. Checked the quality control and quality assurance procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters. There were no hindrances or barriers that were faced by the verification team while carrying out the site visits all equipment and processes of the project activity were accessible.	At site	08/11/2016 to 09/11/2016	Rekha Menon Cyril Augustus

C.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Rukwongtrakool	Suwipa	Swiss Carbon Assets Ltd (Project Manager)	08-09/11/2016	1. Project implementation, status , construction and actual operation. 2. Moniotring plan and moniotring parameters for this monitroing period. 3. Emission Redcution calculation. 4. QA/QC procedures 5 .Environmental Impacts	Rekha Menon
2	Udom	Jiravat	Factory Manager (Maesod Biogas plant)			
3	keawloadi	Annapa	QA/QC in-charge(Maesod Biogas plant)			
4	Choapreecha	Pakawat	Biogas plant Manager (Maesod Biogas plant)			

C.4. Clarification requests, corrective action requests and forward action requests raised

Areas of validation findings	No. of CL	No. of CAR	No. of FAR
Compliance with PDD form			
Temporary deviations from the registered monitoring plan, monitoring methodology or standardized baseline	1		
Corrections			
Changes to the start date of the crediting period			

Inclusion of a monitoring plan to a registered project activity			
Permanent changes from registered monitoring plan, monitoring methodology or standardized baseline			
Changes to the project design of a registered project activity			
Types of changes specific to afforestation and reforestation project activities			
Others (please specify)			
Total	1		

SECTION D. Validation findings

D.1. Compliance with PDD form

Means of validation	To check the compliance of the monitoring report with the latest monitoring report form available at UNFCCC
Findings	N/A
Conclusion	The latest version of MR form available at UNFCCC is 05.1 and the same has used by the project proponent in the monitoring report. RINA confirms that the above MR is based on the currently valid MR template /14/ and is completed in accordance with the applicable instruction /15/.

D.2. Temporary deviations from the registered monitoring plan, monitoring methodology or standardized baseline

Means of validation	During the site visit it was noted that the flow meter for measurement of monitoring parameter $Q_{oil,y}$ (Quantity of the thermic fluid from boiler to the process plant) and $FC_{k,y}$ (Quantity of fossil fuel combusted in the thermal oil boiler) were not installed. $Q_{oil,y}$ is used in calculating emission reductions for the thermal component (AMS-I.C) of the project i.e biogas sent to the boiler. Since the same is not monitored, the baseline emission from the thermal component is considered as zero, which was accepted by RINA. Further, to be on conservative side the emission from $FC_{k,y}$ is accounted in project emissions.
Findings	CL 1 During the site visit it was noted that the flow meter for measurement of monitoring parameter $Q_{oil,y}$ (Quantity of the thermic fluid from boiler to the process plant) and $FC_{k,y}$ (Quantity of fossil fuel combusted in the thermal oil boiler) were not installed as discussed in the registered PDD. For more information please refer to Appendix-4 of this report CL1 is closed.
Conclusion	As per the registered PDD: $FC_{k,y}$ (Quantity of fossil fuel type (fuel oil) k combusted in the thermal oil boiler) will be measured using flow meter. As per the MR: $FC_{k,y}$ (Quantity of fossil fuel type (fuel oil) k combusted in the thermal oil boiler) is measured using dipstick. It was checked that the amount of fuel used in the boiler was monitored directly from the tank using dipstick, which is further measured using the tape. The volume measured in m3 is then converted into tonnes using default density value 0.95. The measured values further checked with stock register and the fuel purchase receipts. The same was found to be appropriate and acceptable. $Q_{oil,y}$ is used in calculating emission reductions for the thermal component (AMS-I.C) of the project i.e biogas sent to the boiler. Since the same is not monitored, the baseline emission from the thermal component is considered as zero, which was accepted by RINA. Further, to be on conservative side the emission from $FC_{k,y}$ is accounted in project emissions It is further noted that the deviation is also applied for part of the subsequent monitoring period. Thus, it is confirmed that the deviation is applied for period from 20/12/2014 – 30/11/2017. RINA further confirms that the above mentioned deviation comply with para 272 and Appendix 1 of the CDM project standard for project activities, version 09. Thus, the

	above mentioned deviation doesn't require PRC approval, revision in the PDD and is suitable for approval under the issuance track as per the appendix 1 of CDM PS for project activities, version 09.
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D.3. Corrections

Means of validation	N/A
Findings	N/A
Conclusion	N/A

D.4. Changes to the start date of the crediting period

Means of validation	N/A
Findings	N/A
Conclusion	

D.5. Inclusion of a monitoring plan to a registered project activity

Means of validation	N/A
Findings	N/A
Conclusion	N/A

D.6. Permanent changes from registered monitoring plan, monitoring methodology or standardized baseline

Means of validation	N/A
Findings	N/A
Conclusion	N/A

D.7. Changes to the project design of a registered project activity

Means of validation	N/A
Findings	N/A
Conclusion	N/A

D.8. Types of changes specific to afforestation and reforestation project activities

Means of validation	N/A
Findings	N/A
Conclusion	N/A

SECTION E. Internal quality control

>>The draft final post registration validation report before being submitted to UNFCCC for request of issuance was subjected to an independent internal technical review to confirm that all verification activities had been completed according to the pertinent RINA instructions. The technical review was performed by a technical reviewer(s) qualified in accordance with RINA's qualification scheme for CDM validation and verification.

SECTION F. Validation opinion

>> RINA Services Spa (RINA) has performed a validation of post registration changes for the project activity "Maesod Wastewater Treatment and Biogas Utilisation Project, CDM Registration Reference N° 8712. The validation has based on the information made available to us.

RINA has performed this validation on the basis of the following documents:

- CDM Executive Board: Clean Development Mechanism Project Cycle Procedure, version 09 of 20/02/2015;
- CDM Executive Board: Clean Development Mechanism Project Standard, version 09 of 20/02/2015;
- CDM Executive Board: Clean Development Mechanism Validation and Verification Standard, version 09 of 20/02/2015;
- Approved baseline and monitoring methodology "AMS-III.H", "Methane recovery in waste water treatment system", version 16 of 26/11/2010, "AMS-I.D", "Grid connected renewable electricity

generation “, version 17 of 03/06/2011 and “AMS-I.C”, “Thermal energy production with or without electricity”, version 19 of 03/06/2011.

The DoE confirms that temporary deviation discussed in section D.2 comply with para 272 and Appendix 1 of CDM project standard, version 09. The discussed deviation doesn't require PRC approval, revision in the PDD and is suitable for approval under the issuance track as per the appendix -1 of CDM PS for project activities, version 09. RINA further confirms that the deviation complies with the relevant requirements related to the temporary deviation from the registered monitoring plan and monitoring methodology.

Appendix 1. Abbreviations

Abbreviations	Full texts
BE	Baseline Emissions
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDM M&P	Modalities and Procedures CDM
CER(s)	Certified Emission Reduction(s)
CH ₄	Methane
CL	Clarification Request
CO ₂	Carbon dioxide
CO _{2e}	Carbon dioxide equivalent
CRT	Coordination and Technical Control Staff
DCI	Certification Division of RINA Services Spa
DEDE	Department of Alternative Energy Development and Efficiency
DNA	Designated National Authority
DOE	Designated Operational Entity
EB	Executive Board
ER	Emission Reductions
FAR	Forward Action Request
GHG(s)	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
JMR	Joint Meter Reading
LoA	Letter of Approval
MoV	Means of Verification
MR	Monitoring Report
NGO	Non-governmental Organization
ODA	Official Development Assistance
PDD	Project Design Document
PE	Project Emission
PEA	Provincial Electrical Authority
PP(s)	Project Participant(s)
PPA	Power Purchase Agreement
Ref.	Document Reference
RINA	RINA Services Spa
SS(s)	Sectoral Scope(s)
TA(s)	Technical Area(s)

UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation and Verification Standard

Appendix 2. Competence of team members and technical reviewers

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	Swiss Carbon Assets Ltd	CDM-PDD for project activity “Maesod Wastewater Treatment and Biogas Utilisation Project” in Thailand.	Version 03 of 20/03/2013	PP
2	Swiss Carbon Assets Ltd	Monitoring report for project activity “Maesod Wastewater Treatment and Biogas Utilisation Project” in Thailand.	Version 01 of 13/10/2016 Version 02 of 28/02/2017 Version 02.1 of 20/06/2017	PP
3	Swiss Carbon Assets Ltd	Emission reduction calculations provided in the form of a spreadsheet, (MBG_2nd ER calculation_v.1 131016.xlsx) Emission reduction calculations provided in the form of a spreadsheet, (MBG_2nd ER calculation_v.2 20022017_rev.xlsx)	Version 01 submitted on 13/10/2016 Version 02 submitted on 20/02/2017	PP
4	RINA	Validation report No.12-IQ-MD-56	Rev no 02 of 22/03/2013	Others
5	Epic Sustainability	Verification report No. ESSPL/CDM/019/2014	Version 01 of 17/02/2015	Others
6	CDM Executive Board	Clean Development Mechanism Project Cycle Procedure	Version 09.0 of 20/02/2015	Others
7	CDM Executive Board	Clean Development Mechanism Project Standard CDM project standard for project activities , version 01.0	Version 09.0 of 20/02/2015 Version 01.0 of 03/03/2017	Others
8	CDM Executive	Clean Development Mechanism Validation	Version 09.0 of	Others

	Board	and Verification Standard	20/02/2015	
9	CDM Executive Board	CDM Executive Board: "AMS-III.H", "Methane recovery in waste water treatment". CDM Executive Board: "AMS-I.C", "Thermal energy production with or without electricity". CDM Executive Board: "AMS-I.D", "Grid connected renewable electricity generation".	version 16 of 26/11/2010 version 19 of 03/06/2011 version 17 of 03/06/2011	Others
10	RINA Services SpA:	Stakeholders/Endusers Interview sheet	dated 08/11/2016	RINA
11	Maesod Biogas Company Limited	COD in and out log sheets	From 20/12/2014 to 30/06/2016	PP
12	Maesod Biogas Company Limited	Fossil fuel consumption	For the year 2015	PP
13	Maesod Biogas Company Limited	Starch production data	From 20/12/2014 to 30/06/2016	PP
14	CDM Executive Board	CDM Executive Board: F-CDM-MR	version 05.1 of 04/05/2015	-
15	CDM Executive Board	Guideline – Attachment "Instructions for filling out the monitoring report form".	Version 05.1 of 04/05/2015	-
16	HACH	Portable data logging colorimeter instrument manual	-	PP
17	Endress + Hauser	Technical specifications of Thermal mass flow measuring system	-	PP
18	Gas Data GFM406	Technical specifications of portable gas analyser	-	PP
19	Proline promag	Technical specifications of electromagnetic flow measuring system	-	PP
20	JE Alia Group Inc Advance, Power tech center	GM3: Thermal Mass flow meter (5591) Thermal Mass flow meter (T815T08H801)	07/11/2013 29/07/2015 09/09/2016	PP
21	Endress & Hauser Advance, Power tech center	GM1: Thermal Mass flow meter (D6090202000)	20/10/2014 24/09/2015 09/09/2016	PP
22	Endress & Hauser Advance, Power tech center	GM2: Thermal Mass flow meter (A90A5702000)	20/10/2014 24/09/2015 09/09/2016	PP
23	Inctech Metrological Center Co Ltd (IMC) Advance, Power tech center	FM1: Magnetic flow meter (D6016C20000)	25/10/2014 16/10/2015 09/09/2016	PP
24	PEA	Power meter (206501524)	14/01/2014 14/10/2015	PP
25	Enviscience Company Ltd	Colorimeter (091290C275916)	31/10/2014 14/09/2016	PP
26	Central Bureau of weights and measures	E23308-0017	04/06/2014 28/09/2016	PP

27	Gas Data Ltd UT Precision Co Ltd	Portable methane analyser (11701)	21/11/2014 03/09/2015 20/09/2016	PP
28	Maesod Biogas Company Limited	Volume of waste water flow, biogas sent to boiler, biogas sent to engine and flare	For the period 20/12/2014 to 30/06/2016	PP
29	Provisional Electrical Authority	Joint meter reading	For the period from 01/2015 to 06/2016	PP
30	Maesod Biogas Company Limited	Invoices to PEA	For the period from 01/2015 to 06/2016	PP
31	PEA	Invoices from PEA	For the period from 12/2014 to 06/2016	PP
32	PEA	Calculation detail for VSPP revenue	For the period from 12/2014 to 06/2016	PP
33	Maesod Biogas Company Limited	Log books of fuel oil consumption	For the period from 12/2014 to 06/2016	PP
34	The Bangkok Petroleum Public company Ltd	Fuel purchase receipts	For the period from 12/2014 to 06/2016	PP
35	IPCC	Guidelines for National Greenhouse Gas Inventories, 2006		Others
36	DEDE	Ministry of Energy: Electric power in Thailand for the year 2011	2011	PP
37	Central Bureau of Weights and Measures Gas Data Endress + Hauser EnviScience Co.,Ltd. Under SPC group Inctech Metrological Center Co., Ltd. Alia	http://www.cbwmthai.org/Default.aspx http://www.gasdata.co.uk/the-company/accreditation/ https://www.th.endress.com/en/Endress-Hauser-group/endresshauser-at-a-glance/Thailand http://spcc.spcgroup.co.th/index.php/en/ Inctech Metrological Center Co., Ltd. http://www.alia-inc.com/en/index.asp	Last retrievevd on 15/05/2017 Last retrievevd on 15/05/2017 Last retrievevd on 15/05/2017 Last retrievevd on 15/05/2017 Last retrievevd on 16/05/2017	PP
38	Advance Power- Tech Center Co., Ltd.	Accreditation no. calibration 0254	Submitted on 15/05/2017	PP

Appendix 4. Clarification requests, corrective action requests and forward action requests

Table 1. CL from this validation

CL ID	01	Section no.	D.2	Date:	22/06/2017
Description of CL					
During the site visit it was noted that the flow meter for measurement of monitoring parameter $Q_{oil,y}$ (Quantity of the thermic fluid from boiler to the process plant) and $FC_{k,y}$ (Quantity of fossil fuel combusted in the thermal oil boiler) were not installed as discussed in the registered PDD.					
Project participant response					Date: 07/07/2017
<p>Since the monitoring parameter $Q_{oil,y}$ (Quantity of the thermic fluid from boiler to the process plant) and $FC_{k,y}$ (Quantity of fossil fuel combusted in the thermal oil boiler) were not temporarily unable to monitor in accordance with the registered monitoring plan, a temporary deviation is proposed as per paragraph 272 of the latest version of CDM project standard. These parameters are required for estimation of emission reductions due to thermal component as per AMS.I.C.</p> <p>In line with Appendix 1 of the latest version of CDM project standard, as the parameter $Q_{oil,y}$ was not monitored, the baseline emissions from thermal component have been taken as zero. Furthermore, for the conservativeness the project emissions from fossil fuel consumption were estimated and more detail about recording can be found in section D.2. Since it is expected that the flow meters will be installed by end of November 2017, this deviation is applied for the period from 20/12/2014 – 30/11/2017.</p>					
Documentation provided by project participant					
<i>Revised MR</i>					
DOE assessment					Date: 07/07/2017
<p>As per the registered PDD: $FC_{k,y}$ (Quantity of fossil fuel type (fuel oil) k combusted in the thermal oil boiler) will be measured using flow meter.</p> <p>As per the MR: $FC_{k,y}$ (Quantity of fossil fuel type (fuel oil) k combusted in the thermal oil boiler) is measured using dipstick. It was checked that the amount of fuel used in the boiler was monitored directly from the tank using dipstick, which is further measured using the tape. The volume measured in m3 is then converted into tonnes using default density value 0.95. The measured values further checked with stock register and the fuel purchase receipts. The same was found to be appropriate and acceptable.</p> <p>$Q_{oil,y}$ is used in calculating emission reductions for the thermal component (AMS-I.C)of the project i.e biogas sent to the boiler. Since the same is not monitored, the baseline emission from the thermal component is considered as zero, which was accepted by RINA. Further, to be on conservative side the emission from $FC_{k,y}$ is accounted in project emissions</p> <p>It is further noted that the deviation is also applied for part of the subsequent monitoring period. Thus, it is confirmed that the deviation is applied for period from 20/12/2014 – 30/11/2017.</p> <p>RINA further confirms that the above mentioned deviation comply with para 272 and Appendix 1 of the CDM project standard for project activities, version 09. Thus, the above mentioned deviation doesn't require PRC approval, revision in the PDD and is suitable for approval under the issuance track as per the appendix 1 of CDM PS for project activities, version 09.</p>					

Table 2. CAR from this validation

CAR ID	N/A	Section no.		Date:	DD/MM/YYYY
Description of CAR					
Project participant response					Date: DD/MM/YYYY
Documentation provided by project participant					

DOE assessment	Date: DD/MM/YYYY
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Table 3. FAR from this validation

FAR ID	N/A	Section no.		Date: DD/MM/YYYY
Description of FAR				
Project participant response				Date: DD/MM/YYYY
Documentation provided by project participant				
DOE assessment				Date: DD/MM/YYYY

Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
01.0	23 March 2015	Initial publication.
Decision Class: Regulatory		
Document Type: Form		
Business Function: Registration		
Keywords: post-registration change, project activities, validation report		