CDM: Recommendation Form for Small Scale Methodologies (version 01)

(To be used for presenting questions/proposals/amendments to the simplified methodologies for small-scale CDM project activity categories)

Date of SSC WG meeting:	26–29 April 2010, SSC WG 25
Title/Subject (give a small title or specify the subject of your submission, maximum 200 characters):	Revision of the definition of anaerobic lagoons in AMS-III.H
Indicative methodology to which your submission relates (refer the items of Appendix B of the Simplified Modalities and Procedures), if applicable.	AMS-III.H, ver. 13[1] "Methane recovery in wastewater treatment"
Name of the authors of the query:	Patrick Bürgi Institution: South Pole Carbon Asset Management, Ltd. p.buergi@southpolecarbon.com, s.tison@southpolecarbon.com

Summary of the query:

Please use the space below to summarize the query related to SSC methodologies/categories SSC Modalities and Procedures provide recommendation/analysis of the SSC WG.

Original text from PP:

The need for a revision of AMS.III.H came up during several validations of wastewater treatment projects, replacing open anaerobic lagoons with a biodigester.

In AMS.III.H version 13, it is specified in the footnote 1 of paragraph 1 that: "Anaerobic lagoons are considered ponds deeper than 2 meters, without aeration, ambient temperature above 15°C, at least during part of the year, on a monthly average basis, and with a volumetric loading rate of Chemical Oxygen Demand above 0.1kg.m-3.d-1."

This footnote was introduced in version 10 of AMS.III.H following a request for clarification[2]. The aim of the revision was to be consistent with AMS.III.I methodology in considering the ambient temperature and residence time in anaerobic wastewater treatment systems in the baseline scenario to establish that the baseline conditions were conducive for methane formation. This applicability condition first appeared in AMS.III.I version 3, to replace the previous condition of the residence time of more than one year, which was unrealistic for a small lagoon[3].

Project proponents would like to revise the section referring to the COD volumetric loading rate of the footnote text provided above in order to (i) eliminate barriers related to the actual application of this condition, (ii) avoid inconsistency with IPCC guidelines, which are the foundation of AMS.III.H; and (iii) ensure conformity between methodologies AMS.III.H and ACM0014.

i) Barriers in applying the footnote

The calculation of the volumetric COD loading rate for the baseline lagoons is problematic and very

[1] AMS.III.H Version 14 has been adopted in EB53 just 2 days prior to the submission of this request. Since the word version of AMS.III.H Version 14 is not available yet, the request has been made on the basis of Version 13. It can be easily applied to Version 14 since the changes adopted at EB53 do not have an impact on the proposed revision.

[2] SSC_165 : http://cdm.unfccc.int/UserManagement/FileStorage/AM_CLAR_9A5BUXK0BZ42WSNVHQ8VMDONR595SM

[3] SSC_042: http://cdm.unfccc.int/UserManagement/FileStorage/AM_CLAR_5VVTZ4TDQNG42KGEZJGYIM8RAHMVX4

difficult to apply in practice, which creates barriers for the application of AMS.III.H. The challenge in determining the COD volumetric loading rate of lagoon systems can be described as follows:

a. Lagoon systems consist of several lagoons with different dimensions (area and depth);

b. Calculating the loading rate for a lagoon system requires historical information about the COD concentration and the volume of the wastewater entering each individual lagoon;

c. COD load into a lagoon can fluctuate a lot throughout the year depending on the process leading to wastewater generation;

d. The COD concentration in the lagoon system can be significantly altered through dilution with rain water, during rainy periods for example;

e. Other factors such as the actual water level in a specific lagoon or the depth of the sedimentation layer at the bottom of the lagoon will also vary over time.

As a consequence, defining the volumetric COD loading rate of a lagoon system poses a serious challenge for development and validation of AMS.III.H projects. Even though it is not explicitly described in AMS.III.H, a proper determination of the volumetric load rate would require:

a. Historical COD measurements at every single lagoon over a period of time, which could be a year or more (in order to ensure a representative figure over a period covering significant changes in climate patterns or typical process-related variations in COD concentration at the wastewater source for example).

b. Historical measurements of the volume of the lagoons based on the actual depth of the lagoons and the level of wastewater within the lagoons for a certain period of time.

Such an approach would be too complex and proves not to be feasible in practice, especially in the context of small-scale CDM projects.

ii) Inconsistency with IPCC guidelines

The requirement of a minimum volumetric COD loading rate is inconsistent with IPCC guidelines, especially for deep lagoons, since the volumetric COD loading rate is inversely proportional to the volume of the lagoon (and thereby to the depth of the lagoon as well). Indeed, it shall be noted that methane emissions calculations in AMS.III.H are based on the 2006 *IPCC Guidelines for National Greenhouse Gas Inventories, Volume 5: Waste, Chapter 6: Wastewater treatment and Discharge*[4]. In the IPCC approach, the depth of the lagoon and the ambient temperature are the only critical factors that influence the COD to methane conversion, which is taken into account in the selection of the Methane Conversion Factor (MCF) as described in Table 6.3 of the above-mentioned chapter. The IPCC guidelines make a distinction between shallow anaerobic lagoons (with a depth of less than 2m) and deep anaerobic lagoons (with a depth of more than 2m), whereas the ability to convert organic matter (determined by the COD load in the lagoon) to methane is much lower for shallow lagoons (MCF of 0.2) than for deep lagoons (MCF of 0.8). The volumetric COD loading rate within the lagoon system is not taken into consideration by the IPCC model, which leads to inconsistencies between the applicability condition specified in the footnote and the basic assumptions behind the IPCC-derived calculation model for methane emissions from lagoon systems in AMS.III.H.

iii) Alignment of AMS.III.H and ACM0014

In addition to the arguments provided above, it is important to highlight that the applicability condition of a minimum COD volumetric loading rate is not consistent with the large scale ACM0014 methodology, which requires that:

- the "average depth of the open lagoons or sludge pits in the baseline scenario is at least 1m", and

[4] Up to version 9 of AMS.III.H, the methodology was very consistent with IPCC guidelines. Subsequent changes from version 10 onwards have modified the original approach by, among other changes, introducing additional applicability conditions in the form of the footnote addressed in this request for revision.

- "the residence time of the organic matter in the open lagoon system should be at least 30 days"

Even though the calculation model under ACM0014 follows a slightly different, more elaborated approach than AMS.III.H - taking the actual ambient temperature over the year into account - the MCF calculation method of ACM0014 clearly mentions that the quantity of methane generated from COD flowing into the open lagoons depends mainly on the temperature and the depth of the lagoon. Accordingly, the methane conversion factor is calculated based on a factor fd, expressing the influence of the depth of the lagoon (70% for depth higher than 5m, 50% for depth between 1 and 5m, 0% for depth lower than 1m) and a factor ft, expressing the influence of the temperature on the methane generation. Hence, the ACM0014 approach is aligned with the principles of the IPCC model described above and does also not include any requirement of a minimum volumetric loading rate.

Proposed revision to AMS.III.H Version 13

Project proponents would argue that the approach used up to AMS.III.H Version 9, which was fully consistent with the IPCC model, represents the best approach in terms of its practical viability - simple applicability conditions and calculation model based only on the lagoon depth and without the need for historical data to determine the lagoon efficiency, COD volumetric loading rate or residence time of organic matter in the lagoons. However, given the development of AMS.III.H after Version 9, efforts by the SSC Working Group (and the Meth Panel) to harmonize CDM methodologies and, last but not least all explanations provided above, project proponents suggest a simple revision of the footnote 1 along the lines of ACM0014.

Such a revision would change the definition of anaerobic lagoons by replacing the condition related to the volumetric COD loading rate with one based on residence time of organic matter in the open lagoons.

The revised footnote would read as follows:

"Anaerobic lagoons are considered ponds deeper than 2 meters, without aeration and ambient temperature above 15°C, at least during part of the year, on a monthly average basis. Residence time of the organic matter in the open lagoon system should be at least 30 days, whereas in case of an existing open lagoon in the baseline scenario the residence time of the organic matter in the lagoon should be verified based on historical data available."

The proposed revision is in line with IPCC guidelines and based on an approved large-scale CDM methodology without any negative impacts on the conservativeness of AMS.III.H. Furthermore, the proposed revision avoids barriers in the application of the methodology since the calculation of the residence time of organic matter in the lagoon system can be calculated based on the design volume of the lagoons divided by the average wastewater flow rate entering the lagoons (in m3 per time unit), which is easier to determine than the COD volumetric loading rate.

Recommendation by the SSC WG:

Please use the space below to provide amendments/change (in your expert view, if necessary).

Please refer to paragraph 15 of the meeting report of the SSC WG 25 (http://cdm.unfccc.int/Panels/ssc_wg).

Answer to authors of query by the SSC WG:

Please use the space below to provide answer to the authors of the above query.

The small-scale working group of the CDM Executive Board would like to thank the author for the submission.

The SSC WG agreed to exclude the reference to the minimum volumetric loading rate of COD ($0.1 kg.m^{-3}.d^{-1}$) in the definition of anaerobic lagoon to be consistent with the approach of 2006 IPCC Guidelines.

The SSC WG agreed to further clarify that lagoon depth can be determined either from the engineering design documents of the lagoon, or through direct measurement, or by dividing the designed total volume

by the measured surface area. In case of systems consisting of multiple lagoons, the weighted average value of the depths of the lagoons may be taken according to their relative volume. The SSC WG agreed to include these issues when recommending a revision to AMS-III.H.
Signed by the Chair, Mr. Peer Stiansen Date: 29/04/2010 Signed by the Vice-Chair, Mr. Hugh Sealy Date: 29/04/2010

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