CORRECTIONS AND CLARIFICATIONS TO *AM0073 GHG EMISSION REDUCTIONS THROUGH MULTI-SITE MANURE COLLECTION AND TREATMENT IN A CENTRAL PLANT*

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This document provides corrections and clarifications applicable to *AM0073: GHG emission reductions through multi-site manure collection and treatment in a central plant, v1.0* when used by a project in Verra's Verified Carbon Standard (VCS) Program. It introduces a new clarification and consolidates the previous corrections and clarifications issued on 11 April 2023 and 15 January 2024. Such corrections and clarifications are effective from the dates provided in the table below. Project proponents and validation/verification bodies (VVBs) shall apply and interpret *AM0073, v1.0*, consistent with the corrections and clarifications set out in this document.

Correction/ Clarification	Description	Document and Section Reference	Effective Date
Correction 1	Measurement and monitoring procedures for average weight of manure	*AM0073, v1.0*, Data and parameters monitored	Effective from 15 January 2024, including to all project requests in the Verra project review process at that date
Correction 2	Error in Equation 3 to calculate $PE_{AD,y}$	*AM0073, v1.0*, Project emissions	Effective from 11 April 2023
Clarification 1	Determination of manure and volatile solids in a consistent dry basis in Equation 21 and Annex 2	*AM0073, v1.0*, Baseline emissions	Effective from 15 January 2024, including to all project requests in the Verra project review process at that date
Clarification 2	Use of other factors in Equation 3 to calculate $PE_{AD,y}$	*AM0073, v1.0*, Project emissions	Effective from 11 April 2023

Clarification 3	References to the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* are replaced by the latest version of the *IPCC Guidelines for National Greenhouse Gas Inventories*	All relevant sections of *AM0073, v1.0*	Effective from 18 July 2024, including to all project requests currently in the Verra project review process

CORRECTION 1

Correction:

Under section III. MONITORING METHODOLOGY, the table with the description of the parameter $W_{manure,LT}$ should read:

Data / parameter	$W_{manure,LT}$
Data unit	kg/animal/day – dry basis
Description	Average manure weight excreted by a defined population
Source of data	Project proponents
Measurement procedures (if any)	Direct measurement or through representative sample of each population (90/10 precision). Weight of manure, or manure volume measured together with the density. The quantity of animal manure and number of animals from different farms and different animal types must be recorded separately. Archive electronically during project plus 5 years
Monitoring frequency	~~Daily~~ At least annually, based on direct measurement or representative sampling
QA/QC procedures	---
Any comment	The PDD should describe the system on monitoring the weight of manure Excreted

Background:

The parameter is an average value and can be determined at different frequencies in weight or volume, depending on the characteristics of the manure and practice in the farms, as long as the resulting average value is representative.

CORRECTION 2

Correction:

Equation 3 should read as:

$$PE_{AD,y} = GWP_{CH_4} \times \rho_{CH_4,n} \times \frac{LF_{AD}}{(1 - LF_{AD})} \times 10^{-3} \times \sum_{h=1}^{8760} (FV_{RG,h} \times fv_{CH_4,RG,h})$$

Background:

Equation 3 calculates methane emissions based on the volume of methane captured, its density, and a leakage factor. A factor of 10^{-3} was included for the conversion of units of the density of the methane if expressed in kg/m³. However, the density of methane ($\rho_{CH_4,n}$) is already expressed as 6.7×10^{-4} t/m³ and not kg/m³.

CLARIFICATION 1

Clarification:

The parameter **$W_{manure, LT}$** in equation 21 must be determined on a dry basis:

$W_{manure, LT}$ = Average manure weight excreted by a defined population at the project site in kg/animal/day - dry basis

Given the parameter is generally measured in a wet basis, the Moisture Content or the Total Solids in the wet manure must be determined in a laboratory test as part of the determination of the **$VS_{manure, LT}$**.

The Total Solids (TS) relative to the wet manure must be used to convert the **$W_{manure, LT}$** to a dry basis before applying equation 21.

$$W_{manure,LT[dry]} = W_{manure,LT[wet]} \times TS$$

Where:

$$TS = \frac{Dry\ weight}{Wet\ weight}$$

Example from USDA-Agricultural Waste Management Field Handbook (2008), Chapter 4 *(pp.4-6).*

A laboratory sample of manure weighing 200 grams is oven dried. After oven drying, the sample weighs 50 grams.

$$Total\ Solids = \frac{50}{200} = 0.25$$

$$Moisture = \frac{200 - 50}{200} = 0.75 = 1 - TS$$

Alternatively, default values for moisture content in manure as excreted may be used from Tables 4-5 a), 4-8 a), 4-10 a) and 4-11 a) from *USDA-Agricultural Waste Management Field Handbook* (2008), Chapter 4 (pag.4-13 to 4-19).

The VVB must assess the validity of the laboratory tests by reviewing the data logs and comparing the results with similar projects in the region (if any) and the default values as stated above. Any significant difference must be properly justified.

Background:

The methodology does not state if the parameter $W_{manure, LT}$ is determined on a dry or wet basis. To be technically correct, $W_{manure, LT}$ and $VS_{manure, LT}$ must be consistent with each other (both must refer to dry manure or to wet manure). Since Annex 2 already determines VS on a dry basis W_{manure} must also be on a dry basis.

Furthermore, Total Solids, Volatile Solids, Fixed Solids and Moisture Content are the characteristics of the manure and mathematically related. Therefore, the laboratory test ensures consistency among them.

CLARIFICATION 2

Clarification:

The use of 0.15 is not mandatory and a lower value may be used, if properly justified through documented evidence which should be validated/verified by the VVB.

For example, *CDM TOOL 14 – Project and leakage emissions from anaerobic digesters* and *2019 Refinement to the 2006 IPCC Guidelines for National GHG Inventories* contain reference values for this parameter.

Background:

The section "Project emissions" on page 9 of *AM0073, v1.0* includes the following paragraph:

Ex ante leakage to be reported in the CDM-PDD will be estimated using equation 3 or 4 below, with a leakage factor of 0.15 or a lower value, if properly justified through documented evidence (which should be validated by the DOE).

However, the methodology uses a fixed leakage factor LF_{AD} of 15% on page 10:

LF_{AD} = Methane leakage from anaerobic digesters/reactor, default of 0.15

CLARIFICATION 3

Clarification:

All references in the methodology to the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* must be replaced by the latest version of the *IPCC Guidelines for National Greenhouse Gas Inventories* or any refinements or amendments to it.

In Annex 5 of *AM0073 v1.0*, Table 10.17 from the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* must be replaced by the data in the latest version of the *IPCC Guidelines for National Greenhouse Gas Inventories*.

Background:

In accordance with the *VCS Standard, v4.7*, which states that "*where external documents are referenced (e.g.,* The 2019 Refinement to the 2006 IPCC Guidelines for National GHG Inventories*), and when such documents are updated, the most recent version of the document shall be used.*"