CARBON CAPTURE AND STORAGE TOOL DIFFERENTIATING REDUCTIONS AND REMOVALS IN CCS PROJECTS ASSESSMENT REPORT

Document Prepared by Aster Global Environmental Solutions Inc.

Tool Title	Differentiating Reductions and Removals in CCS Projects
Version	1.0
Methodology Category	Module
Sectoral Scope(s)	16 Carbon Capture and Storage
Report Title	Tool VT0013 Differentiating Reductions and Removals in CCS Projects Assessment Report

Report Version	1.0
Client	Perspectives Climate Group
Pages	29
Date of Issue	10 October 2025
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Summary

Aster Global Environmental Solutions, Inc., (Aster Global) was commissioned by the Perspectives Climate Group to perform the methodology assessment of the new methodology tool *VT0013 Differentiating Reductions and Removals in CCS Projects* and associated modules and tools in accordance with the VCS Methodology Development and Review Process, VCS Program Guide, VCS Standard, VCS Methodology Requirements, and VCS Program Definitions. A carbon offset project will be able to use the methodology combined with applicable capture, transport, and storage modules for a project using this modular approach. This report documents the assessment of *VT0013 Differentiating Reductions and Removals in CCS Projects*, which is the tool to be incorporated with *VM0049 Carbon Capture and Storage*. This tool establishes principles and provides procedures for differentiating baseline emissions and allocating project and leakage emissions among activities that result in reductions and removals.

The purpose and scope of this methodology tool assessment was to evaluate whether the methodology tool document was prepared in conformance with the VCS program requirements. Aster Global's tool assessment included a detailed review of adherence to the VCS requirements and adherence to the principles of the VCS rules and requirements (relevance, completeness, consistency, accuracy, transparency, and conservativeness). Aster Global's assessment also included a detailed analysis of the methodology tool, supporting calculations, Verra technical reviews, and responses to all non-conformance reports (NCRs), clarifications (CLs), and opportunities for improvement (OFIs) based on the VCS rules and requirements.

The methodology tool was listed for public stakeholder consultation from 1 March to 15 April 2024. The assessment team identified 13 findings related to the tool's adherence to the VCS program requirements. All were addressed satisfactorily in line with the VCS program requirements. These NCRs, CLs, and OFIs provided necessary clarity to ensure the methodology complied with the VCS rules and requirements.

As detailed in v4.4 of The Methodology Development and Review Process document a methodology tool assessment must, at a minimum, cover the following fifteen categories; Relationship to approved or pending methodologies, Stakeholder consultation, Structure and clarity of methodology, Definitions, Applicability conditions, Project boundary, Baseline scenario, Additionality, Baseline emissions, Project emissions, Leakage emissions, Estimated GHG emission reductions and removals, Monitoring, data and parameters, Uncertainty, and Verifiability. The scope of this tool assessment covered only these categories: Project emissions and Leakage emissions.

Aster Global confirms all tool assessment activities, including objectives, scope and criteria, level of assurance and the tool's adherence to the VCS Program, as documented in this report, are complete. Aster Global concludes without any qualifications or limiting conditions that *VT0013 Differentiating Reductions and Removals in CCS Projects* meets the requirements of the VCS Program. Aster Global recommends that Verra approve the methodology module.

CONTENTS

1 INTRODUCTION

1.1 Objective

This methodology tool assessment (hereinafter referred as tool assessment) was performed to evaluate the likelihood that implementation of the tool would result in accurate calculations and appropriate eligibility criteria for GHG emission reductions/removals (ISO 14064-3:2019). This assessment evaluates the first tool in the framework that will include Verra's methodology - Carbon Capture and Storage (VM0049), this tool, 13 other modules, another tool and another methodology. The VM0049 methodology provides the framework for carbon capture and storage projects. This report documents the assessment of *VT0013 Differentiating Reductions and Removals in CCS Projects.*

This report summarizes the findings of the tool assessment of the Verified Carbon Standard (VCS) methodology development and review process. The Perspectives Climate Group, referred to as the "methodology developer", commissioned Aster Global Environmental Solutions, Inc. (Aster Global), referred to as the "assessment team," to perform the tool assessment of *VT0013 Differentiating Reductions and Removals in CCS Projects* hereafter referred to simply as the Reductions/removals tool.

This report presents the findings of a qualified methodology/module/tool assessment team of auditors and experts in methodologies for GHG emissions, who have assessed the tool under the applicable rules of the VCS Program. Section 2 below presents the tool assessment approach, Section 3 below summarizes the tool assessment process and conclusions, Appendix A lists the documents reviewed during the assessment. Appendix B provides details and resolutions of all individual findings from the tool assessment process.

1.2 Summary Description of the Methodology Tool

The VM0049 methodology establishes framework, criteria, and procedures to quantify the greenhouse gas (GHG) emission reductions and carbon dioxide (CO_2) removals from Carbon Capture and Storage (CCS) projects.

This tool calculates GHG emission reductions ("reductions") and carbon dioxide removals ("removals") procedures and requirements to allocate project emissions and leakage emissions for projects eligible under the most recent version of VCS methodology *VM0049 Carbon Capture and Storage* where project activities using mixed feedstocks eligible under the most recent version of VCS methodology VM0049 Carbon Capture and Storage and associated modules.

The procedures and calculations in this tool, together with those calculated in the modules, are used in VM0049 to calculate the net CO_2 reductions/removals from a carbon capture and storage project.

2 ASSESSMENT APPROACH

2.1 Method and Criteria

This tool assessment is based on standard auditing techniques in line with Verra requirements to assess the correctness of the information provided. In accordance with the VCS rules, the assessment encompasses project emissions, leakage emissions, and data and parameters to be monitored.

The Verra documents used to assess the Methodology were:

- Program Guide (v4.4, 29 August 2023)
- Program Definitions (v4.5, 16 April 2024)
- Methodology Requirements (v4.4, 4 October 2023)
- Methodology Development and Review Process (v4.4, 16 April 2024)
- Methodology Template (v4.3, 29 August 2023)
- Module Template (v4.1 20 January 2022)
- Methodology Assessment Report Template (v4.2, 29 August 2023)
- Standard (v4.5, 4 October 2023, v4.6, 21 March 2024, v4.7, 16 April 2024)

2.2 Document Review

Documents provided and reviewed are listed in Appendix A.

2.3 Interviews

Interviews were conducted online using Microsoft Teams via typical channels, including the opening meeting, methodology walkthrough, meetings to discuss reviews and findings, in addition to email exchanges, phone calls, and the closing meeting. Details and attendees of each meeting are included below:

Opening Meeting	**13 December 2024**

Methodology Assessment Team Barbara Toole O'Neil Drake Fisher	Methodology Development Team Paulien Veen Jordan Kummerfield Ian Kuwahara
Meetings – Reviews and Issues	**19 December 2024** **23 January 2025** **3,7,14 February 2025** **10,11 March 2025**
Methodology Assessment Team Barbara Toole O'Neil Drake Fisher	Verra Methodology Development Team Jordan Kummerfield
Meetings – Reviews and Issues	**17 March 2025**
Methodology Assessment Team Barbara Toole O'Neil Drake Fisher	Verra Methodology Development Team Ian Kuwahara Jordan Kummerfield

2.4 Assessment Team

The names, roles, and summary of qualifications/expertise/experience relevant to the methodology assessment team follow:

Name	Role	Summary of qualifications, expertise, relevant methodology experience
Barbara Toole O'Neil, MS ChemE, QEP	Lead Assessor/Approved Standards Methods Expert	Since 2010 she has completed assessments of 14 new methodologies. Her work responsibilities have addressed a wide range of environmental issues from preparing inventories or offset project documents to assessing methodologies submitted to the Verified Carbon Standard (VCS) (forestry to energy efficiency); , validating/ verifying inventories and carbon offset projects, corporate social responsibility auditing, developing governance for sustainability non-profits, to writing a social standard to assess the impact of environmental projects (carbon, water, forestry, agriculture) on the quality of life for women in emerging third world countries She has the following accreditations: ICAO Certified CORSIA Verifier, Accredited Lead Verifier for California Air Resources Board under the mandatory reporting rule (H-21-133), Accredited Lead Verifier for California Air Resources Board under the Compliance Offset program, Ozone Depleting Substances (ODS) offset project specialist and livestock project specialist (H2- 19-198), Verra (VCS) Approved Standardized Methods Expert, ANAB Assessor for 1SO-14064.

		Prior to her focus on climate services, Ms. Toole O'Neil was an experienced engineer and research manager focused on energy, air quality and environmental issues. She has worked as a process engineer, research manager, regulatory inspector, and consultant. The work includes pre- and post-combustion research for fossil-powered generation focusing on fuel, fuel quality and fuel upgrades while with EPRI. At EPA, she was an accredited enforcement inspector in Air Division of EPA Region 9 focusing on power generation, and the cement industry. She is a published fuels and combustion expert and has over 120 publications including a book on combustion research to control emissions of criteria and air toxic pollutants. In addition to Aster Global work, she is currently a member of the Hearing Board of the Bay Area Air Quality Management District.
Drake Fisher, BS Mech Eng.	Assessment Team Member	Drake Fisher, has worked on verifications and validations across multiple sectoral scopes for VCS, ACR, CAR, GHG Protocol, and the Canadian GHG Reporting Program (Sask & BC). Drake has consulted on the development of two VCS Methodologies and is now part of the methodology assessment team for this VCS methodology. Prior to working at Aster Global he worked for six years as a new product development engineer for Stanley Black & Decker, and Pentair Inc. This work included overseeing a small design team, conducting Finite Element Analysis for part stress/airflow optimization, and reviewing manufacturing processes to ensure that parts and assemblies met all design criteria. Relevant course work from The Johns Hopkins University Mechanical Engineering degree includes Fluid Mechanics, Heat Transfer, Design and Analysis of Dynamic Systems, Mechanics Based Design, and Electronics & Instrumentation.
Janice McMahon. MS Env Science	QA/QC / President	Janice McMahon has been conducting third-party validations and verification since 2007 and has been responsible for and oversees the accredited VVB activity under ANAB for her previous employer and Aster Global for the past 14 years. Janice has been the Lead Verifier on over 85 organizational-level GHG inventory verifications focusing on the energy sector in Canada (BC and TCR) and has provided technical review or QA/QC on 100+AFOLU offset projects and methodology assessments for VCS, CCB, CAR, ACR, ARB and NFS. Janice holds multiple accreditations including : ICAO Certified CORSIA Verifier, ISO 14064 Series Class Certifications, and Certified Wildlife Biologist. As

		President, Janice is responsible for leading Aster Global teams on Validation/Verification and auditing projects all around the world.

2.5 Resolution of Findings

The process of the module assessment involved formal rounds of evaluation called findings by the assessment team followed by additional clarifications and resulted in a methodology version in conformance with VCS rules. Findings related to corrective actions requests and clarifications were resolved during communication between the assessment team and the methodology/module development team. More specifically, where noted by the assessment team, the methodology development team implemented corrective actions by amending methodology text and requirements and providing written clarification responses. Types of findings were characterized in the following manner:

Non-Conformance Reports (NCRs) were issued as a response to material discrepancies in a part of the methodology and generally fell into one of the following categories:

- Non-conformance to a VCS guiding document listed in Section 2.1 above
- Lack of clarity in calculations.
- Additional information was required by the assessment team in order to confirm reasonable assurance for compliance

Clarifications (CL) were issued when language within the methodology needed extra clarification to avoid ambiguity/confusion for the reader.

Opportunities for Improvement (OFI) were issued to the methodology developer when an opportunity for improvement was identified but was not required to be addressed to confirm to VCS rules.

During the course of the tool assessment 13 findings (NCRs, CLs, and OFIs) related to the module's adherence to the VCS program requirements were identified. Of those, Aster Global ensured *reasonable* assurance was achieved to close all findings. Throughout the module assessment, all NCRs/CLs were satisfactorily addressed to the standards and requirements of Aster Global and/or VCS. The NCRs/CLs provided necessary clarity to ensure the module complied with the requirements of VCS. Detailed summaries of each finding, including the issue raised, responses and final conclusions are provided in Appendix B.

3 ASSESSMENT FINDINGS

The tool was found to be in conformance with the principles set out in the VCS Methodology Development and Review Process, the VCS Standard and other VCS rules and requirements. The tool provides the procedures and requirements to allocate project emissions and leakage emissions for projects eligible under the most recent version of VCS methodology *VM0049 Carbon Capture and Storage* where non-VCS CO_2 flows through the project boundary. A specific carbon offset project will be able to use this tool combined with VMD0059 and applicable capture, transport, and storage modules for a project using this modular approach. The tool assessment addressed specific issues, which are pertinent to the above-mentioned principles set forth by the VCS Standard.

3.1 Relationship to Approved or Pending Methodologies

This is a methodology module and not a separate methodology. This section was completed in the assessment report for the assessment of VM0049 and is not repeated here.

3.2 Stakeholder Comments

The tool was listed for public stakeholder consultation from 1 March 2024 to 15 April 2024. Verra evaluated the public comments separately. The review of stakeholder comments was not part of the assessment.

3.3 Structure and Clarity of Methodology

Through the development and review process, the assessment team ensured the tool was written in a clear, logical, concise, and precise manner in accordance with the Methodology Development and Review Process using the current version of the Verra template.

Verra decided to use a new unpublished version of the methodology template for this tool. The majority of the sections are the same as the previous template that the assessment team used during the assessment.

The terminology used in the methodology tool is consistent with that used in the VCS Program, and GHG accounting generally. The assessment team issued Findings related to equations and calculations. All Findings were resolved to ensure the equations were consistent, appropriate and correct.

The criteria and procedures are written in a manner that can be understood and applied readily and consistently by project proponents. The criteria and procedures are written in a manner that allows the calculations to be audited. Several findings were issued to ensure the module can be consistently and robustly applied with the VMD0059 and VM0049 and other proposed modules.

Overall, it is the Assessment Team's opinion that the structure of the module document meets the methodological requirements of the VCS Program.

3.4 Definitions

In addition to the definitions set out in the VCS Program Definitions v4.5 and VM0049, two additional terms were defined in the tool. These key terms defined i were presented clearly and appropriately in the definitions sections at the beginning of the documents by the methodology developers for ease of use. The assessment process ensured definitions of key terms are presented concisely and can assist the reader in comprehension for effective implementation of the methodology and modules. The definitions section only includes key terms used in the module, and not those key terms relevant to the methodology. The definitions section also does not include any terms defined in the Program Definitions v4.5.

3.5 Applicability Conditions

During the assessment process, the assessment team ensured the applicability conditions were appropriate for the activities targeted by the tool. Quantification procedures required by the tool adequately target the relevant applicability conditions. The applicability conditions appropriately specify relevant requirements to bioenergy projects. The methodology assessment team determined the applicability conditions contained within the tool are appropriate, adequate and in compliance with the VCS Program.

Further, the assessment team determined the applicability conditions provide sufficient clarity to projects determining if their activities are or are not eligible under this tool.

In general, this tool combined with the VMD0059 and VM0049 methodology is applicable to project activities that capture CO_2 from bioenergy. Other modules ensure that the CO_2 is captured and transported safely to be stored permanently in geological storage complexes using the appropriate modules. An assessment of the specific applicability condition is below:

Applicability Condition	Assessment
1. This tool is applicable to project activities eligible under the most recent version of VM0049 that capture, transport, or store mixed streams of CO2 eligible to generate reductions and removals.	This applicability provides clarity for the types of project activities that are applicable. The applicability condition is written in a clear and concise manner, ensuring a project adheres to the condition and that conformance can be demonstrated at the time of project validation.

3.6 Project Boundary

The VCS Standard requires that the methodology or module establish criteria and procedures for describing the project boundary and identifying the sources, sinks, and reservoirs relevant to the baseline and project scenarios. The boundary and equipment are described in in VM0049 and associated modules.

3.7 Baseline Scenario

No additional assessment of the methodology baseline scenario was completed for this tool assessment.

3.8 Additionality

Additionality is determined using VM0049 and appropriate Verra or CDM Tools. Additionality is not part of the methodology module assessment.

3.9 Quantification of GHG Emission Reductions and Carbon Dioxide Removals

3.9.1 Baseline Emissions

The tool is not applicable to estimate the baseline emissions.

3.9.2 Project Emissions

The tool is not applicable to estimate the baseline emissions.

3.9.3 Leakage Emissions

The tool is not applicable to estimate the baseline emissions.

3.9.4 GHG Emission Reductions and Carbon Dioxide Removals

The standard equation for GHG emissions reductions or CO_2 removals is provided in VM0049, Section 8.4. Section 5 of this tool outlines the procedure for determining the separation of captured CO_2 into reductions and removals and allocating project and leakage emissions to each.

3.9.5 Uncertainty

The assessment of uncertainty was completed by Verra and is not part of this assessment.

3.10 Monitoring, Data and Parameters

The following are data, parameters and procedures that will be monitored during the monitoring period.

Data/Parameter	Assessment Team Findings
$QCO2,c,y$	Total carbon dioxide captured by capture facility c in year y.
$m_{sb,b,c,y}$	Mass of sustainable biomass type b, on a dry basis, generating emissions captured by capture facility c in year y
$M_{f,c,y}$	Mass of each feedstock type f, on a dry basis, generating emissions captured by capture facility c in year y
$w_{sb,b,c,y}$	Values provided by the feedstock supplier in invoices are the preferred data source. Where these are unavailable, values may be sourced through measurement by the project proponent or operator of the source facility.
$w_{f,c,y}$	Weighted average mass fraction of carbon in feedstock type f, on a dry basis, captured by capture facility c in year y
$V_{Sb,y}$	Volatile solids content, on a dry basis, in biomass type b in year y Volatile solids content, on a dry basis, in feedstock type f in year y
$Y_{BG,b,y}$ $Y_{BG,f,y}$	Nm3 biogas or syngas/t volatile content Nm3 biogas or syngas/t volatile content
$\eta_{sep,b}$ $\eta_{sep,f}$	Efficiency of separation of carbon dioxide from other gases in total gas yield for biomass type b Efficiency of separation of carbon dioxide from other gases in total gas yield for feedstock type f
$Y_{G,b,y}$	Volume of carbon dioxide produced from one tonne of volatile solids in biomass type b, on a dry basis, in year y
$Y_{BE,b,y}$	Ethanol yield of biomass type b, on a dry basis, in year y (i.e., mass or volume unit of ethanol produced from one tonne of dry matter of biomass type b)
$\%CO2_{vol(STP)}$	Volumetric carbon dioxide fraction in gas flow at STP conditions
$FR_{vol(STP)}$	Volumetric flow rate of gas emitted during ethanol production, measured at actual conditions and converted to STP conditions
$Q_{ethanol,y}$	Ethanol produced by project activity plant in year y

Through review of all data/parameters to be monitored for this tool, VMD0059 and VM0049, the assessment team confirms with reasonable assurance they are appropriate for the project activities covered by the methodology. The assessment team concludes the monitoring plan ensures that these elements of GHG emission reductions and removals are monitored and reported appropriately and the data/parameters and procedures for monitoring are in line with VCS rules.

3.11 Verifiable

After completion of the full methodology tool assessment, the assessment team confirms with reasonable assurance that the methodology tool is sufficiently clear and specific to require project developers to transparently report project results in combination with the methodology and appropriate modules and tools that can pass validation and verification audits with high confidence.

4 ASSESSMENT CONCLUSION

Aster Global Environmental Solutions, Inc., has completed the methodology module assessment of *VT0013 Differentiating Reductions and Removals in CCS Projects.* The assessment team confirms the methodology module adheres to the criteria established for this methodology module assessment, which are documented and complete. Aster Global concludes without any qualifications or limiting conditions that the methodology documentation meets the requirements of the VCS Program Guide, VCS Methodology Requirements, and the VCS Methodology Development and Review Process. Therefore, Aster Global recommends that Verra approve the methodology *VT0013 Differentiating Reductions and Removals in CCS Projects* as prepared by Perspective Climate Group and Verra.

5 EVIDENCE OF FULFILMENT OF VVB ELIGIBILITY REQUIREMENTS

This is the first methodology, fourth module, and second tool in Sectoral Scope 16 Carbon Capture and Storage. There are no registered Carbon Capture and Storage projects in the Verra pipeline. Aster Global has requested accreditation for scope expansion with ANAB for Sector Scope 16, Carbon capture and storage (ANAB 4).

Aster Global fulfills the eligibility requirements for validation/verification bodies as the assessor for this methodology in the following ways:

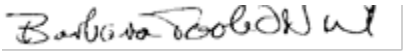
- Aster Global and/or the Lead Assessor has assessed at least 28 methodologies

- Aster Global has two standard methods experts on staff,
- Aster Global staff are experienced assessors including a power and energy generation expert

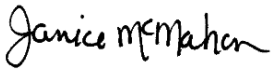
6 SIGNATURE

Signed for and on behalf of:

Name of entity: Aster Global Environmental Solutions, Inc.

Signature: 

Name of Lead Assessor: Barbara Toole O'Neil

Signature: 

Name of signatory: Janice McMahon

Date:

10 October 2025

7 APPENDIX A: LIST OF DOCUMENTS RECEIVED FROM CLIENT

Document Name	Date Received
VT0013-Differentiating-Reductions-and-Removals-in-CCS-Projects-final-publication	4/22/2025
Re_ 22025.00 CCS+ update and questions (1) (2)	2/2/2024
11_CCS-Tool01_Removals-Reductions_final.docx	9/9/2024
12_CCS-Tool02_non_VCS_final.docx	9/9/2024
20231122-Batch 1_Documentation summary.pptx	11/22/2023
22025.00 - BECCS Module - Round 1 Findings - Verra Respones.xlsx	2/24/2025
22025.00 - Carbon Capture Storage+ Findings Document 20Dec2023_GK.docx	1/11/2024
22025.00 - Carbon Capture Storage+ Findings Document 20Dec2023_GK.docx	2/2/2024
22025.00 - Carbon Capture Storage+ Findings Document 2February2024.docx	3/5/2024
22025.00 - CCS Meth - Checklist - Round 2 Findings - 2024-04-18.xlsx	5/13/2024
22025.00 - CCS Meth - Public Comments - Round 2 Findings - 2024-04-18.xlsx	5/13/2024
22025.00 - DAC - Checklist - Round 2 Findings - 2024-04-18.xlsx	5/15/2024
22025.00 - DAC - Checklist - Round 3 Findings - 2024-09-10_Verra responses.xlsx	9/13/2024
22025.00 - DAC - Public Comments - Round 2 Findings - 2024-05-03.xlsx	5/15/2024
22025.00 - DAC - Public Comments - Round 3 Findings - 2024-09-10 - Verra responses.xlsx	9/18/2024
22025.00 - Non-VCS Tool - Round 1 Findings - Verra Response.xlsx	2/24/2025
22025.00 - Red-Rem Tool - Round 1 Findings - Verra Responses.xlsx	2/24/2025
22025.00 - Storage (Saline DOGR)- Checklist - Round 1 Findings - 2024-10-09 - Verra Responses.xlsx	10/17/2024
22025.00 - Storage (Saline DOGR)- Checklist - Round 1 Findings - 2024-10-09 - Verra Responses.xlsx	10/18/2024
22025.00 - Storage (Saline DOGR)- Public Comments - Round 1 Findings - 2024-10-09 - Verra Responses.xlsx	10/17/2024
22025.00 - Storage (Saline DOGR)- Public Comments - Round 1 Findings - 2024-10-09 - Verra Responses.xlsx	10/18/2024
22025.00 - Transport - Checklist - Round 3 Findings - 2024-10-09 - Verra Responses.xlsx	10/17/2024
22025.00 - Transport - Checklist - Round 3 Findings - 2024-10-09 - Verra Responses.xlsx	10/18/2024
22025.00 - Transport - Public Comments - Round 3 Findings - 2024-10-09 - Verra Responses.xlsx	10/18/2024
22025.00 - Transport - Public Comments - Round 3 Findings - 2024-10-09.xlsx	10/17/2024
22025.00 Docs List Index.xlsx	6/27/2024

22025.00__VCS methodologyassessment_propV5-03242022_PCG.pdf	4/2/2022
220250_1.DOC	1/25/2024
Aquifer and DOGR module_final.docx	9/18/2024
Aquifer and DOGR module_final.docx	10/17/2024
Aquifer and DOGR module_final.docx	10/18/2024
Aquifer and DOGR module_final_publication.docx	10/22/2024
Aquifer and DOGR module_final_publicationv2.docx	10/22/2024
Aquifer and DOGR module_working_2.docx	9/16/2024
Aquifers Storage Module - Public Consultation_clean.docx	11/22/2023
Aquifers Storage Module - Public Consultation_clean.docx	4/19/2024
Aquifers Storage Module - Public Consultation_TC.docx	11/17/2023
Aquifers-Storage-Module-Public-Consultation-Draft.pdf	6/5/2024
BECCS module_final_v1.docx	12/2/2024
BECCS module_final_v2.docx	2/24/2025
BECCS module_final_v3.docx	3/11/2025
BECCS module_final_v3.docx	3/19/2025
CCS Methodology - Public Consultation_clean.docx	11/22/2023
CCS Methodology - Public Consultation_TC.docx	12/12/2023
CCS Methodology.docx	1/11/2024
CCS Methodology.docx	1/25/2024
CCS Methodology.docx	2/2/2024
CCS Methodology.docx	3/11/2024
CCS Methodology_04042024.docx	4/9/2024
CCS Methodology_05052024.docx	5/13/2024
CCS Methodology_18032024.docx	3/21/2024
CCS Methodology_22052024 - Clean.docx	5/23/2024
CCS Methodology_22052024 - TC.docx	5/23/2024
CCS Methodology_24052024 - clean.docx	5/24/2024
CCS Methodology_24052024 - TC.docx	5/24/2024
CCS Methodology_27032024.docx	3/28/2024
CCS Methodology_27052024 - Clean.docx	5/27/2024
CCS Methodology_27052024 - TC.docx	6/20/2024
CCS Methodology-Road Map.xlsx	1/19/2024
CCS Methodology-Road Map.xlsx	2/2/2024
CCS+ Figures.pptx	3/5/2024
CCS+ Initiative .pptx	11/14/2023
CCS+ VVB (1).pdf	6/24/2024
CCS+-Batch 2 internal PC - Responses.xlsx	10/2/2024
CCS+-internal Public Consultation Template.xlsx	11/17/2023
CCS+-internal Public Consultation Template_20240405.xlsx	4/8/2024
CCS-Methodology-Public-Consultation-Draft.pdf	7/13/2023

Compare result - CCS Methodlogy_Verra Reveiw and CCS+052724 - Clean.docx	6/19/2024
Compare result - CCS Methodlogy_Verra Review and CCS+052724 - Copy.docx	6/19/2024
Compare result - CCS Methodlogy_Verra Reveiw and CCS+052724.docx	6/19/2024
DAC Module - Public Consultation_clean.docx	11/22/2023
DAC Module - Public Consultation_TC.docx	11/17/2023
DAC Module.docx	1/11/2024
DAC Module.docx	1/25/2024
DAC Module.docx	2/2/2024
DAC Module.docx	3/5/2024
DAC Module_04042024.docx	4/9/2024
DAC Module_04042024.docx	4/19/2024
DAC Module_05052024.docx	5/15/2024
DAC Module_18032024.docx	3/21/2024
DAC Module_27032024.docx	3/28/2024
DAC module_Final_draft.docx	8/28/2024
DAC module_Final_draftv2.docx	9/13/2024
DAC module_Final_draftv2.docx	9/16/2024
DAC module_Final_draftv3.docx	9/17/2024
DAC module_Final_draftv3.docx	9/20/2024
DAC module_Final_draftv3.docx	10/17/2024
DAC module_Final_draftv3.docx	10/18/2024
DAC module_Final_publication.docx	12/24/2024
DAC-Module-Public-Consultation-Draft.pdf	7/13/2023
Draft-PC-document-CCS-Methodology.pdf	7/13/2023
Example calculation - Batch 1.xlsx	11/27/2023
FAR Responses.pdf	12/11/2023
Fw_ 22025.00 Update.zip	11/17/2023
GCS-Non-Permanence-Risk-Tool-v4.0-FINAL.pdf	7/13/2023
GCS-Requirements-v4.0-FINAL.pdf	7/13/2023
Graphic schedule from CCS+ Feb2023.docx	4/13/2023
Methodology for Carbon Capture and Storage.docx	2/28/2024
Module for CO2 Capture from Air (Direct Air Capture).docx	12/11/2023
Module for CO2 Storage in Saline Aquifers.docx	12/11/2023
Module for CO2 Transport.docx	12/11/2023
MRR_CCS Methodology and Modules_Batch1.pdf	11/22/2023
MRR_CCS Methodology and Modules_Batch1_Responses June 26.pdf	11/13/2023
Non-VCS Tool_final_v1.docx	1/29/2025
Non-VCS Tool_final_v2.docx	2/24/2025
Non-VCS Tool_final_v3.1.docx	3/11/2025
Non-VCS Tool_final_v3.docx	3/11/2025

Re_ 22025.00 CCS+ update and questions (1).zip	1/11/2024
Reductions and Removals_final_v1 - Copyw comments.docx	1/29/2025
Reductions and Removals_final_v1.docx	12/2/2024
Reductions and Removals_final_v2.docx	2/24/2025
Reductions and Removals_final_v3.1.docx	3/11/2025
Reductions and Removals_final_v3.docx	3/11/2025
Specific Questions_VVB.docx	3/21/2024
Storage Module.docx	1/11/2024
Storage Module.docx	2/2/2024
Summary of comments Aug2023.pdf	8/27/2023
Transport Module - Public Consultation_clean.docx	11/22/2023
Transport Module - Public Consultation_TC.docx	11/17/2023
Transport Module.docx	1/11/2024
Transport Module.docx	1/25/2024
Transport Module.docx	2/2/2024
Transport Module.docx	3/6/2024
Transport Module.docx	4/19/2024
Transport Module_final.docx	9/18/2024
Transport Module_final.docx	10/17/2024
Transport Module_final.docx	10/18/2024
Transport Module_final_publication.docx	10/22/2024
Transport Module_final_publicationv2.docx	10/22/2024
Transport Module_working.docx	9/16/2024
Transport-Module-Public-Consultation-Draft.pdf	7/13/2023
Uncertainty assessment - Batch 1_v2.xlsx	4/10/2024
Uncertainty assessment - Batch 1_v3.xlsx	5/13/2024

8 APPENDIX B: FINDINGS

Item	1
VCS Methodology Requirements v4.4 4 October 2023 (Section)	2.2.1
VCS Methodology Requirements v4.4 4 October 2023 (Description)	Methodologies may employ a modular approach in which a framework document provides the structure of the methodology and separate modules and/or tools are used to perform specific methodological tasks. Such methodologies shall use the VCS Methodology Template for the framework document and the VCS Module Template for the modules and tools. The framework document shall clearly state how the modules and/or tools are to be used within the context of the methodology
Applicability to Project (Y or N/A)	Y
Requirement Met (Y, N or Pending)	Y
Evidence Used to Assess (Location in PD/MR or Supporting Documents)	DIFFERENTIATING REDUCTIONS AND REMOVALS IN CCS PROJECTS
Aster Global Initial Findings (2025 Feb 03)	It is unclear to the assessment team why the latest VCS module template is not being used.
Round 1 NCR/CL/OFI	NCR: The latest VCS module template is not being used.
Round 1 Response from Methodology Development Team	Our technical editor has organized the module to meet the requirements of the most recent template. We understand that Aster is reviewing against the version that was in place at the outset of the review process for Batch 1, which is no longer active. We are ok with leaving this non-conformance in your review report as an unresolved finding or having you discuss with Christian (Director of Methodlogies) to find a solution that works for all.
Round 2 Findings	Verra has decided to use a new unpublished version of the methodology template. The majority of the sections are the same as the previous template that the assessment team used during the assessment. This will be noted in the assessment report.

Item	2
VCS Methodology Requirements v4.4 4 October 2023 (Section)	3.6.1
VCS Methodology Requirements v4.4 4 October 2023 (Description)	Methodologies shall establish criteria and procedures for quantifying GHG emissions and carbon stocks or carbon stock changes in the project boundary.
Applicability to Project (Y or N/A)	Y

Requirement Met (Y, N or Pending)	Y
Evidence Used to Assess (Location in PD/MR or Supporting Documents)	Red-Rem Tool - 5.2.1 - Last sentence
Aster Global Initial Findings (2025 Feb 03)	It is unclear to the assessment team why the last sentence in section 5.2.1 refers to Section 4 for guidance on how to calculate f,rem-CO2,c,y. Parameter tables for f,rem-CO2,c,y & f,red-CO2,c,y also contain references to Section 4, which appear to not be relevant to the parameters, and one section has no reference in the 'description of measurement methods and procedures to be applied' row of the f,red-CO2,c,y parameter table.
Round 1 NCR/CL/OFI	1. CL: Please clarify in line with the finding.
Round 1 Response from Methodology Development Team	Cross references have been updated.
Round 2 Findings	Text has been updated to reference the correct section. Finding is closed.

Item	3
VCS Methodology Requirements v4.4 4 October 2023 (Section)	3.6.1
VCS Methodology Requirements v4.4 4 October 2023 (Description)	Methodologies shall establish criteria and procedures for quantifying GHG emissions and carbon stocks or carbon stock changes in the project boundary.
Applicability to Project (Y or N/A)	Y
Requirement Met (Y, N or Pending)	Y
Evidence Used to Assess (Location in PD/MR or Supporting Documents)	Red-Rem Tool - 5.2.1/5.2.2
Aster Global Initial Findings (2025 Feb 03)	It is unclear to the assessment team if guidance for when a project must use 'Mass Balance' or 'Emission Source Analysis' cover all likely project scenarios. For example, which method should the project use if they know the quantity of sustainable biomass in the feedstock, are not using non-traceable biomass, but are also capturing CO2 on site from fossil fuel combustion? Is the 'Emission Source Analysis' likely to be used with the BECCS module or is this intended to cover coming modules?
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Methodology Development Team	Yes, the emissions from biomass are quantified and the emissions from fossil are what remains.

Round 2 Findings	Text has been updated clarifying that the mass balance approach is still applicable when fossil fuels are being used. Finding is closed.

Item	4
VCS Methodology Requirements v4.4 4 October 2023 (Section)	3.6.1
VCS Methodology Requirements v4.4 4 October 2023 (Description)	Methodologies shall establish criteria and procedures for quantifying GHG emissions and carbon stocks or carbon stock changes in the project boundary.
Applicability to Project (Y or N/A)	Y
Requirement Met (Y, N or Pending)	Y
Evidence Used to Assess (Location in PD/MR or Supporting Documents)	frem-CO2,c,y - Desc of measurement methods
Aster Global Initial Findings (2025 Feb 03)	The description of measurement methods and procedures to be applied row of the frem-CO2,c,y parameter table contains language that directs the project developer to section 5.2.1 or 5.2.2 based on 'Where the waste can be sorted into pure biogenic and fossil'. It is unclear to the assessment team if this guidance is aligned with the requirements of 5.2.1 and 5.2.2. Specifically, how do the terms biogenic and fossil align with section 5.2.1 which only mentions sustainable biomass and non-traceable biomass.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Methodology Development Team	Yes, the emissions from biomass are quantified and the emissions from fossil are what remains.
Round 2 Findings	Parameter tables for calculated parameters have been removed per verra's requirements, section 5.2 have been updated to use the defined terms more consistently. Finding is closed.

Item	5
VCS Methodology Requirements v4.4 4 October 2023 (Section)	3.6.1
VCS Methodology Requirements v4.4 4 October 2023 (Description)	Methodologies shall establish criteria and procedures for quantifying GHG emissions and carbon stocks or carbon stock changes in the project boundary.
Applicability to Project (Y or N/A)	Y

Requirement Met (Y, N or Pending)	Y
Evidence Used to Assess (Location in PD/MR or Supporting Documents)	Red-Rem Tool - 5.5
Aster Global Initial Findings (2025 Feb 03)	It is unclear to the assessment team if the segmentation mentioned in section 5.5 of the red/rem tool aligns with the guidance in the non-vcs tool. The non-vcs contains requirements for segment identification and also requires the segments to be defined in the PD for validation purposes, but the red-rem tool contains no such requirements/guidance for project developers.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Methodology Development Team	Guidance on the use of segments aligned with that included in the Non_VCS tool has been added
Round 2 Findings	Text has been updated to provide guidance and requirements for segments within the Red/Rem tool. Finding is closed.

Item	6
VCS Methodology Requirements v4.4 4 October 2023 (Section)	3.6.1
VCS Methodology Requirements v4.4 4 October 2023 (Description)	Methodologies shall establish criteria and procedures for quantifying GHG emissions and carbon stocks or carbon stock changes in the project boundary.
Applicability to Project (Y or N/A)	Y
Requirement Met (Y, N or Pending)	Y
Evidence Used to Assess (Location in PD/MR or Supporting Documents)	Red-Rem Tool
Aster Global Initial Findings (2025 Feb 03)	It is unclear to the assessment team if the tool provides adequate guidance for project developers to allocate project and leakage emissions appropriately between reductions and removals when using the transport and/or storage modules. The fraction of CO2 stream eligible for reduction/remove is calculated from the capture facility, but this fraction could be different for transport and storage if non-vcs flows share segments in transportation and storage.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.

Round 1 Response from Methodology Development Team	The proportion of frem to fred in the VCS stream would not be altered by the presence of Non-VCS gas in the segment. In such cases, the Non-VCS tool would be used to determine the VCS share of PE and LE and the R&R tool would be used to determine the share of each associated with removals and reductions.
Round 2 Findings	Text has been updated with the fraction of CO2 streams identified at the segment level. Finding is closed.

Item	7
VCS Methodology Requirements v4.4 4 October 2023 (Section)	3.6.1
VCS Methodology Requirements v4.4 4 October 2023 (Description)	Methodologies shall establish criteria and procedures for quantifying GHG emissions and carbon stocks or carbon stock changes in the project boundary.
Applicability to Project (Y or N/A)	Y
Requirement Met (Y, N or Pending)	Y
Evidence Used to Assess (Location in PD/MR or Supporting Documents)	Red-Rem Tool - Eqn 21 & 22 - PE,total,g,y & LE,total,g,y
Aster Global Initial Findings (2025 Feb 03)	It is unclear to the assessment team how PE,total,g,y and LE,total,g,y align with the parameters in equations 7 & 8 in VM0049, as those equations take into account project and leakage emissions from capture, transport and storage, not from identified segments. Same comment for PE,total,g,y and LE,total,g,y in equations 23 & 24.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Methodology Development Team	Segment emissions should be determined using the relevant module depending which phase of the project the segment is located in. References to VM0049 have been changed to reflect this.
Round 2 Findings	References to VM0049 have been updated to ensure that the specific modules guidance is used as required depending on where the segment is located in the project. Finding is closed.

Item	8
VCS Methodology Requirements v4.4 4 October 2023 (Section)	3.9

VCS Methodology Requirements v4.4 4 October 2023 (Description)	Methodologies must describe the data and parameters available at validation (i.e., those that are fixed for the duration of the project crediting period) and data and parameters monitored (i.e., those that must be monitored during the project crediting period for each verification). Additionally, methodologies must describe the criteria and procedures for obtaining, recording, compiling, and analyzing monitored data and parameters.
Applicability to Project (Y or N/A)	Y
Requirement Met (Y, N or Pending)	Y
Evidence Used to Assess (Location in PD/MR or Supporting Documents)	Equation 14 - Parameter w,nt,b,c,y
Aster Global Initial Findings (2025 Feb 03)	It is unclear to the assessment team why parameter w,nt,b,c,y is not included in section 6 - Data and Parmeter's.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding
Round 1 Response from Methodology Development Team	Parameter added to section 6
Round 2 Findings	Parameter table has been added. Finding is closed.

Item	9
VCS Methodology Requirements v4.4 4 October 2023 (Section)	3.9
VCS Methodology Requirements v4.4 4 October 2023 (Description)	Methodologies must describe the data and parameters available at validation (i.e., those that are fixed for the duration of the project crediting period) and data and parameters monitored (i.e., those that must be monitored during the project crediting period for each verification). Additionally, methodologies must describe the criteria and procedures for obtaining, recording, compiling, and analyzing monitored data and parameters.
Applicability to Project (Y or N/A)	Y
Requirement Met (Y, N or Pending)	Y
Evidence Used to Assess (Location in PD/MR or Supporting Documents)	Equation 15 - Parameter m,nt,b,c,y
Aster Global Initial Findings (2025 Feb 03)	It is unclear to the assessment team why parameter m,nt,b,c,y is not included in section 6 - Data and Parameters.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding

Round 1 Response from Methodology Development Team	Parameter added to section 6
Round 2 Findings	Parameter table has been added. Finding is closed.

Item	10
VCS Methodology Requirements v4.4 4 October 2023 (Section)	3.9
VCS Methodology Requirements v4.4 4 October 2023 (Description)	Methodologies must describe the data and parameters available at validation (i.e., those that are fixed for the duration of the project crediting period) and data and parameters monitored (i.e., those that must be monitored during the project crediting period for each verification). Additionally, methodologies must describe the criteria and procedures for obtaining, recording, compiling, and analyzing monitored data and parameters.
Applicability to Project (Y or N/A)	Y
Requirement Met (Y, N or Pending)	Y
Evidence Used to Assess (Location in PD/MR or Supporting Documents)	Parameter Table - f,rem-CO2,c,y
Aster Global Initial Findings (2025 Feb 03)	It is unclear to the assessment team why all equations where f,rem-CO2,c,y is used are not listed in the equations row of the parameter table.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding
Round 1 Response from Methodology Development Team	This parameter has been removed from section 6
Round 2 Findings	Parameter table has been removed. Finding is closed.

Item	11
VCS Methodology Requirements v4.4 4 October 2023 (Section)	3.9
VCS Methodology Requirements v4.4 4 October 2023 (Description)	Methodologies must describe the data and parameters available at validation (i.e., those that are fixed for the duration of the project crediting period) and data and parameters monitored (i.e., those that must be monitored during the project crediting period for each verification). Additionally, methodologies must describe the criteria and procedures for obtaining, recording, compiling, and analyzing monitored data and parameters.
Applicability to Project (Y or N/A)	Y

Requirement Met (Y, N or Pending)	Y
Evidence Used to Assess (Location in PD/MR or Supporting Documents)	Efficiency of CO2 separation from other gasses
Aster Global Initial Findings (2025 Feb 03)	It is unclear to the assessment team if the efficiency of separation of CO2 from other gases in the total gas yield can be determined at validation or if this should be monitored parameter. It seems likely that this value will vary with operational conditions and changing gas composition from feedstock variations.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding
Round 1 Response from Methodology Development Team	Parameter description moved to list of monitored parameters.
Round 2 Findings	Parameter table has been moved to the monitored parameter sections to account for any changes over the monitoring period. Finding is closed.

Item	12
VCS Methodology Requirements v4.4 4 October 2023 (Section)	3.9
VCS Methodology Requirements v4.4 4 October 2023 (Description)	Methodologies must describe the data and parameters available at validation (i.e., those that are fixed for the duration of the project crediting period) and data and parameters monitored (i.e., those that must be monitored during the project crediting period for each verification). Additionally, methodologies must describe the criteria and procedures for obtaining, recording, compiling, and analyzing monitored data and parameters.
Applicability to Project (Y or N/A)	Y
Requirement Met (Y, N or Pending)	Y
Evidence Used to Assess (Location in PD/MR or Supporting Documents)	Y,BG,b,y, Y,G,b,y, & Y,BE,b,y - Calculation metho
Aster Global Initial Findings (2025 Feb 03)	It is unclear to the assessment team how the values of Y,BG,b,y, Y,G,b,y, and Y,BE,b,y are to be determined. The source of data is 'on-site measurements', but QA/QC specifies measurements must be taken at an accredited lab. Also the calculation method and description of measurements methods say the value can be 'estimated based on empirical data or calculated using models'.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding

Round 1 Response from Methodology Development Team	Parameter description revised to require the use of lab testing. modelling or yield data from peer-reviewed literature.
Round 2 Findings	Parameter tables and data sources have been updated to provide clear guidance and options to the project developer. Finding is closed.

Item	13
Methodology Development and Review Process v4.4 16 April 2024 (Section)	3)
Methodology Development and Review Process v4.4 16 April 2024 (Description)	Structure and clarity of methodology: Assessment of whether the methodology is written in a clear, logical, concise, and precise manner that will enable project developers to consistently implement projects and transparently report project results;
Applicability to Project (Y or N/A)	Y
Requirement Met (Y, N or Pending)	Y
Evidence Used to Assess (Location in PD/MR or Supporting Documents)	Red-Rem Tool - Section 3 - Definitions
Aster Global Initial Findings (2025 Feb 03)	It is unclear to the assessment team why the definitions of Ineligible biomass, non-traceable biomass, and sustainable biomass contain references to appendices that are not included in the tool.
Round 1 NCR/CL/OFI	CL: Please clarify in line with the finding.
Round 1 Response from Methodology Development Team	Appendices containing the references for those definitions was moved to BECCS module. References corrected.
Round 2 Findings	Definitions have been updated accordingly. Finding is closed.