VCS METHODOLOGY ELEMENT ASSESSMENT REPORT

VCS METHODOLOGY ELEMENT "IMPROVED FOREST MANAGEMENT – LOGGED TO PROTECTED FOREST (IFM-LTPF) ON FEE SIMPLE FORESTED PROPERTIES"

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Client: ERA Inc. & 3GreenTree Inc.	Client ref.: David Rokoss (ERA) & Mike Vitt (3GreenTree)

Name of Methodology: Improved Forest Management – logged forests to protected forests (LtPF) on Fee Simple Forested Properties.

Assessment Phases:

☐ Desk Review
☐ Follow up interviews
☐ Resolution of outstanding issues

Assessment Status

☐ Corrective Actions Requested
☐ Clarifications Requested
☒ Full Approval by DNV
☐ Rejected

Det Norske Veritas (U.S.A), Inc. (DNV) has performed a first validation of proposed Verified Carbon Standard (VCS) methodology element - "Improved Forest Management – logged forests to protected forests (LtPF) on Fee Simple Forested Properties" (hereafter called "the MED"). This was done in accordance with the VCS double approval process, version 1.1 and Voluntary Carbon Standard 2007.1.

In summary, it is DNV's opinion that the proposed VCS methodology element "Improved Forest Management – logged forests to protected forests (LtPF) on Fee Simple Forested Properties" as described in MED version 9.2 of March 29, 2011, meets all relevant VCS requirements for VCS methodology elements. DNV recommends the methodology element for approval and request Verified Carbon Standard Association (VCSA) to finally approve the methodology element, contingent to the second validator's approval of the proposed VCS methodology.

Report No.:	Date of this revision:	Rev. No.
2010-9022	04/1/2011	02

Report title:
Validation of Proosed VCS Methodology "Improved Forest Management – logged forests to protected forests (LtPF) on Fee Simple Forested Properties"

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Key words:
VCS
Methodology Element
Validation

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Abbreviations

A/R	Afforestation/Reforestation (under CDM)
AFOLU Guidelines	Agriculture, Forestry and Other Land Uses section of Guidelines for National Greenhouse Gas Inventories 2006
CAR	Corrective action request
CDM	Clean development mechanism
CL	Clarification request
DNV	Det Norske Veritas
EB	Executive Board
ERA	Ecosystem Restoration Associates Inc
GPG LULUCF	Intergovernmental Panel on Climate Change's Good Practice Guidance for Land-Use Land Use Change and Forestry
LtPF	Logged forests to protected forests
GWP	Global warming potential
IFM	Improved forest management (under VCS)
MED	Methodology element documentation
VCS	Verified Carbon Standard
VCSA	Verified Carbon Standard Association
VCU	Verified Carbon Unit
WBCSD	World Business Council for Sustainable Development
WRI	World Resources Institute

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1 ASSESSMENT STATEMENT

Det Norske Veritas (U.S.A), Inc (DNV) has performed the validation of proposed VCS methodology "Improved Forest Management – logged forests to protected forests (LtPF) on Fee Simple Forested Properties" for ERA Ecosystem Restoration Associates Inc. The validation was performed on the basis of VCS criteria for methodology development.

The methodology element was prepared based on the requirement of VCS 2007.1 and VCS Program Normative Document: Double Approval Process, version 1.1. The methodology element additionally follows the VCS guidelines and tools listed below:

- VCS Guidance for Agriculture, Forestry and Other Land Use Projects (AFOLU), November 18, 2008
- VCS Tool for AFOLU Non-Permanence Risk Analysis and Buffer Determination, November 18, 2008
- VCS Tool for AFOLU Methodological Issues, November 18, 2008

The methodology element belongs to the scope of *agriculture, forestry and other land use*.

The desk review was performed using the following artifacts –

- proposed new MED version 9.2, dated March 29, 2011 /2/;
- other supporting documentation including referenced, published scientific literature, reports and exiting methodologies listed in section 2.1 of this document.

In summary, it is DNV's opinion that the proposed VCS methodology element "Improved Forest Management – logged forests to protected forests (LtPF) on Fee Simple Forested Properties" as described in MED version 9.2, meets all relevant VCS requirements for VCS methodology elements. DNV thus recommends the methodology element for approval and request VCSA to finally approve the methodology element, contingent to the second validator's approval of the proposed VCS methodology.

2 INTRODUCTION

ERA Ecosystem Restoration Associates Inc has commissioned Det Norske Veritas (U.S.A), Inc (DNV) as the first validator to perform an assessment of the methodology element "Improved Forest Management – logged forests to protected forests (LtPF) on Fee Simple Forested Properties". This report summarizes the findings of the assessment of the methodology element, performed on the basis of VCS criteria for methodology elements. VCS criteria refer to VCS 2007.1 and the subsequent VCS Program Normative Documents.

The assessment consists of the following three phases:

I a desk review of the new methodology;

II follow-up interviews; and

III the resolution of outstanding issues and the issuance of the final assessment report and opinion

The following sections outline each step in more detail.

2.1 Desk Review of the New Methodology

The following table lists the documentation that was reviewed during the assessment:

/1/ ERA Ecosystem Restoration Associates Inc , Methodology element documentation "Improved Forest Management – logged forests to protected forests (LtPF) on Fee Simple Forested Properties", February 13, 2010

/2/ ERA Ecosystem Restoration Associates Inc , Methodology element documentation "Improved Forest Management – logged forests to protected forests (LtPF) on Fee Simple Forested Properties", version 9.2 March 29, 2011

/3/ VCSA, Voluntary Carbon Standard 2007.1.

/4/ VCSA, VCS Program Normative Document: Double Approval Process, v1.1, January 21, 2010

/5/ VCS Guidance for Agriculture, Forestry and Other Land Use Projects (AFOLU), November 18, 2008

/6/ VCS Tool for AFOLU Non-Permanence Risk Analysis and Buffer Determination, November 18, 2008

/7/ VCS Tool for AFOLU Methodological Issues, November 18, 2008

/8/ UNFCCC CDM EB: "Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities", version 1

(available at: http://cdm.unfccc.int/methodologies/ARmethodologies/tools/ar-am-tool-02-v1.pdf)

/9/ The UNFCCC "Tool for testing significance of GHG emissions in A/R project activities", Version 1

(available at: http://cdm.unfccc.int/methodologies/ARmethodologies/tools/ar-am-tool-04-v1.pdf)

/10/ IPCC. (2006b). 2006 IPCC Guidelines for National Greenhouse Gas Inventories. IGES, Japan: National Greenhouse Gas Inventories Programme.

/11/ CDM EB, Tool for the demonstration and assessment of additionality, version 5.2.

/12/ WRI/WBCSD, The GHG Protocol Project Accounting.

2.2 Follow-up Interviews

Date	Name	Organization	Topic
03.17.2010	Mike Vitt Gordon Smith Shruthi Bachamanda Sam Stevenson	ERA DNV	1. The methodology element's eligibility criteria; 2. The baseline approach and additionality; 3. Project boundary; 4. Emissions, including leakage; 5. Monitoring, data and parameters. 6. Baseline modeling

2.3 Resolution of Outstanding Issues

The objective of this phase of the assessment is to resolve any outstanding issues that need to be clarified prior to DNV's positive conclusion on the methodology element. The assessment findings relate to the methodology element as documented and described in the initial methodology element documentation./1/

In order to ensure transparency the issues raised and the methodology element developer's response are documented in Appendix A.

Findings established during the assessment can either be seen as a non-fulfillment of VCS criteria or where a risk to the fulfillment of methodology element objectives is identified. Corrective action requests (CAR) are issued, where:

I. mistakes have been made with a direct influence on methodology application;
II. VCS specific requirements have not been met; or
III. there is a risk that the methodology element would not be accepted as a VCS methodology.

A request for clarification (CL) may be used where additional information is needed to fully clarify an issue.

Fig 1 below provides a sample table for presentation of the CARs and CLs and subsequent response from ERA Ecosystem Restoration Associates Inc.

Assessment Table: Resolution of Corrective Action and Clarification Requests		
Draft report clarifications and corrective action requests	***Summary of methodology element developer response***	***Assessment conclusion***
If the conclusions from the draft assessment are either a CAR or a CL, these should be listed in this section.	*The responses given by the methodology element developer during the communications with the assessment team should be summarized in this section.*	*This section should summarize the assessment team's responses and final conclusions.*

Figure 1 Assessment Table

2.4 Internal Quality Control

The final assessment report and methodology element underwent a review by technical reviewer before DNV submitted the assessment report to ERA Ecosystem Restoration Associates Inc. The review was performed by a technical reviewer qualified in accordance with VCS requirements.

2.5 Assessment Team

The table below lists the details and involvement of the DNV team for the methodology assessment

			Type of involvement					
Role/Qualification	***Last Name***	***First Name***	Desk review	Interviews	Reporting	Supervision of work	Technical review	Expert input
Project manager	Stevenson	Sam		✓		✓		
Methodology Reviewer	Bachamanda	Shruthi	✓	✓	✓			
Technical reviewer	Espejo	Andreas					✓	
Technical reviewer	Kapambwe	Misheck					✓	
Sector Expert	Smith	Gordon	✓	✓	✓			✓

3 ASSESSMENT FINDINGS

The methodology assessment findings have been documented as clarification (CL) and corrective actions (CAR). The CARs and CLs raised during the methodology assessment, responses to the CLs and CARs and the basis on which the response was accepted by DNV have been described in detail in Appendix A.

3.1 Eligibility Criteria

The eligibility criteria for the methodology element are defined in the methodology element documentation (MED). The methodology is applicable to:

1. Projects which meet the most recent approved criteria for VCS Improved Forest Management – Logged to Protected Forest (IFM-LtPF) eligible projects. Currently projects must meet either of the criteria defined in the VCS Guidance for AFOLU Projects (VCS, 2008a)/5/:
    a. Protecting currently logged or degraded forests from further logging; and,
    b. Protecting unlogged forests that would be logged in the absence of carbon finance; and,
2. Projects located in Temperate and Boreal Domain Global Ecological Zones (as defined by FAO (FAO, 2001)) which are forest lands remaining forest lands (as defined by IPCC (IPCC, 2003)), and which can meet IPCC GPG LULUCF Tier III inventory and data requirements (IPCC, 2003); and,

3. Projects on fee simple or freehold private ownership properties where the project proponent has clear legal representation of estate title rights without legal title encumbrances that prevent the project from proceeding. Term leases, concessions, or equivalent; public ownership lands; and unknown or legally disputed ownerships are excluded; and,

4. Projects on properties where the starting average annual illegal, unplanned, and fuelwood removals are less than 5% of total annual harvest levels (in CO_2e) in the baseline scenario, and have a low rating in any applicable criteria in the latest approved VCS Non-Permanence Tool assessment criteria related to ongoing enforcement and number of project activities related to managing unplanned removals; and,

5. Projects which do not encompass managed peatland forests (peatland as defined by IPCC GPG LULUCF); and,

6. Projects where the total percentage of wetlands in the project area is not expected to change as part of project activities; and,

7. Projects that can demonstrate there will be no leakage through activity shifting to other lands owned or managed by project participants outside the project boundary at the beginning of the project (within the first year of the project start date); and,

8. Projects that do not include non-de minimis application of organic or inorganic fertilizer in the project scenario.

3.2 Baseline Approach

The methodology element's approach to determine the baseline scenario is clearly defined as below:

1. Identification of Plausible Alternative Baseline Scenarios to the VCS Project Activity
    a. Should include historical and common practice baseline scenario
    b. All identified baseline scenarios must, at a minimum:
        1) Comply with IFM-LtPF project and eligibility requirements by only including activities and areas where forests remaining forests;
        2) Comply with legal requirements for forest management and land use in the area, "unless verifiable evidence can be provided demonstrating that common practice in the area does not adhere to such requirements" (VCS, 2008);
        3) Demonstrate that the "projected baseline scenario environmental practices equal or exceed those commonly considered a minimum standard among landowners in the area" (VCS, 2008);
2. Investment analysis or barrier analysis of the latest approved version of the VCS Tool for demonstration and assessment of additionality can be used to remove alternatives that are financially infeasible or face clear barriers to implementation.

The remaining baseline scenarios are then further evaluated to select the most likely baseline scenario, as follows.

3. The baseline scenario based on actual property harvest history must be selected if the current property owner retains ownership of the property and has at least 5 years historical harvest level data history.

4. If the current owner has owned the property for less than five years then the project proponent may:
    a. choose to use the previous owners historical activities or management plan as representative of common practice, in which case the baseline scenario is selected based on the process and criteria in (3); or,
    b. Choose to select the baseline scenario based on common practice and investment analysis of scenarios as outlined in (5) below.
5. For recent or pending changes in project property ownership without historical data (> 5 years) (or otherwise not selecting a historical baseline scenario as per (4b)), the project proponent will select the baseline scenario(s) based on an assessment of regional common practice supported by a financial analysis for achieving typical market returns from forest products.

a. The MED proposes the use Step 2 Option II and/or Option III in the Tool for the Demonstration and Assessment of Additionality in VCS AFOLU Project Activities (VCS, 2010a) to choose the most financial attractive return on investment from forest product returns using the assessment process
b. Additionally, the MED provides a list of criteria's that the selected baseline needs to meet to ensure that the selected scenario is the typical common practice of the region.

DNVs review confirms that the MED has taken all the required VCS criteria into consideration to develop the baseline determination approach.

3.3 Additionality

The latest version of "Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities" is used in the MED as the tool to determine project additionality. This is deemed appropriate and adequate by DNV.

3.4 Project Boundary

The project's physical boundary is clearly and properly defined. The carbon pools included in or excluded from the project boundary are shown in Table 1; the justification to include or exclude certain type of carbon pools is justified reasonably. DNV is able to confirm that the project boundary is defined in lines with VCS guidance for AFOLU /5/.

Table 1: Selected carbon pools

Carbon pools	Selected (Yes or No)
Above-ground biomass	Yes
Above-ground non-tree biomass	No
Below-ground biomass	Yes
Dead wood	Yes
Litter	No
Soil carbon pool	No
Wood products pool	Yes

Table 2: Emissions sources included in the project boundary

Sources	Gas	Included / Excluded	Justification / Explanation of choice
Use of Fertilizers	CO_2	Excluded	Non-de minimis use of fertilizer in the project scenario is excluded. In the baseline scenario, fertilizer emissions are deemed insignificant, as per the VCS May 24th, 2010 AFOLU
	CH_4	Excluded	
	N_2O	Excluded	

			Program Update (Voluntary Carbon Standard, 2010c). These exclusions are conservative, and do not increase the emission reductions.
Combustion of Fossil Fuels by Vehicles / Equipment	CO_2	Included	Carbon emissions from harvesting equipment, log transport, and primary forest product manufacturing are included.
	CH_4	Excluded	CH_4 and N_2O emissions from equipment are assumed to be de-minimis.
	N_2O	Excluded	
Burning of biomass	CO_2	Excluded	Carbon stock decreases due to biomass burning are accounted as a carbon stock change.
	CH_4	Excluded	
	N_2O	Excluded	

The emission sources included in or excluded from the project boundary area is shown in Table 2. The emission sources included in project boundary is appropriate for improved forest management projects.

3.5 Emissions

The approach provided for calculating baseline emissions, project emissions and emission reductions are deemed appropriate by DNV.

3.5.1 Baseline GHG removals

The baseline net GHG removals by sinks is determined as the changes in carbon stored in all pools deducting the GHG emission as a result of forest management activities within the project boundary in the baseline. The carbon pools considered in the baseline include carbon storage changes in above ground tree biomass, below ground biomass, dead wood and harvested wood products. The carbon storage changes in above ground tree biomass, below ground biomass, dead wood and harvested wood products is conducted using mathematical models for forest management across baseline period. The MED list the mandatory and preferred criterion's that the model used needs to meet.

The MED provides guidelines for the modeling of chosen baseline scenario. The MED employs the IPCC gain-loss method (IPCC, 2006a), which requires the biomass carbon loss be subtracted from the biomass carbon increment for the reporting year. This method is appropriate for areas with a mix of stands of different forest types, and/or where biomass change is very small compared to the total amount of biomass.

The total annual carbon balance in year, t, for the baseline scenario is calculated as ($\Delta C_{BSL,t}$, in t C yr^{-1}):

$$\Delta C_{BSL,t} = \Delta C_{BSL,P,t}$$

where:

$\Delta C_{BSL,P,t}$ is the annual change in carbon stocks in all pools in the baseline across the project activity area;

$$\Delta C_{BSL,P,t} = \Delta C_{BSL,LB,t} + \Delta C_{BSL,DOM,t} + \Delta C_{BSl,HWP,t}$$

$\Delta C_{BSL,LB,t}$ = annual change in carbon stocks in living tree biomass (above - and belowground);

$\Delta C_{BSL,DOM,t}$ = annual change in carbon stocks in dead organic matter; and

$\Delta C_{BSl,HWP,t}$ = annual change in carbon stocks associated with harvested wood products.

$$\Delta C_{BSL,LB,t} = \Delta C_{BSL,G,t} - \Delta C_{BSL,L,t}$$

where:

$\Delta C_{BSL,G,t}$ = annual increase in tree carbon stock from growth; and

$\Delta C_{BSL,L,t}$ = annual decrease in tree carbon stock from a reduction in live biomass.

3.5.2 Project GHG removals

The actual net GHG removals by sink is estimated as the difference between carbon stock in above ground tree biomass, below ground biomass, dead wood and harvested wood products in project scenario and increase in GHG emissions as a result of project activity.

Net project emissions are calculated by repeating the procedures described in the baseline GHG removals estimation, using the project scenario strata, data, and modeling. The MED requires all modeling methods, calculations, assumptions, and data sources to be consistent in both the baseline and project scenarios.

3.5.3 Emission Reduction

Emissions reductions are calculated annually as the difference between the baseline and project scenario net emission reductions:

$ER_{y,GROSS} = (\Delta C_{BSL,t} - \Delta C_{PRJ,t}) * 44/12$

Where,

$\Delta C_{BSL,t}$ = total net baseline scenario emissions (t CO_2e/yr)

$\Delta C_{PRJ,t}$ = total net project scenario emissions (t CO_2e/yr)

44/12 = factor to convert C to CO2e

$ER_y = ER_{y,GROSS} - LE_y$

Where,

ER_y = the net GHG emissions reductions and/or removals in year y (the overall annual carbon change between the baseline and project scenarios, net all discount factors except the permanence buffer) (t CO_2e/yr)

$ER_{y,GROSS}$ =the difference in the overall annual carbon change between the baseline and project scenarios (t CO_2e/yr)

LE_y = Leakage in year y (t CO_2e/yr)

3.6 Leakage

The methodology considers leakage from activity shifting leakage and market effects resulting from a shift in harvest through time in lines with VCS guidance for AFOLU/5/ and Tool for AFOLU Methodological Issues/7/.

Activity Shifting Leakage: The MED requires that the project developers demonstrate that as per VCS requirements for IFM projects and the applicability conditions of the MED there is no leakage due to activity shifting within the project proponent's lands upon the start up of the project. Additionally, the MED requires project proponents to (1) The project proponent shall annually provide to the validator and/or verifier the locations and descriptions of all forestlands within the project country over which the project proponent has ownership, management, or legally sanctioned rights of use and (2) to demonstrate annually that there is no activity shifting leakage.

Market Leakage: The MED follows the VCS guidelines to quantify market leakage:

1. Apply the most current VCS market leakage tool to determine a discount factor (VCS, 2010c) to the net change in carbon stock associated with the activity that reduces timber harvest; or,

2. Develop a project-specific market leakage factor that accounts for country level leakage within similar forest types. The MED allows two variations for the same:
    - the CAR Forest Protocol 3.2 market leakage equation, if the project is located within countries where CAR applies, or
    - can demonstrate equivalent market conditions; or use the detailed leakage risk assessment form provided in the MED.

3.7 Monitoring

The parameters to be monitored to calculate the emission reduction calculations are defined appropriately and clearly listed in the MED, which ensure that the emission reduction from the project activity will be estimated properly.

DNV has been able to ensure that the monitoring approach is robust and consistent with the forestry sector standards.

3.8 Data and Parameters

Both monitored and not monitored data (fixed through crediting period) and parameters used in calculations are defined in the MED clearly and appropriately to make it possible for the emission reductions to be estimated and verified during the crediting period.

Not monitored data and parameters include area of baseline stratum, biomass expansion factor, carbon fraction of dry matter, root shoot ratio, etc. The references used in the MED for the various data parameters have been described clearly.

The MED clearly defines the requirements for data and calculation reviews. DNV considers these requirements to be appropriate and considers that this will reduce uncertainties related to the emission reductions.

3.9 Adherence to the project-level principles of the VCS Program

The MED was developed in line with the project-level principles of VCS 2007.1 as elaborated in the above. It is also deemed by DNV that the principles of relevance, completeness, consistency, accuracy, transparency, and conservativeness are properly addressed in the MED.

3.10 Comments by Stakeholders

Ecosystem Restoration Associates Inc has submitted the proposed MED "Improved Forest Management – logged forests to protected forests (LtPF) on Fee Simple Forested Properties", to VCS for stakeholder consultation. The MED was published on the VCS website for a period of 30 days from 2 August 2010 – 2 September 2010 for public stakeholder consultation. There were six comments received from stakeholders during the stakeholder consultation period. DNV has reviewed all the comments received and confirms that 3GreenTree Ecosystems Services Ltd. and ERA Ecosystem Restoration Associates Inc. has taken all comments into account in the revised methodology version 9.2.

http://www.v-c-s.org/methodology_ifm.html

APPENDIX A

RESOLUTION OF CORRECTIVE ACTION AND CLARIFICATION REQUESTS

CAR 1
Draft Report Corrective Action Request by Assessment Team **Eligibility criteria:** (Bullet point (1) – Eligibility criteria) - The applicability criteria states that the project is applicable to VCS Improve Forest Management – Logged to protected Forest (IFM-LtPF) eligible projects as defined in the VCS Tool for AFOLU Methodological Issues. *As per the VCS for AFOLU Methodological Issues - Conversion of logged forests to protected forests (LtPF) includes:* *a) protecting currently logged or degraded forests from further logging; and,* *b) protecting unlogged forests that would be logged in the absence of carbon finance;* *The methodology developer needs to describe in the MED whether both a) and b) above are applicable under this methodology or only of the above.* **Summary of Methodology Element Developer Response** The eligibility criteria have been modified significantly, including the inclusion of the VCS IFM-LtPF criteria. A project is eligible if it meets either criteria.
Assessment Team Conclusion The eligibility criteria are now consistent with the VCS guidance. CAR 1 is closed.

CAR 2
Draft Report Corrective Action Request by Assessment Team (Bullet point (3) Eligibility criteria) – *CAR 3– (Bullet point (3) above) – The requirement to qualify under 'change in ownership or management practices, which is driven by economic interests and/or requiring new capital investment' should be clearly defined. Is the methodology applicable only if there is a transfer of property or if there is an imminent possibility of a sale?*

Summary of Methodology Element Developer Response

The eligibility criteria have been modified substantially, and eliminated this need for change in ownership.

Assessment Team Conclusion

If the change in ownership applicability criterion is eliminated, then the modeling of NPV maximizing harvest has little relevance in the baseline. Without ownership change, the baseline setting process must clearly specify that the baseline is determined by modeling prior management practices, or common practice carbon stocks, whichever results in a higher carbon stock.

Round 2 - Summary of Methodology Element Developer Response

After further phone discussion, the issue was clarified to revolve around modeling theoretical NPV maximizing baseline harvesting if the historical baseline is selected. The baseline selection process has been clarified to clearly establish historical practice as the baseline unless clearly underperforming, in which case common practice is selected. Unclear wording has been removed from the section. Further clarity has been added to better show the decision making process in the section. Also relates to issue 5.6.

Round 2 - Assessment Team Conclusion

We appear to have a significant failure of communication regarding determination of project baselines. As we have discussed since our initial phone conversation on August 27, we believe that it is not sufficient to set the baseline only with modeling effects of applying typical management rules. We believe that there must be a check against actual behavior. We discussed quantifying the average carbon stocks present on non-project lands that are similar to the project, and using this observed carbon stock as a minimum for the baseline. In effect, this means that the baseline is the greater of the modeled carbon stock or the average carbon stock observed on non-project lands. In our phone conversations with you, we thought we had reached agreement on this issue. However, the most recent version of the methodology has the baseline set only by modeling, and does not use carbon stocks on non-project lands as a threshold below which the baseline cannot fall.

Round 3 - Summary of Methodology Element Developer Response

In terms of the baseline concerns:

I agree we must have mis-communicated, as I do indeed clearly remember discussing Gordon's thoughts (at length I recall; twice) that we should/could be using comparable avg. standing stocks similar to the performance standards in Climate Action Reserve (which is, realistically, exactly what you are asking for). However, it was not my conclusion that you were *mandating* that we use the approach recommended by Gordon. In fact, my understanding was that this was his *preferred approach from his own project development experience*, but that the actual CAR was based on wanting to insure we were not suggesting a purely theoretical maximum harvest model could be matched to a purely theoretical maximum NPV model to create the baseline without any tie to observable common practice and operational/market reality in general. Although this was never the intent of the baseline selection process text, we did review and modify the process to better clarify that

demonstrated, observable evidence of common practice is required (notice the list in 2.c.2 have "and's").

So, with this in mind, I'd like to put forth a number of points on why we have not included this average standing stock approach in the document, in advance of a needed follow-up discussion:

First, this type of average actual standing stock data is simply not available to my knowledge here in Canada, nor in the SE (examples where I have worked and know what's available) - perhaps it is reported in areas of the PNW. Unless I'm misunderstanding, it would have to be some roll-up of avg. age, avg. site, avg. forest type, and avg. rotation age across accessible, economic timber land base area, and other factors. In lieu of some govn't or association reporting or carbon standard rules providing something, I just don't see how you would get actual standing stock reports, by age, type, and ownership area from more than a very few friendly private land holders (but not representing an average). In the U.S. south, actual forest & harvest data, areas, and rotations are proprietary due to market sales and wood supply/price models (that's why they blind bid everything...). In Canada, harvest land bases and accessibility varying tremendously between forests, such that any "averages" would have to be analyzed substantially to understand and compare land bases in a reasonable manner. Therefore, this would either create an undue burden on project developers to create, or more likely have to be created by modeling from an assumed or representative age class structure over an area, overlayed with assumed operating practices, harvest patterns, or harvest rates - all methods you are implying or stating should not be used for a baseline creation. Frankly, we do not know how we would do this for the [redacted] project.

Second, we are specifically using a *project based baseline*, not a *performance benchmark baseline* - therefore, by nature, the baseline selection process should be specific to the actual project and project conditions. By *requiring* a default to the standing stock of average of regional forests we would fundamentally no longer be creating a project baseline, but rather a regional performance baseline (as suggested by DNV, project conditions would only apply if they resulted in higher carbon stocks). Although I'm not sure VCS would prevent this approach, there are different rules for performance baselines as I understand it, which implies a different type of process.

Third, our baseline selection process requires the project proponent to demonstrate that the selected baseline is first of all consistent with all legal land use requirements, and second consistent with *observable* regional common practice and a series of capacity tests to capture a view of reality on the project land base. The project proponents must provide evidence that the scenario is reasonable and representative of common practice applicable to the project condition (i.e. see step 2c.1 and 2c.2). For example, with the pre-validation of the [redacted] project, RA looked at the historical data, our assumptions of common practice (which included the forward modeling representation scenarios of common practice for the actual property), previous appraisal/valuation documentation, and went to local independent stakeholders and RPF's to test that it was reasonable and rationale - and they were satisfied we provided a rationale and reasonable baseline with supporting evidence in the PDD.

Fourth, to cut to the most important point, there is no requirement in VCS (that I am aware of) that a project baseline be created or compared

to regional average standing stock data, nor that a baseline default to this as a minimum level. We have, in fact, quoted the VCS requirements in the text. It is therefore difficult to understand how DNV can define this prescriptive approach as necessary to approve the baseline selection process. Also, look at the VCS additionality tool and the tests used within it - it freely uses common financial assessment tools and anecdotal project evidence (i.e. for barrier tests, common practice tests). To me, this tool provides substantial similarity and guidance to the level of expectation for the baseline and project scenarios intended by VCS, and so I do not believe the requirement you are making is consistent with the requirements and expectations of the VCS.

And finally, just for further context, we have reviewed this latest baseline selection process with RA, and they are satisfied (not that this has direct bearing on your audit, however it does provide a comparable assessment for consideration). We in fact discussed DNV's concerns briefly, and shared the written your CAR summaries with them, and they had no comment or concern similar to DNV's.

So, let us discuss this further at your earliest opportunity, even if over the holidays at some point. This concern would fundamentally alter the methodology requirements, and potentially set the entire [redacted] project offline. So this is obviously a critical concern for us to resolve asap.

After all of that, please have a very happy holiday Sam!

Regards,
Mike

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Round 3 - Assessment Team Conclusion

CAR 2 remains open. Version 8.2 of the methodology does not meet the VCS requirement that project baselines be conservative.

PART I

First, the methodology does not require use of historical management when the property does not change ownership and records exist. VCS Guidance for AFOLU Projects (18 November 2008) states:

> *14. In the case of IFM project activities, project developers using a project-based approach (rather than a performance/benchmark standard) for establishing a baseline shall provide the following information to prove that they meet minimum acceptable standards:*
> *a. A documented history of the operator (e.g. operator shall have 5 to 10 years of management records to show normal historical practices). Common records would include data on timber cruise volumes, inventory levels, harvest levels, etc. on the property; and*
> *b. The legal requirements for forest management and land use in the area, unless verifiable evidence can be provided demonstrating that common practice in the area does not adhere to such requirements; and*
> *c. Proof that their environmental practices equal or exceed those commonly considered a minimum standard among similar landowners in the area.*

The baseline for the IFM project is then the management plan projected through the life of the project, satisfying at a minimum the three standards given above.

However, v8.5 of the draft methodology, section 6, step 2a, point 2a.2 states that historical management must be selected for the baseline only if "The properties [sic] historical financial returns records (average of at minimum 5 previous years) demonstrate the historical management surpasses financial barriers by providing above average market returns."

Where a management history exists, VCS requires use of historical management of the property as the baseline, regardless of whether the historical management produced higher or lower than market average returns. Allowing projects to ignore their well established historic harvesting that has given a below market average financial return—and instead select as their baseline modeled aggressive harvesting—violates VCS guidance requiring use of demonstrated historic management as the baseline. This is further clarified in the VCS Document for Public Consultation: *AFOLU, Forestry and Other Land Use (AFOLU) Requirements* (August 12th, 2010 Update) in section 3.4.6:

3.4.6 A methodology that establishes criteria and procedures for identifying alternative baseline scenarios using a project-based approach, rather than with a performance standard, shall require the following:

> *1) Documented evidence of the project proponent's operating history, such as five to 10 years of management records, to provide evidence of normal historical practices. Management records may include, inter alia, data on timber cruise volumes, length of roads*

and skid trails, inventory levels, and harvest levels within the project area. Where the project proponent (and implementing partner, if applicable) has no history of logging practices in the project region, the baseline shall reflect the local common practices and legal requirements. However, if the common practice is unsustainable and unsustainable practices contravene the mission of the implementing entity, then a sustainable baseline is the minimum that can be adopted. For projects where the project proponent (including an entity with a conservation or sustainability mission) takes over ownership of a property specifically to reduce forest management emissions, then the project baseline may be based on the projected management plans of the previous property owners and/or operators (i.e., the baseline shall represent what would have most likely occurred in the absence of the project).

PART II

The baseline is set by modeling tree growth and management rules forward into the future. Appendix 1 of version 7.0 of the methodology provided a limit that the modeled baseline stating that the modeled baseline cannot have merchantable timber present at the time of the start of the project all harvested in less than 15 years. Because model outputs are hypothetical, it is extremely difficult for verifiers to contest implausible modeled baselines, when each individual model input activity and factor can be argued to be reasonable but when the modeled output standing timber stocks are much less than timber stocks that are observed in reality. This 15 year minimum duration of total harvest of timber present at the time of the start of the project provides a verifiable limit on the reasonableness and conservativeness of modeling. This 15 year minimum term of liquation of timber present at the start of the project is removed from version 8.3 of the draft methodology. The methodology does not include any sort of check of modeled baselines against timber stocks present on non-project lands as a protection against modeled baselines that have implausibly low carbon stocks. The 15-year minimum term of forest liquation provides a limit on the possible lack of realness and conservativeness of baselines. In the absence of either comparison to actual forest management outcomes or some sort of objectively verifiable limit on implausible model results, verifiers cannot reliably reject implausible model outcomes and prevent model results that have plausible inputs but implausible outputs from being accepted as project baselines. With the removal of the 15-year minimum time for harvest of all economically merchantable trees, the proposed baseline quantification methods fail to meet the VCS requirement that methods produce conservative baselines.

Round 4 - Summary of Methodology Element Developer Response

1. Our interpretation of the AFOLU guidance quoted in the CAR is fundamentally based on the interpretations found in other approved methodologies. The text in the 3GT methodology is in fact virtually identical to other approved AFOLU methodologies.
Specifically, below is a comparison of the quoted language in the 3GT methodology, approved methodology VM0003 and approved methodology VM0010. It should be noted that we believe DNV was a validator on these methodologies. It is inconsistent for DNV to approve this language under previous methodologies, and then have differing requirements for 3GT/ERA. We do understand that other methodologies are not intended to be precedent setting, however the fact is that not one, but two methodologies have undergone a double review, and the other auditor on the 3GT methodology has approved this, indicates that this phrasing has been reviewed successfully five independent times, leading us to believe it is fully consistent with VCS intent.

Table 1 - Relevant Text from Current 3GT/ERA Methodology v.8.5

STEP 2 – Selection of a Single Baseline Scenario for the Project Project proponents shall select a single baseline scenario for the project using the following steps: STEP 2a - The Historical Baseline Scenario – based on historical operating practices on the property: The baseline scenario based on actual property harvest history must be selected if: 2a.1 The current property owner retains ownership of the property and has at least 5 years historical harvest level data history, and 2a.2 The properties historical financial returns records (average of at minimum 5 previous years) demonstrate the historical management surpasses financial barriers by providing above average market returns.1 2a.3 As an alternative to historical harvest records, project proponents may choose to utilize an existing and current forward-looking forest management plan2 for the property as the baseline scenario for the project area, if the management plan:

[1] Below-market returns shall be defined as 80% or less of the current published (or otherwise verifiable) internal rate of return for timberland investment in comparable forest types and locations, including timber and non-timber forest product property returns averaged over the last five years.
[2] Management plans projecting harvesting levels and related operational activities for a minimum of 5 years from their date of creation.

i. Has been documented for at least 24 months prior to the start of the project; and,

ii. Can be demonstrated to have not been developed with the intention to create a carbon project; and,

iii. Is consistent with regional common practices under similar ownership conditions; and

iv. Meets the requirements of STEPS 2a.1 and 2a.2 above.

All other cases will utilize the Common Practice Baseline Scenario Selection steps below:
1 Below-market returns shall be defined as 80% or less of the current published (or otherwise verifiable) internal rate of return for timberland investment in comparable forest types and locations, including timber and non-timber forest product property returns averaged over the last five years.

Table 2 - VM0003 Ecotrust Methodology for Improved Forest Management through Extension of Rotation Age

"Historical Baseline
Historical Baseline must be modeled as the project baseline if the following documents exist for the forest property:
1) Historical records of forest management exist for 20 or more years preceding the project start date.
2) Historical records indicate that the management practices have surpassed the legal barriers provided by conforming with all local and regional forest legislation
3) Historical records that indicate that the historical management surpasses financial barriers by providing above average market returns.7
Common Practice Baseline
All other cases must model common practice in the region. It is possible that the common practice and project scenarios are the same, in which case the project scenario would not be considered additional.
Common practice will be defined by an accredited forest consultant entity and should consider the following elements of forest management:…"

"7 Below-market returns shall be defined as 80% or less of the current prevailing internal rate of return for forestland investment in comparable forest types and locations, after considering the full array of timber, non-timber and ecosystem service net revenues associated with the property, averaged over the last five years. Forestland investment in comparable forest types and locations shall be defined as the common practice management"

Table 3 - VM0010 Green Collar Methodology for Improved Forest Management: Conversion of Logged to Protected Forest

"Step 2.2 Modeling the baseline scenario
Once the baseline scenario of planned timber harvest is demonstrated project proponents must determine how to model the baseline management scenario. A Historical Baseline Scenario (Step 2.2.1) must be used where data is available, otherwise a Common Practice Baseline Scenario (Step 2.2.2) shall be used.
Step 2.2.1 Historical Baseline Scenario
A baseline scenario and timber harvest plan (see Box 1) derived from the historical practices of the baseline agent of timber harvest must be modeled as the project baseline if the following documents exist for the project proponent as the baseline land manager for forests in the same region as the project area:
1. Historical records of forest management exist for a minimum of 5 or more years preceding the project start date
2. Historical records indicate that the management practices have surpassed the legal requirements provided by conforming with all local and regional forest legislation
3. Historical records that indicate that the historical management surpasses financial barriers by providing above average financial returns
Step 2.2.2 Common Practice Baseline Scenario
All other cases must model baseline harvest based on common practice. Common practice will be timber harvest under the legal requirements for forest management and will be determined from a timber harvest plan (see Box 1) developed from:…"

2. To clarify text within the CAR: in the 3GT/ERA methodology the alternative for a project where the historical results can be shown to have achieved defined below market returns is not "…instead select as their baseline modeled aggressive harvesting", but instead to select a common practice baseline scenario. As noted in the methodology, this includes provision of observable, verifiable evidence related to multiple aspects of defining a common practice baseline. If there is observable, verifiable evidence that "aggressive harvesting" is common practice; the project would be fully compliant with VCS requirements to select this baseline.
3. On a principle basis, the reason this clause has been included is we believe it is consistent with the AFOLU guidance, and depending on how you read the section. More importantly we believe it is not the intention of any carbon program to punish early movers and the best historical practitioners from participating equaling in the carbon market. In addition, we do not believe the intent is to incentivize early movers/best performers to alter their practices to come in line with common practice prior to starting a carbon project, which would have an overall detrimental effect on the atmosphere. So, this clause allows the full participation of previous owners who were clearly (and verifiably) not operating consistently with the common practice and average marketplace (and note, 20% below average market performance is not going to allow poor business performers to benefit, it is expected to allow properties which have been consistently managed to higher carbon stocks to the detriment of financial returns to participate up to the level of common practice).

4. As further evidence, the use of financial indicators for analysis and selection of baseline and project scenarios is well established within the VCS additionality tool. In this additionality tool, financial tools and measures are used to compare the project and baseline scenarios, including comparing against market return benchmarks and making conclusions about the most or least financially attractive scenario(s). The use of this additionality tool for selection of baseline scenarios has been approved within VCS Methodology VM004, for comparison. We have inserted portions of the relevant tool text below for reference.

Table 4 - VCS Tool VT0001 - Selected text from: Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities

2.3. Step 2. Investment analysis

Determine whether the proposed project activity, without the revenue from the sale of GHG credits is economically or financially less attractive than at least one of the other land use scenarios. Investment analysis may be performed as a stand-alone additionality analysis or in connection to the Barrier analysis (Step 3). To conduct the investment analysis, use the following sub-steps.

2.3.1 Sub-step 2a. Determine appropriate analysis method

Determine whether to apply simple cost analysis, investment comparison analysis or benchmark analysis (sub-step 2b). If the VCS AFOLU project generates no financial or economic benefits other than VCS related income, then apply the simple cost analysis (Option I). Otherwise, use the investment comparison analysis (Option II) or the benchmark analysis (Option III). Note, that Options I, II and III are mutually exclusive hence, only one of them can be applied.

2.3.2 Sub-step 2b. – Option I. Apply simple cost analysis

Document the costs associated with the VCS AFOLU project and demonstrate that the activity produces no financial benefits other than VCS related income.

→ If it is concluded that the proposed VCS AFOLU project produces no financial benefits other than VCS related income then proceed to Step 4 (Common practice analysis).

2.3.3 Sub-step 2b. – Option II. Apply investment comparison analysis

Identify the financial indicator, such as IRR8 (investment rate of return), NPV (net present value), payback period, cost benefit ratio most suitable for the project type and decision-making context.

2.3.4 Sub-step 2b – Option III. Apply benchmark analysis

Identify the financial indicator, such as IRR9, NPV, payback period, cost benefit ratio, or other (e.g. required rate of return (RRR) related to investments in agriculture or forestry, bank deposit interest rate corrected for risk inherent to the project or the opportunity costs of land, such as any expected income from land speculation) most suitable for the project type and decision context. Identify the relevant benchmark value, such as the required rate of return (RRR) on equity. The benchmark is to represent standard returns in the market, considering the specific risk of the project type, but not linked to the subjective profitability expectation or risk profile of a particular project developer. Benchmarks can be derived from:

	a) Government bond rates, increased by a suitable risk premium to reflect private investment and/or the project type, as substantiated by an independent (financial) expert; b) Estimates of the cost of financing and required return on capital (e.g., commercial lending rates and guarantees required for the country and the type of project activity concerned), based on bankers views and private equity investors/funds required return on comparable projects; c) A company internal benchmark (weighted average capital cost of the company) if there is only one potential project developer (e.g., when the proposed project land is owned or otherwise controlled by a single entity, physical person or a company, who is also the project developer). The project developers shall demonstrate that this benchmark has been consistently used in the past, i.e., that project activities under similar conditions developed by the same company used the same benchmark. 2.3.5 Sub-step 2c. Calculation and comparison of financial indicators (only applicable to options II and III): a) Calculate the suitable financial indicator for the proposed VCS AFOLU project without the financial benefits from the VCS and, in the case of Option II above, for the other land use scenarios. Include all relevant costs (including, for example, the investment cost, the operations and maintenance costs), and revenues (excluding GHG credit revenues, but including subsidies/fiscal incentives where applicable), and, as appropriate, non-market cost and benefits in the case of public investors. b) Present the investment analysis in a transparent manner and provide all the relevant assumptions in the VCS AFOLU project description, so that a reader can reproduce the analysis and obtain the same results. Clearly present critical economic parameters and assumptions (such as capital costs, lifetimes, and discount rate or cost of capital). Justify and/or cite assumptions in a manner that can be validated. In calculating the financial indicator, the project's risks can be included through the cash flow pattern, subject to project specific expectations and assumptions (e.g. insurance premiums can be used in the calculation to reflect specific risk equivalents). c) Assumptions and input data for the investment analysis shall not differ across the project activity and its alternatives, unless differences can be well substantiated. d) Present in the VCS AFOLU project description submitted for validation a clear comparison of the financial indicator for the proposed VCS AFOLU project without the financial benefits from the VCS and: i) Option II (investment comparison analysis): If one of the other land use scenarios has the better indicator (e.g. higher IRR), then the VCS AFOLU project cannot be considered as the financially attractive; or ii) Option III (benchmark analysis): If the VCS AFOLU project has a less favorable indicator (e.g., lower IRR) than the benchmark, then the VCS AFOLU project cannot be considered as financially attractive. → If it is concluded that the proposed VCS AFOLU project without the financial benefits from the VCS is not financially most attractive then proceed to Step 2d (Sensitivity Analysis). 8 For the investment comparison analysis, IRRs can be calculated either as project IRRs or as equity IRRs. Project	

IRRs calculate a return based on project cash outflows and cash inflows only, irrespective the source of financing. Equity IRRs calculate a return to equity investors and therefore also consider amount and costs of available debt financing. The decision to proceed with an investment is based on returns to the investors, so equity IRR will be more appropriate in many cases. However, there will also be cases where a project IRR may be appropriate.
9 For the benchmark analysis, the IRR shall be calculated as project IRR. If there is only one potential project developer (e.g. when the project activity upgrades an existing process), the IRR shall be calculated as equity IRR.

Based on this, we do not believe it is necessary to make further changes to the methodology based on CAR 2, Part 1 – this clause is consistent in intent and application in multiple methodologies and hence should be appropriate in this IFM methodology as well.

2. **DNV CAR Part 2:**

The baseline is set by modeling tree growth and management rules forward into the future. Appendix 1 of version 7.0 of the methodology provided a limit that the modeled baseline stating that the modeled baseline cannot have merchantable timber present at the time of the start of the project all harvested in less than 15 years. Because model outputs are hypothetical, it is extremely difficult for verifiers to contest implausible modeled baselines, when each individual model input activity and factor can be argued to be reasonable but when the modeled output standing timber stocks are much less than timber stocks that are observed in reality. This 15 year minimum duration of total harvest of timber present at the time of the start of the project provides a verifiable limit on the reasonableness and conservativeness of modeling. This 15 year minimum term of liquation of timber present at the start of the project is removed from version 8.3 of the draft methodology. The methodology does not include any sort of check of modeled baselines against timber stocks present on non-project lands as a protection against modeled baselines that have implausibly low carbon stocks. The 15-year minimum term of forest liquation provides a limit on the possible lack of realness and conservativeness of baselines. In the absence of either comparison to actual forest management outcomes or some sort of objectively verifiable limit on implausible model results, verifiers cannot reliably reject implausible model outcomes and prevent model results that have plausible inputs but implausible outputs from being accepted as project baselines. With the removal of the 15-year minimum time for harvest of all economically merchantable trees, the proposed baseline quantification methods fail to meet the VCS requirement that methods produce conservative baselines.

3GT Response:

First, to be clear, ALL baselines are created by projecting (i.e. modeling) current or projected activities forward. ALL methodologies do this, and all use some form of model for the projection. Throughout this baseline CAR issue DNV has presented this idea that 3GT is somehow unique or incorrect to be using harvest scheduling, forest inventory, and growth & yield models to project baseline and project conditions

forward; when in fact this is both necessary and in fact standard best practice for all forms of forward-looking forest management planning. Further, this methodology requires verifiable, observable evidence in multiple forms to develop the baseline scenario, which is then projected forward using a model. As noted, this is the exact same process utilized in virtually all AFOLU methodologies.

The methodology outlines one of the most robust set of requirements of any methodology for the provision of a detailed set of verifiable, observable evidence of regional common practice. There are multiple elements and multiple verifiable and observable data sources listed which fully enable auditors to make well informed decisions about the reasonableness of a projected common practice baseline scenario. The DNV auditor appears to posit that a common practice baseline scenario of any kind could be created and projected without any evidence, when this is clearly not the case following this methodology.

VCS currently defines common practice as: "Extrapolation of observed similar activities in the geographical area with similar socio-economic and ecological conditions as the project area occurring in the period beginning ten years prior to the project start date" (Voluntary Carbon Standard, 2010a). The baseline selection process and verifiable evidence requirements clearly provide auditors the ability to test whether a baseline scenario is a projection of extrapolated activities from the comparable area.

With respect to CAR 2, Part 2 specifically:

The second part of CAR 2 is not clear as it refers to other material incorrectly. The "15 year minimum term of liquation" quoted is in fact referenced from the v.7.0 Appendix 1: "Example of Project Area Stratification". This was included as a very simple example of the sequence of steps for stratifying a land base and very basic harvest scheduling. This was an example only, and it used a 15 year mature harvest period simple because the resulting example table fit on the page. As such, the quote: "With the removal of the 15-year minimum time for harvest of all economically merchantable trees, the proposed baseline quantification methods fail to meet the VCS requirement that methods produce conservative baselines" is incorrect, as a 15-year minimum was never included as a methodology requirement or suggestion – it was in an example related to stratification, which was later removed as unnecessary. Setting a mandatory liquidation period for all projects would not be appropriate in all situations, and hence has never been part of the methodology.

We do not believe any further change is necessary to meet CAR 2, Part 2 – the quoted change was never made (as it never existed except in an example), and is not relevant to meeting VCS requirements.

Round 4 - Assessment Team Conclusion

In Section 6, addressing baselines, in step 2a for determining the baseline scenario based on historical practices, point 2a.2 should be moved to step 2a.3 and references to 2a.2 shall be removed.

DNV discussed with VCS how to assure that modeled baselines are conservative, real, and plausible. DNV discussed with VCS the appropriate level of guidance a methodology should contain regarding modeling of project baselines and DNV determines that the verifier is to determine if the modeled baseline for a project is conservative, real and plausible.

Round 5 – Summary of Methodology Element Developer Response

(The MED has deleted section 2a.2 and 2a.3)

Round 5- Assessment Team Conclusion

CAR 2 is closed.

CAR 3

Draft Report Corrective Action Request by Assessment Team

– Reference (5) above – The methodology is applicable to properties with predominantly upland forests and without substantial emission reductions planned from forested swamps, forested peat lands, or other forests on deep organic soils.

The above requirement should be described numerically e.g. The minimum percentage of forest area that needs to be upland forests and the minimum area of forest that can be forested swamps, forested peatlands, or other forests on deep organic soils.

Summary of Methodology Element Developer Response

These eligibility criteria have been modified to clarify the treatment of wetlands (excluding managed peat forest areas) and with a clause around excluded properties where % of wetland area is being modified.

Assessment Team Conclusion

CAR 3 is closed. Agree that the changes do what the methodology proponent states they do, and that the changes address the CAR.

CAR 4

Draft Report Corrective Action Request by Assessment Team

The baseline approach should be consistent with the applicability criteria listed above. There are some terminologies and sentences in Section 2 that contradict the applicability criteria e.g.

Section 2.2 – this methodology is designed for properties undergoing a significant change in ownership or management practice

Summary of Methodology Element Developer Response

This eligibility criteria has been removed, and the new baseline selection process should be consistent with the eligibility criteria.

Assessment Team Conclusion

Same response as to CAR 2.

CAR 5

Draft Report Corrective Action Request by Assessment Team

The MED also does not conform to the following requirement in the VCS 2007.1 (Page 18);

"Methodologies shall be informed by a comparative assessment of the project and its alternatives in order to identify the baseline scenario. Such an analysis shall include, at a minimum, a comparative assessment of the implementation barriers and net benefits faced by the project and its alternatives."/2/

The revised MED will need to be in conformance with the guidelines specified in the Tool for AFOLU Methodological Issues/6/:

In the case of IFM project activities, project developers using a project-based approach (rather than a performance/benchmark standard) for

establishing a baseline shall provide the following information to prove that they meet minimum acceptable standards:

- A documented history of the operator (e.g., operator shall have 5 to 10 years of management records to show normal historical practices). Common records would include data on timber cruise volumes, inventory levels, harvest levels, etc. on the property;

    - For new management entities with no history of logging practices in the project region, the baseline should reflect just the common practices and legal requirements. However, if the common practice is unsustainable and unsustainable practices contravene the mission of the implementing entity then a sustainable baseline is the minimum that can be adopted. For projects focused on stopping logging or reducing the impact of logging, where the implementing entity takes over ownership of a property specifically to reduce forest management emissions, then the project baseline may be based on the projected management plans of the previous property owners (i.e., the baseline shall represent what would have most likely occurred in the absence of the carbon project.)

Proof that their environmental practices equal or exceed those commonly considered a minimum standard among similar landowners in the area.

Summary of Methodology Element Developer Response

The baseline selection process has been re-designed to include all of the listed VCS requirements in this CAR, and modified in a manner similar to the suggested process outlined here. See section 6.

Round 2 - Draft Report Corrective Action Request by Assessment Team

5.1 If the project activity is included as a possible baseline, the revised sections address the CAR by including the steps required by VCS.

5.2 The baseline determination approach is not conservative and does not ensure that a realistic baseline is chosen.

5.3 The common practice should be considered as the minimum acceptable baseline carbon stock level. The principle of conservativeness requires that the selected baseline be the higher of common practice or the most likely management of the project lands as determined in previous base setting steps. This requirement is stated in point 14.c. of the VCS guidance for AFOLU projects (2008).

5.4 The alternatives described should be clear. The historical baseline or common practice baseline cannot include a financial aspect to it.

5.5 The discussion of determination of common practice should be corrected.

5.6 In Section 6, Step 1, page 11. Modeling is not observation of common practice. References to modeling should be removed from the discussion of determining common practice. It would be clearer if the discussion of assessing common practice focused on quantifying carbon stocks on other ownerships and did not include mentions of "management" that could be misconstrued as meaning that modeling a management regime could count as assessing common practice.

5.7 On pages 12 and 13, Steps 2b and 2c, must be revised. Common practice is what others do in general, not what one landowner was doing. The point here is whether or not landowners commonly harvest as quickly predicted by models that maximize harvest NPV. This is checked by seeing of observed forest carbon stocks are at or above the stocks predicted by models maximizing NPV. Thus, common practice is assessed by quantifying the average carbon stocks observed on other lands in the region that have similar forest type and ownership type.

5.8 Section 7, Step 2 should state "in the absence of GHG offset revenues" after the words "determined that."

Round 2 - Summary of Methodology Element Developer Response

5.1 – n/a, closed.

5.2, 5.3, 5.4, 5.5 – Clarifying discussions were held which concluded that financial measures such as NPV and IRR against published industry data was an acceptable measure of common practice for determining baseline scenarios, if combined with observable common practice in regional markets (including operational common practice and financial common practice). The updated text should clarify this accordingly. This also related to clarification in 5.6.

5.6 – the DNV auditors had mis-interpreted the baseline selection intent to believe we were indicating a theoretical optimized NPV and operating case were being used in place of observable common practice. It appears upon verbal clarification this element is resolved, but as in 5.5, baseline text has been clarified as well.

5.7 steps 2b and 2c have been clarified to establish the decision tree between the steps. In addition, these CAR comments related to a gap which was not covered, where an existing landowner was not meeting step 1.2 (IRR >80% industry norm). This step is now clarified. Also this comment relates to 5.6.

5.8 – no change necessary: confirmed direct quote from VCS tool as is.

Round 3 - Draft Report Corrective Action Request by Assessment Team

The original CAR relating to consideration of possible alternative baseline scenarios has been addressed and thus this CAR is closed. The later issues relating to baseline conservativeness are dealt with in CAR 2.

CAR 5 is closed

CAR 6

Draft Report Corrective Action Request by Assessment Team

In section 2.2, item 6 in the list of scenarios should be deleted. This is a LtPF methodology, not an avoided deforestation methodology.

Summary of Methodology Element Developer Response

All references to avoided deforestation have been removed.

Assessment Team Conclusion

CAR 6 is closed. A search of the document revealed no instance of the term deforestation.

CAR 7

Draft Report Corrective Action Request by Assessment Team

- *The emission sources (GHG CO_2, CH_4 and N_2O) included in or excluded from the project boundary area has not been provided in the MED.*

Summary of Methodology Element Developer Response

This has been clarified in Table 2, section 5.4. CH4 and N2O are excluded from the methodology.

Assessment Team Conclusion

CAR 7 is closed because the revised text says what the methodology developer claims it says.

CAR 8.1

Draft Report Corrective Action Request by Assessment Team

– *The baseline GHG removals method should be revised to reflect on the revised baseline determination requirements. The Baseline GHG*

removals should provide a method for determination of common practice baseline, sustainable baseline or historic baseline as applicable. The geographic boundary for similar lands to be included in common practice analysis should be described. The carbon pools to be included in the common practice assessment need to be listed.

Summary of Methodology Element Developer Response

The baseline and project GHG calculations have been fully modified to reflect the baseline scenario selections. Further clarifications and updates to the definitions, stratifications, and calculations have been made throughout section 8 & 9.

Assessment Team Conclusion

In addition: Equation 13 (and Eq. 37 in project case) should be the woody debris stock times the decomposition rate, not the woody debris increment times the decomposition rate.

Round 2 - Summary of Methodology Element Developer Response

The requested changes have been made in both Equation 13 and 37.

Round 2 - Assessment Team Conclusion

CAR 8.1 is closed because the equations have been corrected. The baseline issues are dealt with in CARs 2, 4, and 5.

CAR 8.2

Draft Report Corrective Action Request by Assessment Team

– *The baseline GHG removals method should be revised to reflect on the revised baseline determination requirements. The Baseline GHG removals should provide a method for determination of common practice baseline, sustainable baseline or historic baseline as applicable. The geographic boundary for similar lands to be included in common practice analysis should be described. The carbon pools to be included in the common practice assessment need to be listed.*

Summary of Methodology Element Developer Response

The baseline and project GHG calculations have been fully modified to reflect the baseline scenario selections. Further clarifications and updates to the definitions, stratifications, and calculations have been made throughout section 8 & 9.

Assessment Team Conclusion

Section 8.1 on page 15 and on pages 16 and 19 provisions are made for allowing the use of a biomass expansion factor to estimate carbon

stock change from merchantable volume change. The option should be deleted because it was provided for tropical forests without inventories and this methodology is for boreal and temperate forests with inventories. Inventories should be used to run individual-tree growth models, and inventories or model predictions of individual tree sizes and numbers should be used to calculate carbon stocks and stock changes.

Round 2 - Summary of Methodology Element Developer Response

Section 8.1 has been revised to clarify when the use of expansion factors is appropriate. The language with respect to the use of models has also been clarified. In addition, minimum model requirements have been added, along with additional starting inventory requirements.

Round 2 - Assessment Team Conclusion

CAR 8.2 is closed because the language now provides adequate guidance on use of expansion factors and inventory data in modeling.

CAR 8.3

Draft Report Corrective Action Request by Assessment Team

– *The baseline GHG removals method should be revised to reflect on the revised baseline determination requirements. The Baseline GHG removals should provide a method for determination of common practice baseline, sustainable baseline or historic baseline as applicable. The geographic boundary for similar lands to be included in common practice analysis should be described. The carbon pools to be included in the common practice assessment need to be listed.*

Summary of Methodology Element Developer Response

The baseline and project GHG calculations have been fully modified to reflect the baseline scenario selections. Further clarifications and updates to the definitions, stratifications, and calculations have been made throughout section 8 & 9.

Assessment Team Conclusion

How can realistic modeling of ingrowth and mortality be assured? In our experiences with some of the models cited, ingrowth and mortality predictions have been implausible even when growth and yield predictions are plausible.

Round 2 - Summary of Methodology Element Developer Response

A criterion describing the requirements with respect to the representation of mortality in growth and yield models has been added in Section

8.1. We did not add a criterion with respect to in-growth as most growth and yield models are based upon even aged stands and do not explicitly represent in-growth. Further, any in-growth would be accounted for in the total stand-level yield.
Round 2 - Assessment Team Conclusion CAR 8.3 is closed because the language in the methodology gives requirements that verifiers can use to require that model results be reasonable.

CAR 8.4
Draft Report Corrective Action Request by Assessment Team – *The baseline GHG removals method should be revised to reflect on the revised baseline determination requirements. The Baseline GHG removals should provide a method for determination of common practice baseline, sustainable baseline or historic baseline as applicable. The geographic boundary for similar lands to be included in common practice analysis should be described. The carbon pools to be included in the common practice assessment need to be listed.* **Summary of Methodology Element Developer Response** The baseline and project GHG calculations have been fully modified to reflect the baseline scenario selections. Further clarifications and updates to the definitions, stratifications, and calculations have been made throughout section 8 & 9.
Assessment Team Conclusion Assuming immediate oxidation of belowground biomass upon tree death is not conservative for the baseline. Belowground wood decomposition should be modeled in section 8.2. Also, gains in belowground carbon are counted in section 8.2.1. Thus, if incremental annual accounting is used, losses of belowground carbon must be included when tallying biomass carbon losses in Equation 10.
Round 2 - Summary of Methodology Element Developer Response We have modified the calculation of C stored in DOM pools (Equation 10 in Section 8.2 and the companion equation 38 in Section 9.3.3) to include a dead belowground biomass term. All of the supporting equations have been added in both sections.
Round 2 - Assessment Team Conclusion In response to CAR 8.4, several equations were added to the methodology. In equations 11a, 11b, 14a, 14b, 17a, and 17b, the nomenclature is not clear. There appears to be improper mixing of stock and change in stock. Also, amount per hectare is mixed with amount per stratum, without a hectares per stratum conversion. Specifically, LDW sub t+1 is in tons per stratum and the other terms are tons per hectare. In

equation 11b, the terms on the right side of the equal sign are change in stock in time t, but the term on the left side of the equation is said to be stock. Is there a missing stock at time t on the right side of the equations, or is the left side supposed to be change in stock? The construction is the same in equations 14 and 17.
Round 3 - Summary of Methodology Element Developer Response Equations 11a-b, 14a-b and 17a-b have been fixed to correct problems associated with units and differences between stocks and change in stocks. Specifically: 1) the (ha -1) term was taken out of the unit descriptions for stock change variables subscripted as IN or OUT; 2) the stock vs. stock changes issue was resolved in Eq. 11b, 14b, 17b.
Round 3 – Assessment Team Conclusion In version 8.5 the time t stock is included in the right hand side of the equations, correcting the error. CAR 8.4 is closed.

CAR 8.5
Draft Report Corrective Action Request by Assessment Team – *The baseline GHG removals method should be revised to reflect on the revised baseline determination requirements. The Baseline GHG removals should provide a method for determination of common practice baseline, sustainable baseline or historic baseline as applicable. The geographic boundary for similar lands to be included in common practice analysis should be described. The carbon pools to be included in the common practice assessment need to be listed.* **Summary of Methodology Element Developer Response** The baseline and project GHG calculations have been fully modified to reflect the baseline scenario selections. Further clarifications and updates to the definitions, stratifications, and calculations have been made throughout section 8 & 9.
Assessment Team Conclusion In Equation 17, please explain how $C_{PERMHWP}$ and $C_{PERMMAN}$ are different things. Is the second term intended to include residuals? Also, can you document that the rates provided as defaults for $C_{PREMHWP}$ do not include carbon stored in products from secondary manufacturing. If residuals are excluded, wouldn't equation 20 be harvested biomass removed from the site minus biomass used in primary wood products?
Round 2 - Summary of Methodology Element Developer Response Equation 17 in the revised text is now equation 18. The terms in equation 18 and the associated text in Section 8.3 have been clarified to indicate that the terms refer to primary and secondary processing. The equivalent equation in Section 9 has also been updated. The default values in Table 3 are derived from Miner 2006. In the paper Miner does not clearly specify whether the defaults include secondary

processing but one could reasonably infer that they do not. Even, if they do, this would only make our calculations of storage in wood products more conservative as we would double account for storage in secondary processing.

With respect to the final comment about equation 20 (now equation 22), the last term is calculated as fproductk(1-fporcessk), which simplifies to fproductk – REk. This should account for removal of storage in wood products.

An additional equation has been added to Section 8.3 (equation 24) to help clarify calculations due to storage during secondary processing.

Round 2 - Assessment Team Conclusion

CAR 8.5 is closed. The accounting is clarified and the calculations are internally consistent.

CAR 8.6

Draft Report Corrective Action Request by Assessment Team

– *The baseline GHG removals method should be revised to reflect on the revised baseline determination requirements. The Baseline GHG removals should provide a method for determination of common practice baseline, sustainable baseline or historic baseline as applicable. The geographic boundary for similar lands to be included in common practice analysis should be described. The carbon pools to be included in the common practice assessment need to be listed.*

Summary of Methodology Element Developer Response

The baseline and project GHG calculations have been fully modified to reflect the baseline scenario selections. Further clarifications and updates to the definitions, stratifications, and calculations have been made throughout section 8 & 9.

Assessment Team Conclusion

At the bottom of page 24 the equation appears to be missing a close parenthesis (and the same equation on page 37).

Round 2 - Summary of Methodology Element Developer Response

Both equations (now equations 21 and 49) now include the missing parenthesis.

Round 2 - Assessment Team Conclusion

The methodology has been revised to correct the errors and CAR 8.6 closed

CAR 8.7
Draft Report Corrective Action Request by Assessment Team – *The baseline GHG removals method should be revised to reflect on the revised baseline determination requirements. The Baseline GHG removals should provide a method for determination of common practice baseline, sustainable baseline or historic baseline as applicable. The geographic boundary for similar lands to be included in common practice analysis should be described. The carbon pools to be included in the common practice assessment need to be listed.* **Summary of Methodology Element Developer Response** The baseline and project GHG calculations have been fully modified to reflect the baseline scenario selections. Further clarifications and updates to the definitions, stratifications, and calculations have been made throughout section 8 & 9.
Assessment Team Conclusion Please explain why Equation 20 is not harvested biomass minus biomass into wood products.
Round 2 - Summary of Methodology Element Developer Response See response to 8.5
Round 2 - Assessment Team Conclusion The description of wood product accounting is internally consistent and with respect to wood product accounting CAR 8.7 is closed. The original baseline issue is addressed in CAR 2.

CAR 8.8
Draft Report Corrective Action Request by Assessment Team – *The baseline GHG removals method should be revised to reflect on the revised baseline determination requirements. The Baseline GHG removals should provide a method for determination of common practice baseline, sustainable baseline or historic baseline as applicable. The geographic boundary for similar lands to be included in common practice analysis should be described. The carbon pools to be included in the common practice assessment need to be listed.*

Summary of Methodology Element Developer Response The baseline and project GHG calculations have been fully modified to reflect the baseline scenario selections. Further clarifications and updates to the definitions, stratifications, and calculations have been made throughout section 8 & 9.
Assessment Team Conclusion Belowground tree biomass is selected in Table 1, this should be included in Sections 9.2.1 and 9.3.
Round 2 - Summary of Methodology Element Developer Response Belowground biomass was in 9.2.1 and has been added with detailed equations in Section 9.3 (see equations 33a and 33b)
Round 2 - Assessment Team Conclusion Below ground biomass has been included in section 9.3 equation 33a and 33b CAR 8.8 is closed

CAR 8.9
Draft Report Corrective Action Request by Assessment Team – *The baseline GHG removals method should be revised to reflect on the revised baseline determination requirements. The Baseline GHG removals should provide a method for determination of common practice baseline, sustainable baseline or historic baseline as applicable. The geographic boundary for similar lands to be included in common practice analysis should be described. The carbon pools to be included in the common practice assessment need to be listed.* **Summary of Methodology Element Developer Response** The baseline and project GHG calculations have been fully modified to reflect the baseline scenario selections. Further clarifications and updates to the definitions, stratifications, and calculations have been made throughout section 8 & 9.
Assessment Team Conclusion Section 9.3.2. should be live biomass loss, not just aboveground biomass loss, to be symmetrical with belowground gains in live biomass.

Round 2 - Summary of Methodology Element Developer Response

Both Section 9.3.2 and the baseline equivalent Section 8.2.2 have been fixed such that they now represent live biomass loss instead of aboveground biomass loss. A few new variables were created, some existing variables were modified and several equations updated. Aboveground biomass loss has been replaced by Live biomass loss in Section 9.3.2. The equation in Section 9.3.2 has been revised accordingly.

Round 2 - Assessment Team Conclusion

The new equations are internally consistent and CAR 8.9 is closed. The remaining baseline issues are addressed in CAR 2.

CAR 8.10

Draft Report Corrective Action Request by Assessment Team

– *The baseline GHG removals method should be revised to reflect on the revised baseline determination requirements. The Baseline GHG removals should provide a method for determination of common practice baseline, sustainable baseline or historic baseline as applicable. The geographic boundary for similar lands to be included in common practice analysis should be described. The carbon pools to be included in the common practice assessment need to be listed.*

Summary of Methodology Element Developer Response

The baseline and project GHG calculations have been fully modified to reflect the baseline scenario selections. Further clarifications and updates to the definitions, stratifications, and calculations have been made throughout section 8 & 9.

Assessment Team Conclusion

Somewhere in section 9.3 it might be useful to clarify that the inventory is used to calculate a carbon stock for a particular year and the prior inventory is used to calculate stock at a prior time, and actual annual change in carbon stock is the measured change divided by the number of years between inventories. It may be that the model is used to calculate growth when stands are inventoried during different years, and the growth of stands measured in earlier years is modeled to estimate the stock at some later year for which a complete inventory is calculated.

Round 2 - Summary of Methodology Element Developer Response

Section 9.3 clearly indicates that all carbon stock calculations are done on an annual time step. Whether data come from actual inventory measurements or a model or some combination of the two is not important. We are concerned that adding text around specific circumstances would only complicate the section.

Round 2 - Assessment Team Conclusion

Inventory data use has been articulated and CAR 8.10 is closed

CAR 9

Draft Report Corrective Action Request by Assessment Team

Section 2.4.5 addresses ex-ante projections, not calculations of amounts of VCUs to be issued. The title of this section should reflect this, such as "Estimation of Expected VCUs".

Summary of Methodology Element Developer Response

Section 11 now includes corrected calculation procedures for first calculating net GHG emissions, applying a leakage factor; and then calculating an uncertainy factor, VCU's, and permanence buffers.

Assessment Team Conclusion

CAR 9 Closed - Due to reorganization of the draft methodology, the CAR is no longer relevant.

CAR 10

Draft Report Corrective Action Request by Assessment Team

– *Equation 3.2.27 in Section 2.5.4.1 given for emission reduction should provide the difference in carbon stock in baseline and project emissions. The equation provided is adding the baseline and project stock.*

Summary of Methodology Element Developer Response

Equations have been fixed.

Assessment Team Conclusion

The error has been corrected and CAR 10 closed

CAR 11

Draft Report Corrective Action Request by Assessment Team

Sections 3.9 and 3.10 lack equations for calculating the ex-post difference between actual achieved stocks, modeled baseline stocks, leakage, VCUs allocated to the buffer, and issued VCUs.

Summary of Methodology Element Developer Response

Section 11 now covers these issues properly in the equations.

Assessment Team Conclusion

In Equation 50, shouldn't the term LE_y be subtracted from gross emission reductions?

In Section 11.4, step 1, please provide the equation for calculating the standard error.

Round 2 - Summary of Methodology Element Developer Response
Equation 50 (now Eqn. 58) has been corrected.

Round 2 - Assessment Team Conclusion
Equation 58 has been revised.
The equation for calculating standard error has not been included in Section 11.4, Step 1 and this CAR remains open.

Round 3 – Summary of Methodology Element Developer Response
We did not intend for the proponent to calculate a stand error term in Step 1. The objective of this step is to determine the average area-weighted, relative (defined as a percent of total ecosystem C) deviation between the modeled value and measured value for each stratum for which plot-level C data is available. The model error term is designed to inform the proponent if the model is over or under-predicting C storage. A model that over-predicts will create a positive error term which increases the overall uncertainty factor. The opposite would be true for an under-predicting model. The standard error term is calculated as part of the Inventory error term in Step 2. This inventory error term is designed to provide information with respect the accuracy of the field measurements of ecosystem C. In this case smaller numbers of plots will typically result in higher error terms.

Round 3 – Assessment Team Conclusion

Part I
Although the approach seems plausible, we are not familiar with the approach to quantifying model error by finding an area-weighted difference between modeled amounts and measured amounts. Can you provide a reference for the approach given in Equation 60a? We would expect the equations to be the typical equations for calculating the uncertainty of a stratified sample, where the sample units are the differences between measured and predicted carbon storage per hectare at each measured point.

Part II
For the calculation of model error in Equations 60a and 60b, please clarify what modeling you mean to be tested against what measurements. Are you intending that modeled growth, mortality, and decomposition be compared to measured growth, mortality, and decomposition? Is modeled harvest to be compared to measured harvest? Something else?

Part III
Equation 60c has terms not included in well-established statistics. The 90% confidence interval (two tailed, in percent, for a reasonably large sample) should be approximately 1.65 times the standard error. Why is this confidence interval divided by an area-weighting of the variability in measured carbon stocks when this area weighting is performed in the calculation of the standard deviation of the project inventory, calculated in Equation 60e?

Part IV
Equations 60d (standard error of the estimate) and 60e (standard deviation of a sample) match well-established statistical methods. However, the text describes area-weighting of uncertainties and the equation given as 60e is for a simple random sample, not the equation for the standard deviation pooled across multiple strata and weighted by area.

Part V
Also, given that Equation 60e is for calculating the uncertainty in the inventory, why are the deviations calculated for the difference between the modeled and inventoried amounts (yd,I,j) instead of the inventory amounts (ym,I,j)?

As shown in version 8.5 of the methodology, we accept the estimation of total error as calculated in Equation 60f.

Round 4 – Summary of Methodology Element Developer Response

Part I
A key term in equation 60a is $y_{di,j}$, as defined in equation 60b. $Y_{di,j}$ is the difference between the measured ($y_{mi,j}$) and predicted ($y_{pi,j}$) values for plot j, stratum/analysis unit, i, weighted by the area of each stratum/analysis unit. This is essentially equivalent to the calculation of a weighted mean or other weighted statistics where the measures differ in their reliability (Sokal and Rohlf 1981. Biometry: The principles and practices of statistics in biological research. W.H. Freeman and Co. NY). These area-weighted values are subsequently converted to a relative value in Equation 60c (see response below for more detail).

Part II
The comparison will be between predicted and measured values for total ecosystem carbon (including all the pools measured in the monitoring plots but excluding dead below-ground biomass which cannot not be measured easily in the field) in a given year. This includes growth,

mortality and decomposition, as well as any harvest removals.

Part III

EI is expressed in relative terms as a 90% CI Error divided by the mean carbon storage in all the measured plots. Since the standard deviation and standard error terms were calculated based upon the area-weighted differences between the predicted and measured values of carbon storage, they must be divided by the area-weighted mean measured value for all of the sampled monitoring plots to be consistent. We have added text to clarify this point. Equations 60a and 60e have also been adjusted to improve clarity (though not fundamentally changed in content).

Part IV

Equations 60d and 60e use the area-weighted values from the random sample (difference * area). The fact that the differences are weighted doesn't fundamentally change the nature of the calculation of S and SE. The area-weighted is factored out in Equation 60c.

Part V

This methodology was designed to handle complex landscapes consisting of hundreds to thousands of polygons, which represent strata. Given, the large number of strata we could not afford to put multiple plots into a single polygon to determine an inventory error in the classic sense you refer to. Rather, inventory error is estimated based upon the error determined as the difference between predicted (modeled) and measured values for monitoring plots established in polygons (strata) representative of the different analysis units developed to represent the main forest types within the project area. Forest inventories in large, complex landscapes are almost always generated using a combination of remote sensing to determine age and forest type and models to determine age-related attributes. Text has been added to clarify this point.

Round 4 – Assessment Team Conclusion

Part I

Sokol and Rohlf is an authoritative source and we accept the equations 60a and 60b in both of the forms presented in versions 8.5 and 8.6 of the methodology. We do note, however, that is it confusing to readers that $y_{d,i,j}$, $y_{m,i,j}$ and $y_{p,i,j}$ are very similar notation, but $y_{d,i,j}$ is area weighted (e.g. tons per analysis unit) while $y_{m,i,j}$ and $y_{p,i,j}$ are not area weighted (e.g. tons per hectare).

Part II

We accept that this method is for checking the accuracy of modeled values that are extrapolated or projected from measurements and calculated for times or locations that are not measured.

Part III

Let us be very clear that we have three scales we are talking about: (a) plot, or "sample unit" or measurement, (b) analysis unit/stratum/polygon, and (c) the entire analysis area, which is the sum of all analysis units. The methodology states that polygons "represent strata" and your discussion below states that a polygon may not have more than one plot. Do you intend that each analysis unit/stratum/polygon will have exactly one plot? Do you intend that a single analysis unit/stratum/polygon could possibly encompass no plots, one plot, or more than one plot? Or do you mean that you might have multiple, non-contiguous polygons that are all in a single stratum and each stratum must contain more than one plot? Or do you intend something different?

Also, let us be clear when we are talking normalized tons per hectare versus tons on a plot (where the plot is typically less than 1 ha in area), tons in an analysis unit (where analysis units may be more or less than 1 ha in area) and tons in the total analysis area. Model outputs are often stated in terms of tons per hectare, but a model estimate for an analysis unit should be treated as a single "observation" or "sampling unit" in these calculations.

As a side comment, equation 60c calculates the error in the percent error in inventory at the 90% confidence level, E_I. We assume that E_I is calculated only at times when inventories are performed and if uncertainty factors are needed for dates between times when the inventory is measured the E_I from the most recent inventory will be used to calculate the total error E_P.
Having stated these clarifications and assumptions, we are trying to understand the uncertainty calculations if there is not a one-to-one mapping of plots and analysis units. If there is exactly one plot per analysis unit, and carbon amounts are normalized to tons per hectare, then we believe the equations 60a through 60e would be correct.

However, if there is more or less than one plot per analysis unit, it appears that some of the definitions of terms would have to be

adjusted.

Specifically, equation 60e calculates the standard deviation where each analysis unit is considered to be a single observation, the value of the number of tons difference between the modeled and measured values for each analysis unit. This approach is appropriate because for each $y_{p,i,j}$ the model produces one value. As this equation is written and used, we would expect N to be the number of analysis units, because for each $y_{p,i,j}$ there is one value. However, N is defined as the number of plots. Similarly, equation 60d calculates the standard error of E_M and when calculating E_M we expect N to be the number of analysis units $y_{p,i,j}$ not the number of plots.

This said, if there are fewer plots than analysis units then we believe the stated definition of N is correct. If there are fewer plots than analysis units, then some $y_{p,i,j}$ and $y_{d,i,j}$ would be estimated by extrapolating from measured $y_{m,i,j}$. These extrapolated values provide no observational power and thus should not be included in the N used to calculate statistical precision. In this case, where the number of analysis units is greater than the number of plots, then N should be the number of plots, as stated in the methodology.
Equation 60e is the standard formula for standard deviation of whatever variable is in the position of the term $y_{d,i,j}$. The methodology defines $y_{d,i,j}$ to be in units of tons per analysis unit. Thus the calculated standard deviation, S, is in tons per analysis unit. Further, the standard error calculated from this S in equation 60d will also be in tons per analysis unit. This SE is then used in equation 60c. To normalize the error to a fraction (for converting into a percent), this SE must be divided by another term that is in the same units. However, the text defining SE states that it is the project level standard error, not the analysis unit standard error. Also, if the SE is in units of tons per analysis area, for the SE to be divided by the total tons per analysis area, the N in the equation must be defined by the number of analysis units, not the number of plots.

Part IV
If there are multiple plots in each inventory stratum, the maximum statistical power would be obtained by analyzing the measurements as a stratified random sample, and we would expect equation 60c to include the calculation of the pooled standard deviation of a stratified random sample. However, a stratified sample may be analyzed as a simple random sample and VCS does not require methodologies to maximize statistical power. Thus we will consider this issue settled.

Part V
Subject to the issues above being settled, the new text further clarifies this point and is adequate.

Round 5 – Summary of Methodology Element Developer Response
Round 5 – Assessment Team Conclusion

CAR 12
Draft Report Corrective Action Request by Assessment Team - *A procedure for leakage estimation should be included in the methodology. The guidance provided in VCS does not fulfill the requirement for quantification of leakage for specific projects.* **Summary of Methodology Element Developer Response** Section 10 now outlines specific procedures for both activity shifting and market leakage. Market leakage includes 3 options for procedures, each of which is quantifiable and defined.
Assessment Team Conclusion 12. 1. In Section 10.2.1, how should the project developer determine where harvesting is displaced to, and the carbon density of forests to which harvest is displaced? Please provide justification for subtracting international leakage from the default VCS leakage rates. Please provide justification for the proposed market leakage rates and justification for using these rates to modify the default leakage rates. On page 47, line L3, the reference to L4 should be L3. In market leakage section L6, wouldn't oversupply increase the elasticity of supply, this increasing leakage, and justifying increasing the leakage rate instead of decreasing the leakage rate? 12.2 In Section 10.2.3, Step 2b-1, bullet b refers to Table 3. Should this be Table 5, not Table 3? 12.3 Leakage through activity shifting has been included in the applicability criteria. If leakage does occur in the future, how will that be monitored and how will that be taken into account?

Round 2 - Summary of Methodology Element Developer Response

12.1 The Option 3 leakage tool has been significantly modified to remove the market conditions factors due to the complexity of providing evidence for each market criteria and the related magnitude of discounts. The tool is now focused on calculating the proportion of leakage to the new VCS biomass ratio criteria and to international leakage alone, and determines where the leakage will occur to by calculating proportions of national timber supply by region and forest type.

12.2 Table references have been corrected.

12.3 Activity shifting monitoring and directions have been included in Section 13 and Section 10. In addition, the eligibility criteria has been modified to make activity shifting a starting requirement for project eligibility, but then also require the use of the VCS methodology revision process for calculating emissions from activity shifting, if it does occur later in projects.

Round 2 - Assessment Team Conclusion

The methodology provides three approaches to quantifying market leakage. We will address each in turn.

Section 10.2.1. With respect to leakage quantification approach 1, please describe how to determine where harvest is displaced to, and the carbon density of the forests to which harvest is displaced. If this guidance cannot be provided, this approach to leakage quantification could be removed from the methodology.

Section 10.2.2. Please provide evidence that leakage emissions are at least approximately close to the given rate of the leakage deduction (20% of harvested carbon).

Section 10.2.3. To show that this method could be implemented, please name data sources for at least two countries that could be used for calculations in Section 10.2.3, Table 5, Section 2 "Proportional leakage biomass ratio," subsection 2 "calculating weighted average leakage biomass ratio," specifically merchantable log biomass and total biomass, by forest type. Also, please explain why the leakage factors that would be produced by the method in 10.2.3 would be realistic.

Round 2 - Summary of Methodology Element Developer Response

CAR 12 was discussed verbally with Sam S., and it was concluded that we should respond to the 2 listed items at the bottom of the CAR text; and the following responses were discussed as likely appropriate to resolve the CAR:

1. As discussed, the data sources for the Leakage Option 3 are widely available in published forest biomass and carbon tables – in fact, the IPCC biomass tables provide regional estimates which could be used for this purpose. This biomass ratio is calculating a simple comparison of the

average total biomass ratio in mature forest types in comparison to the average mature forest type biomass ratio at the project site. This leakage measure is interested in where harvest volume could be shifted to other harvest ready forest types for replacement volume. Based on our discussions, we have not provided the 2 example sources due to the widely available nature of merchantable and total biomass for average regional mature forest types (however, for example, in Canada we calculated biomass ratios regionally from: Canada's National Forest Inventory 2006 (https://nfi.nfis.org/)).

2. As noted in the CAR, VCS does not explain how to apply their leakage tool in detail, which became problematic where a different portions of potential leakage volume would likely flow into different categories of the VCS tool. For example, VCS notes international leakage is zero, but does not instruct how to blend known international leakage into leakage into different biomass ratio categories. This tool is simply a method to pro-rate the VCS leakage factors into various likely leakage result areas.

VCS does not provide detailed explanation or justification for the leakage factors used, so we cannot elaborate. The market supply factors are verifiable from published market data.

However, in PDD work related to the example used in this tool, we found the results to be comparable and conservative than the best analysis of leakage factor evidence for North American we could find, which is presented in: U.S. EPA. (2005). Greenhouse Gas Mitigation Potential in U.S. Forestry and Agriculture. Washington D.C. United States Environmental Protection Agency.

Round 2 - Assessment Team Conclusion

As the project proponent notes, option 1 and 2 of the MED utilize approved VCS leakage discount methods. For the third option, DNV agrees that it is appropriate to include international timber trade when quantifying leakage. Thus CAR 12 is closed.

CAR 13.1

Draft Report Corrective Action Request by Assessment Team

The minimum frequency of forest inventories should be specified. Equations that will be used to calculate carbon stocks should be provided. Where possible, factors used in equations should be specified in Section 3

Summary of Methodology Element Developer Response

The section on monitoring (Section 13) has been revised and includes text on monitoring frequency, and how measured data are translated into carbon pool estimates. 9.2.1 provides guidance as to how field measures are used with equations to calculate ex post carbon stocks.

Assessment Team Conclusion

The section still does not provide guidance on conducting inventories, or equations for calculating carbon stocks and stock change increments from inventory data.

Round 2 - Summary of Methodology Element Developer Response

Section 13 has been updated to include a detailed description of how monitoring should be conducted with respect to strata and analysis units. We have also added detail around the use of analysis units to facilitate modeling and monitoring in the case of large, complex forest areas (Section 8 & 13).

Further, Section 13 has been updated to include specific descriptions of how to calculate amounts of stand-level live tree biomass, standing dead tree mass, and lying dead wood mass from the monitoring data. References have also been added to Section 9.2 where the data from the monitoring activities are used to calculate ex-post carbon stocks.

Round 2 - Assessment Team Conclusion

The methodology specifies how recent data must be, this providing a minimum frequency for forest inventories and CAR 13.1 is closed.

CAR 13.2

Draft Report Corrective Action Request by Assessment Team

The minimum frequency of forest inventories should be specified. Equations that will be used to calculate carbon stocks should be provided. Where possible, factors used in equations should be specified in Section 3

Summary of Methodology Element Developer Response

The section on monitoring (Section 13) has been revised and includes text on monitoring frequency, and how measured data are translated into carbon pool estimates. 9.2.1 provides guidance as to how field measures are used with equations to calculate ex poste carbon stocks.

Assessment Team Conclusion

Section 8.2 states that inventory data used in modeling shall not be more than 10 years old. Section 9.2 states that “any new inventory data” shall be used in calculations of actual on-site carbon stocks. It would be clearer if the maximum length if the inventory re-measurement cycle was stated in Section 9, but because modeling is used to credit offsets between inventories the inventory re-measurement cycle is implicitly limited to 10 years.

Round 2 - Summary of Methodology Element Developer Response

The maximum interval of 5 years for field plot re-measurement for inventory updating has been specified in the text. Additionally further guidance on requirements for annualized forest cover and activity shifting monitoring.

Round 2 - Assessment Team Conclusion

The methodology specifies how recent data must be, this providing a minimum frequency for forest inventories and CAR 13.2 is closed

CAR 14

Draft Report Corrective Action Request by Assessment Team

– *The criteria for the determination of all parameters, including method on the data sources that can be used and what are the most preferred data source should be provided in the MED.*

Summary of Methodology Element Developer Response

References, default values and/or recommended sources are provided for all variables in the ex ante estimation procedures.

Assessment Team Conclusion

Default values and sources that may be used to obtain values are now specified and thus CAR 14 is closed.

CAR 15

Draft Report Corrective Action Request by Assessment Team

– *The methodology needs to specify the parameters that will not be monitored and kept constant through the crediting period and the parameters that will be monitored.*

Summary of Methodology Element Developer Response

The monitoring section now contains a table specifying those parameters that will not be monitored (section 12) and those that will (section 14).

Assessment Team Conclusion

The monitoring section now contains a table specifying those parameters that will not be monitored (section 12) and those that will (section 14) And thus CAR 15 is closed.

CAR 16

Draft Report Corrective Action Request by Assessment Team

– *The parameters specific for baseline and project calculation should be clearly identifiable in the monitoring plan.*

Summary of Methodology Element Developer Response

In the monitoring section, the table in section 12 delineates parameters for the baseline and project cases that are not monitored. The table in section 14 lists the parameters and variables that are monitored and the equations to which they pertain.

Assessment Team Conclusion

The claimed changes have been made and address the CAR and thus CAR 16 is closed.

CAR 17

Draft Report Corrective Action Request by Assessment Team

- The MED allows the use permanent plots and temporary plots for sampling. It has been observed that regardless of how accurately temporary sample plots are measured, two successive volume inventories based upon them cannot yield a very precise estimate of growth because of sampling errors involved. *The MED needs to provide guidance on when project developers should use permanent or temporary plots for sampling.*

Summary of Methodology Element Developer Response Text has been added to this effect (see Plot type, in the monitoring section)
Assessment Team Conclusion The MED allows the use permanent plots and temporary plots for sampling. It has been observed that regardless of how accurately temporary sample plots are measured, two successive volume inventories based upon them cannot yield a very precise estimate of growth because of sampling errors involved. *The MED needs to provide guidance on when project developers should use permanent or temporary plots for sampling.* We do not find this guidance. Please point it out.
Round 2 - Summary of Methodology Element Developer Response The clarification has been made in the subsection of Section 13.2.2 entitled “Plot type” Section 13.2.2 has been revised to provide a description on the preference of permanent plot. However, If there are temporary plots installed on the project activity area, these should be located, if possible, and converted to permanent plots.
Round 2 - Assessment Team Conclusion Guidance language has been added and CAR 17 is closed

CL 1
Draft Report Clarification by Assessment Team – (Bullet point (2) above) - The eligibility criteria for specifies that the project is applicable to forests where there is a threat of significant logging or related forest management practice where forests remain forest. *Please provide examples of documentation that can support a threat of significant logging. Please describe the related forest management practice.*

Summary of Methodology Element Developer Response

The eligibility criteria have been modified to exclude this qualitative assessment criteria.

Assessment Team Conclusion

CL 1 closed because it is no longer relevant.

CL 2

Draft Report Clarification by Assessment Team

– Reference (4) above – *How does the methodology define 'minimal risk' of illegal logging or unplanned development pressure*

Summary of Methodology Element Developer Response

As above, the eligibility criteria have been modified.

Assessment Team Conclusion

New quantitative guidance addresses the requested clarification.
CL 2 Closed.

CL 3

Draft Report Clarification by Assessment Team

In the third to last paragraph of section 2.2 it appears that it is intended that logging and management costs should be include in analyses of "operability". The guidance would be stronger if this is explicitly stated.

Summary of Methodology Element Developer Response

This section has been modified substantially in ways that deal with this observation.

Assessment Team Conclusion

The material is now in section 6 and additional clarification has been added and thus CL 3 Closed.

CL 4
Draft Report Clarification by Assessment Team *In section 2.4.1, in the paragraph beginning "The project then projects…" we suspect that you mean that the baseline should be modeled for the entire project life. If so, you may wish to state this.* **Summary of Methodology Element Developer Response** Fixed.
Assessment Team Conclusion The issue has been clarified and CL 4 Closed.

CL 5
Draft Report Clarification by Assessment Team *The guidance should specify the goal of modeling. Is net present value maximized over the project life (including the value of standing timber at the end of the project life), is all merchantable and operable timber liquidated in 15 years, or something else?* **Summary of Methodology Element Developer Response** This section on selecting baselines has been modified to clarify.
Assessment Team Conclusion Clarifying text has been added and CL5 is closed.

CL 6
Draft Report Clarification by Assessment Team *The newly approved VCS tool: "Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land*

Use(AFOLU) Project Activities" (Voluntary Carbon Standard, 2010) is similar to the current CDM "Tool for the demonstration and assessment of additionality", version 5.2 only that it is specific to AFOLU projects. Is it still necessary to include the CDM tool?

Summary of Methodology Element Developer Response

This has been changed to specify use of the VCS tool, with option to use the CDM tool if desired.

Assessment Team Conclusion

The new provisions conform to VCS requirements and CL 6 Closed.

CL 7

Draft Report Clarification by Assessment Team

The carbon pools and emission sources selected do not match the VCS Tool for AFOLU Methodological Issues /6/ (Table 1, Pg 5). Do you want projects to include pools that VCS states are not to be included?
Is the use of fertilizers an optional pool or a conditional pool? If conditional, please specify the condition.

Summary of Methodology Element Developer Response

This has been corrected in Table 1.

Assessment Team Conclusion

The use of the word "Optional" does match VCS usage but it would be cleared to state that fertilizer emissions shall be considered if fertilizer use is above a specified level. Because the terminology matched VCS guidance, this CL is closed.

CL 8

Draft Report Clarification by Assessment Team

Section 3.3 implies that the baseline will be re-calculated and revised each year of the project. Do you really intend this, or do you intend to calculate the baseline at the start of the project and have that baseline be valid for the term allowed by VCS guidance documents? Please specify if this will be a fixed baseline or an evolving baseline.

Summary of Methodology Element Developer Response

This has been changed such that the baseline is now fixed for the duration of the project.

Assessment Team Conclusion

This issue is superseded by other changes to baseline provisions and VCS guidance, and thus CL 8 Closed.

CL 9

Draft Report Clarification by Assessment Team

We expect that you intend that models must be applicable to the species an climate addressed, but as written the language allows the project to use a model that is not appropriate to the species and climate of the project lands if the model is approved by a government and has been published.

Summary of Methodology Element Developer Response

Wording on model selection has been clarified. Model selection and use are contained within a separate section 8.1).

Assessment Team Conclusion

Language has been added to avoid the potential problem and CL 9 is closed

CL 10

Draft Report Clarification by Assessment Team

The emissions from burning of fuel wood have not been included in the project emission, the reason for excluding the same needs to be provided. If the emission from burning of fuel wood is taken into account in baseline, it needs to be included in project emissions.

Summary of Methodology Element Developer Response

Burning of fuelwood is no longer included in the methodology, and is an exclusion criteria in the eligibility.

Assessment Team Conclusion

The change in applicability requirements makes the CL moot and CL 10 is closed

CL 11

Draft Report Clarification by Assessment Team

The default values, equations and monitored data to be used for ex-ante calculation are not described in the MED. E.g.In Section 2.4 how shall values be determined for the factors $f_{ACTUALi}$, $f_{FUELWOODi}$, $f_{DAMAGEi}$, $f_{NATURALi}$, BLT_{IN}, and BLT_{PERM}?

Summary of Methodology Element Developer Response

Units, default values and/or recommend sources for values are provided for all variables.

Assessment Team Conclusion

Examples and data sources are now provided
CL 11 is closed

CL 12

Draft Report Clarification by Assessment Team

Do the methodology proponents wish to add a buffer release factor, as is allowed by VCS or is this addressed adequately in the VCS AFOLU buffer tool?

Summary of Methodology Element Developer Response

In the new document, inventory updates are required annually as part of the monitoring and ex-post data handling, and VCU calculations are made annually based on updated ex-post inventory information. However, we do not specify a full new inventory requirement.

Assessment Team Conclusion

The methodology developer response does not address the original CL, but it is not required to make the CL and DNV chooses to close this CL.

CL 13

Draft Report Clarification by Assessment Team

It appears that the MED allows the modeling of VCS amounts between inventory times. If modeling of VCU amounts is allowed between inventory times, this should be specified.

Summary of Methodology Element Developer Response

In the new document, inventory updates are required annually as part of the monitoring and ex-post data handling, and VCU calculations are made annually based on updated ex-post inventory information. However, we do not specify a full new inventory requirement.

Assessment Team Conclusion

Text of the methodology clarifies the issue and CL 13 is closed

CL 14

Draft Report Clarification by Assessment Team

What are steps "3-1a and 3-1b above" cited on page 12, in Step 2a, point 1.3.d?

Summary of Methodology Element Developer Response

These step references were typos from older versions and have been corrected.

Assessment Team Conclusion

This CL pertained to version 7.2 of the methodology and the language in question is not in the latest version of the methodology so the CL is closed.

CL 15

Draft Report Clarification by Assessment Team

In the line above Equation 21, the term "$C_{EMITDIRECT,t}$" is given. We do not find a definition of this term. Is this term intended to be $C_{EMITFOSSIL,t}$?

Summary of Methodology Element Developer Response

This reference has been corrected to the proper term.

Assessment Team Conclusion
The new equation 25 defines the term and CL 15 is closed.

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