

VALIDATION REPORT FOR THE REFORESTATION OF DEGRADED FOREST RESERVES IN GHANA PROJECT



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Summary:

This report describes the validation audit of the Reforestation of Degraded Forest Reserves in Ghana project (“the project”), an Afforestation Grouped project located in Ghana that was conducted by SCS. The purpose of the validation audit was to assess the conformance of the project with the validation criteria. The validation audit was performed through a combination of document review, interviews with relevant personnel and on-site inspections. The project complies with all of the validation criteria, and the assessment team has no restrictions or uncertainties with respect to the compliance of the project with the validation criteria.

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1 INTRODUCTION

1.1 Objective

The purpose of the validation audit activity was to conduct an independent assessment of the Reforestation of Degraded Forest Reserves in Ghana ("the project") to determine whether the project complies with the validation criteria, as set out in the guidance documents listed in Section 1.2 of this report.

1.2 Scope and Criteria

In accordance with Section 4.3.4 of ISO 14064-3:2006, the scope was defined as follows:

- The project and its baseline scenarios;
- The physical infrastructure, activities, technologies and processes of the project;
- The GHG sources, sinks and/or reservoirs that are applicable to the project;
- The types of GHGs that are applicable to the project; and
- The project crediting period, as discussed in Section 3.1.4 of this report.

In accordance with Section 5.3.1 of the VCS Standard, the criterion for validation was the VCS Version 3, including the following documents:

- VCS Program Guide
- VCS Standard
- VCS AFOLU Requirements
- VCS AFOLU Non-Permanence Risk Tool

Unless otherwise indicated, the assessment was performed against the most recent version of the relevant VCS guidance document.

1.3 Level of assurance

In accordance with Section 5.3.1 of the VCS Standard, the level of assurance of this report is reasonable.

1.4 Summary Description of the Project

The project's overall goal is reforestation of degraded forest reserves in Ghana. It is a grouped project, which is structured to allow inclusion of additional project areas subsequent to validation. The current validation includes the Asubima Forest Reserve, which comprises the initial instance of the grouped project.

The Asubima forest reserve, consisting of approximately hectares in central Ghana, used to be a productive reserve covered with high, semi-deciduous forest. However, the reserve has been severely degraded by overexploitation, bush fires, and conversion to agricultural land, particularly between 1980 and 2000 and has been declared degraded by the Government of Ghana. Without the reforestation project the area would remain degraded and degrade even further due to illegal farming, bushfires, and logging of the last remaining trees.

Project proponent (PP) FORM Ghana Ltd. has a land lease agreement with traditional land owners and the Government of Ghana for reforestation on approximately 1800 hectares of the reserve to restore productive forest. This lease construction is part of the presidential policy to restore degraded forest reserves in Ghana, which is a strong policy instrument showing the commitment of the Government of Ghana to conserve, restore and promote the sustainable use of forest resources in the country. The VCS project is implemented on 1506 hectares within the FORM Ghana concession.

FORM Ghana is a company limited under Ghanaian law, established in 2007. It has been certified according to the principles and criteria of the Forest Stewardship Council (FSC) since January 2010. The FSC certificate demonstrates the commitment and adherence of FORM Ghana to the highest sustainability standards of both social and ecological aspects. The VCS carbon project will be implemented according to the same high operational standards.

Project activities comprise CO₂ sequestration in tree plantations with exotic and indigenous tree species, natural forest restoration in riparian buffer zones and harvesting of high quality teak timber. Project activities are carried out and monitored according to approved project methodology AR-ACM0001 version 05.2.0 for a project period of 40 years.

2 VALIDATION PROCESS

2.1 Method and Criteria

The validation was performed through a combination of document review, interviews with relevant personnel and on-site inspections, as discussed in Sections 2.2 through 2.4 of this report. At all times, the project was assessed for conformance to the criteria described in Section 1.2 of this report. As discussed in Section 2.5, findings were issued to ensure that the project was in full conformance to all requirements.

2.2 Document Review

The project description (PD) and supporting documentation were carefully reviewed for conformance to the validation criteria.

Particular attention was focused on the PD, given its central role in the description of “the project and its context” (VCS Standard, Section 3.19.1). Through review of the PD, the audit team ensured that:

- The project design, as described in the PD, is in conformance with the VCS rules and the requirements of the methodology
- The PD satisfies all applicable documentation requirements of the VCS rules and the methodology

In addition to the PD, the following written documents (e.g., reports, memos, land deeds and titles) were reviewed to ensure conformance of the project to the VCS rules and the methodology:

Document (Date Created)	Date Reviewed
FORM Ghana VCS Project Description 20130114.docx	Throughout validation
FORM Ghana VCS Non-Permanence Risk Report 20121109.docx	Throughout validation
Ex ante overview CONFIDENTIAL 20130114.xlsx	Throughout validation
Ex Post 2012 confidential 20130114.xlsx	Throughout validation
Guiding document calculations CONFIDENTIAL 20130114.xlsx	Throughout validation
Letter from Forestry Commission concerning the degradation of Asubima.jpg (5 October 2009)	26 July 2012 to 30 July 2012
P 13 monitoring plantation growth and biodiversity aspects 2012-11-09.doc	8 Aug 2012 to 5 December 2012
Odoom, F. 1998. Hardwood Plantations in Ghana. Forestry Dept. UN FAO (1998)	26 July 2012 to 30 July 2012
Abeney, E.A. 2008. Social and Environmental Impact Assessment of the FORM Agro-forestry Project in Asubima Forest Reserve, Ghana (2008)	26 July 2012 to 30 July 2012
Landlease access agreement 2008.pdf (2008)	26 July 2012
Form Ghana MP ASU and AFR.pdf (2011)	16 January 2013

2.3 Interviews

Interviews constituted an important component of the audit process. The following personnel associated with the project proponent and/or implementing partner were interviewed. The phrase “throughout audit” under “Date Interviewed” indicates that the individual in question was interviewed on multiple occasions throughout the audit process.

Individual	Affiliation and Role	Date Interviewed
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Individual	Affiliation and Role	Date Interviewed
Rik Sools	FORM International, Lead Project Developer	Throughout audit
Remi de Wilde	FORM International, Project Developer	Throughout audit
Willem Fourie	FORM Ghana, Project Manager	11 - 13 Sept 2012
Millicent Tanson	FORM Ghana, Monitoring Supervisor	12 - 13 Sept 2012
Francis Ogoe	FORM Ghana, Plantation Manager	12 Sept 2012

In addition, the following individuals who were not associated with the project proponent and/or implementing partner provided information regarding the project.

Individual	Affiliation and Role	Date Interviewed
Ernest Kwartang	Ghana Forestry Commission, District Forest Manager of Offinso Forest District	11 Sept 2012
Charles Nyarku	Ghana Forestry Commission, Assistant Forest Manager of Offinso Forest District	11 Sept 2012
William Agyapong	Ghana Forestry Commission, Assistant Forest Manager of Offinso Forest District	11 Sept 2012

2.4 Site Inspections

The objectives of the on-site inspections performed were to:

- Ensure that the geographic area of the project, as reported in the PD and the accompanying KML file, is in conformance with Section 3.11.1 of the VCS Standard;
- Select samples of data from on-the-ground measurements for validation in order to meet a reasonable level of assurance and to meet the materiality requirements of the project, as required by Section 5.1.3 of the VCS Standard;
- Perform a risk-based review of the project area to ensure that the project is in conformance the eligibility requirements of the VCS rules and the applicability conditions of the methodology; and

- Perform a risk-based review of the project area to ensure that the project conforms to all other requirements of the VCS rules and the methodology.
- Observe the Project Proponent's field inventory crews collecting and recording data in order to assess whether data collection techniques conform to the monitoring plan and related documentation and to evaluate data quality control systems.

In fulfilment of the above objectives, the audit team performed an on-site inspection of the project area on the dates 11 September 2012 to 13 September 2012. The audit team traversed the project area observing the project area and vicinity to assess whether conditions are as described in the Project Plan. The audit team collected GPS tracking data and waypoints and took photographs to help correlate observations with mapping data supplied by the client in a KML file. The audit team observed FORM Ghana inventory foresters and assistants collect field data on a sample of previously measured inventory plots, checking measurements and observing field procedures.

2.5 Resolution of Any Material Discrepancy

Any potential or actual material discrepancies identified during the assessment process were resolved through the issuance of findings. The types of findings issued by SCS were characterized as follows:

Non-Conformity Report (NCR): An NCR signified a material discrepancy with respect to a specific requirement. This type of finding could only be closed upon receipt by SCS of evidence indicating that the identified discrepancy had been corrected. Resolution of all open NCRs was a prerequisite for issuance of a validation statement.

New Information Request (NIR): An NIR signified a need for supplementary information in order to determine whether a material discrepancy existed with respect to a specific requirement. Receipt of an NIR did not necessarily indicate that the project was not in compliance with a specific requirement. However, resolution of all open NIRs was a prerequisite for issuance of a validation statement.

Opportunity for Improvement (OFI): An OFI indicated an area that should be monitored or ideally, improved upon. OFI's were considered to be an indication of something that could become a non-conformity if not given proper attention, and were sometimes issued in the case that a non-material discrepancy was identified. OFIs were considered to be closed upon issuance.

All findings issued by the audit team during the validation process have been closed. In accordance with Section 5.3.6 of the VCS Standard, all findings issued during the validation process, and the impetus for their closure, are described in Appendix A of this report.

3 VALIDATION FINDINGS

3.1 Project Design

3.1.1 *Project scope, type, technologies and measures implemented, and eligibility of the project*

The project exists under sectoral scope 14 (AFOLU). As described in Section 4.2 of the VCS AFOLU Requirements, the project falls under the category of Afforestation, Reforestation, and Revegetation. The

Project is a grouped project. The Asubima Forest Reserve project instance represents the initial instance of the grouped project.

3.1.2 Project proponent

The Project Proponent is identified as:

FORM Ghana Ltd
P.O. Box 8597
Ahensan Estate, Kumasi, Ghana
Managing Director Mr. Willem Fourie

Contact information and description of roles and responsibilities provided in the PD complies with the VCS requirements. Other entities involved in the project include the project developer, FORM International, B.V., and Sustainable Forestry Investments B.V., the owner and shareholder of FORM Ghana Ltd. Contact information and description of roles and responsibilities provided for these entities complies with the VCS requirements.

The audit team examined a Certified True Copy of the Certificate of Incorporation for FORM Ghana Ltd, enacted on 20 August 2007 and signed by Paulus Hol and Hermann J. Vroom, and others. Mr. Hol is a signatory party to the Land Lease Agreement for the Asubima Reserve and Mr. Vroom is signatory to the Benefit Sharing Agreement. The FORM Ghana web site, www.formghana.com lists Mr. Fourie, Mr. Hol, and Mr. Vroom as members of the team.

The audit team finds that contact and entity information provided in the PD conforms to the VCS requirements.

3.1.3 Project start date

Project start date is 1 March 2008. This start date is corroborated by a 14 February 2008 authorization from the Forestry Commission and by expense records for March 2008 observed by the audit team showing expenses incurred for diesel, chainsaws, worker transport, and contracts paid for weed and stump removal. Teak trees observed on site were consistent with having been planted in 2008. The audit team determined that a 1 March 2008 project start date is consistent with observed evidence and complies with VCS rules.

3.1.4 Project crediting period

Project crediting period is 40 years, ending 1 March 2048, and is in conformance with the VCS rules.

3.1.5 Project scale and estimated GHG emission reductions or removals

The project is considered a project according to the requirements of Section 3.10.1 of the VCS Standard. The project is estimated to result in GHG emission reductions and removals equivalent to 360,943 tCO₂e over the 40 year project crediting period, and average of 8,815 tCO₂e per year.

3.1.6 Project activities

Project activities are described in detail in Section 1.8 of the PD

3.1.7 *Project location*

Project location for the Asubima Reserve instance is described generally in PD section 1.9. The Project Proponent provided a KML file, in conformance with the VCS Standard, 3.10.1 (3).

3.1.8 *Project compliance with applicable laws, statutes and other regulatory frameworks*

Section 1.1 of the PD provides a listing of laws and regulations that apply to the project area, and to which the project complies. Interviews with the regional Forestry Commission district manager revealed no known instances of violation of regulations. Planting, thinning, and similar activities relating to forest management require permits and inspections by the Forestry Commission. The District Manager of the Forestry Commission stated he considered it unlikely that violations of applicable laws would go undetected. The Asubima Reserve instance is certified under FSC, providing an additional level of assurance that the project complies with applicable laws and regulations.

The audit team finds that the evidence of compliance of the project with applicable laws and regulations is adequate.

3.1.9 *Ownership and other programs*

3.1.9.1 *Right of use*

Right of use is established by agreements between the traditional landowner, the Forestry Commission, and FORM Ghana Ltd. In Ghana, while the traditional landowner of the Forest Reserve has title to the land itself, the Forestry Commission is in charge of forest management including all decisions regarding planting, silviculture, and harvesting of trees. The Project Proponent displayed a Land Lease agreement between the Forestry Commission and FORM Ghana dated 14 November 2008 which leases access to FORM Ghana for the purpose of developing commercial forest plantations for an initial period of 50 years, with option to renew. Clause 3.2 of this agreement states “The Lessee shall have the sole and exclusive right to participate in the development of plantations in the allocated area ...” The audit team finds that this clause demonstrates that the proponent (the Lessee under the agreement) is the only party authorized to implement the site preparation, planting, and maintenance activities leading to GHG removals, and that this constitutes Right of Use under the VCS Standard. A related document, the Benefits Sharing Agreement, signed by the traditional landowner, the chief executive of the Forestry Commission and Mr. H. Vroom for FORM Ghana was shown to the audit team specifying that 90% of the returns from investment flow to FORM Ghana, with the remaining 10% dispersed to the Forestry Commission, local communities, and the traditional landowner. The Forestry Commission District Manager confirmed that these arrangements are standard practice and comply with Ghanaian law.

An additional land use arrangement occurring on the project planting areas is a temporary agro-forestry use wherein FORM Ghana contracts with local farmers who are allowed to establish certain food crops on plantations during the first 3 years of growth. In exchange for permission to grow food crops, the farmers provide vegetation control and fire protection to the teak seedlings during the time period covered. FORM Ghana includes on its staff a manager who oversees these arrangements. The land use agreements with the farmers are temporary and are at the discretion of FORM Ghana and represent no claim on GHG removal credits.

The audit team finds that the Project Proponent's right of use is unconditional, undisputed, and unencumbered, in accordance with VCS requirements.

3.1.9.2 Emissions trading programs and other binding limits

As the project has not reduced GHG emissions from activities that are included in an emissions trading program or any other mechanism that includes GHG allowance trading, this section is not applicable.

3.1.9.3 Participation under other GHG programs

As the project has not been registered under any other GHG program, this section is not applicable.

3.1.9.4 Other forms of environmental credit sought or received

As the project has not sought or received other forms of environmental credit, this section is not applicable.

3.1.9.5 Rejection by other GHG programs

As the project has not been rejected by any other GHG programs, this section is not applicable.

3.1.10 *Additional information relevant to the project*

3.1.10.1 Eligibility criteria for grouped projects

In accordance with Section 3.4.9 of the VCS Standard, the PD contains eligibility criteria for the inclusion of new project activity instances. Validation findings with respect to these eligibility criteria are described below.

Eligibility criteria for the Grouped Project are provided in the PD, Section 1.13.1. All project instances must be within the nation of Ghana. Additional eligibility criteria pertaining to the methodology are listed, including the requirement for independent leakage and risk assessments as set out in the AFOLU Requirements, Section 3.8.

The audit team finds that the discussion of eligibility requirements is adequate and conforms to VCS rules.

3.1.10.2 Leakage management for AFOLU projects

FORM Ghana has policies to reduce potential leakage due to displacement of pre-project agricultural activities through intercropping agreements whereby farmers are allowed to grow certain permitted crops for 2 or 3 years following planting of teak. The PD also points out that local farmers are provided employment opportunities. However, since leakage cannot be avoided, it is quantified following the procedures described in the methodology.

3.1.10.3 Commercially sensitive information

The Project Proponent has excluded the yield tables for teak used for ex ante quantification and the financial analysis spreadsheet model from the PD. These exclusions have no effect on project eligibility.

3.1.10.4 Any further information

In accordance with Section 3.7.3 of the VCS AFOLU Requirements, the project's non-permanence risk report was assessed by the audit team. The non-permanence risk report upon which the risk analysis assessment was based is contained within FORM Ghana VCS Non-Permanence Risk Report 20121109.docx, Version V3. The findings and conclusion regarding the non-permanence risk analysis undertaken for the project are summarized below for each risk category and factor.

For internal risks, the non-permanence risk report indicates a score of 7. The findings of the audit team regarding the risk scores applied for each factor are as follows.

Project Management		
Risk Factor	Audit Team Findings	Risk Rating
a)	Teak is known to grow well in the area, a fact corroborated by the audit team's Ghanaian forestry expert. Several teak plantations were observed by the audit team in the project vicinity, The rating claim is reasonable	0
b)	The project proponent describes security measures in place to prevent ongoing encroachment. The audit team observed uniformed security personnel under the direction of a former officer of the Ghanaian army manning entry gates to the plantations. In addition, the area is regularly traversed by fire lookouts, forest management personnel and work crews.	0
c)	The management team is highly experienced, the rating claim is reasonable	0
d)	Dedicated full time management staff are less than 1 day from the site, the rating claim is reasonable	0
e)	The risk report does not claim mitigation credit for AFOLU expertise.	0
f)	The project proponent provided a copy of the management plan. The plan includes sections on social corporate responsibility and legal compliances, and describes the physical and biological environment. It details the silviculture and management plans. It includes sections on biodiversity management, a social plan, and a fire management plan. The plan describes planned monitoring activities in order to evaluate forest management and environmental performance and "adapt its management when necessary". In addition, the project is FSC certified and is subject to regular audits of its forest management. The audit team finds that the requirement for an adaptive management plan is met and that the mitigation credit is justified.	-2
Total Project Management (PM) [as applicable, (a + b + c + d + e + f)] Total may be less than zero.		-2

Financial Viability		
Risk Factor	Audit Team Findings	Risk Rating

a)	Cashflow breakeven is in 9 years from the current risk assessment. Cashflow spreadsheet model was examined on-site and determined to be based on reasonable assumptions. Rating is justified.	2
b)		
c)		
d)		
e)	Project has secured 15% to 40% of funding needed to reach breakeven. The Project Proponent provided investment agreements and other information demonstrating access to 8 million euro to 2015. The audit team finds the rating to be justified.	2
f)		
g)		
h)		
i)		
Total Financial Viability (FV) [as applicable, ((a, b, c or d) + (e, f, g or h) + i)]		4
Total may not be less than zero.		

Opportunity Cost		
Risk Factor	Audit Team Findings	Risk Rating
a)	Baseline activity is subsistence-driven farming. The Risk Report describes a number of net positive community benefits including provision of local employment and a benefit sharing agreement that distributes a share of net revenue back to the local communities. The report points out the project pays more than minimum wage and provides health care, meals, and transportation to and from work for the employees and also provides training. In addition, the report points out the more than 100 intercropping agreements between local farmers and FORM Ghana were signed between 2010 and 2011. These claims are consistent with the audit team's observations and interviews conducted. The audit team determines that net positive community impacts are adequately demonstrated and therefore the risk rating of 0 is justified.	0
b)		
c)		
d)		
e)		
f)		
g)		
h)	Project is protected by a 50 year lease agreement with the Forestry Commission. The mitigation claim is justified	-2
i)		
Total Opportunity Cost (OC) [as applicable, (a, b, c, d, e or f) + (g or h)]		0
Total may not be less than 0.		

Project Longevity		
Risk Factor	Audit Team Findings	Risk Rating
a)	Project has a legal requirement to replant after harvest according to 50 year	5

b)	lease agreement. The calculated risk rating is justified.	
Total Project Longevity (PL) May not be less than zero		5

For external risks, the non-permanence risk report indicates a score of 0. The findings of the audit team regarding the risk scores applied for each factor are as follows.

Land Ownership and Resource Access/Use Rights		
Risk Factor	Audit Team Findings	Risk Rating
a)	Land is owned by traditional owners, forest management is controlled by a government agency with which the Project Proponent has a 50 year lease. The rating is justified.	2
b)		
c)		
d)		
e)		
f)	Project is protected by a legally binding lease agreement that covers the crediting period. The mitigation claim is justified.	-2
g)		
Total Land Tenure (LT) [as applicable, ((a or b) + c + d + e+ f)] Total may not be less than zero.		0

Community Engagement		
Risk Factor	Audit Team Findings	Risk Rating
a)		
b)		
c)	The project generates net social and community benefits, including providing employment, however the Project Proponent chooses not to make a mitigation claim	0
Total Community Engagement (CE) [where applicable, (a+b+c)] Total may be less than zero.		0

Political Risk

Risk Factor	Audit Team Findings	Risk Rating
a)	Governance score is .08. Risk rating is appropriate to the score. Calculation of governance rate was reviewed by the audit team and found to be adequate.	2
b)		
c)		
d)		
e)		
f)	Ghana has received World Bank funding for developing a REDD+ policy framework and is developing an implementation plan. Mitigation claim is valid.	-2
Total Political (PC) [as applicable ((a, b, c, d or e) + f)]		0
Total may not be less than zero.		

For natural risks, the non-permanence risk report indicates a score of 3.25. The findings of the audit team regarding the risk scores applied for natural risk are as follows.

Natural Risk		
Risk Factor	Audit Team Findings	Risk Rating
F	Proponent assigns LS score of 5. This is reasonable due to teak's relatively high resistance to fire damage and likely low level of understory and ladder fuels as a result of both pruning and high canopy cover. In addition, during one half of the planned rotation, the first 10 years, full recovery of carbon stocks would be expected within 10 years, which Table 10 of the risk tool associates with a Significance level of insignificant. Fire prevention plans and equipment and training and involvement of the local community in fire prevention support a 0.5 mitigation claim. Numerous burned areas adjacent to the project area and low level of evidence of burn within the project area support a 0.5 mitigation claim based on risk containment, resulting in a combined mitigation claim of .25. While the risk of fire occurrence in the project vicinity is high, the risk of reversal is mitigated by teak's relative resistance and a well functioning fire prevention program as described in the Risk Report. The audit team therefore finds the risk rating of 1.25 to be reasonable.	1.25
PD	Proponent assigns an LS score of 2. The audit team finds this to be reasonable in view of low level of pest and disease problems as attested by the Forestry Commission District Manager and frequent monitoring by FORM Ghana forestry staff.	2
W	FORM International has been operating in the project area since 2001, when a pilot plantation (not included in the project) was started. There have been no significant weather related losses over the intervening 12 years. Since the Asubima Reserve is approximately 170 miles from the Gulf of Guinea, the risk of damage due to hurricane force winds is minimal. This was corroborated by the Forestry Division District Manager. The audit team determines that the risk	2

	rating for damage due to extreme weather is reasonable.	
G	The project proponent claims that since Ghana is not in an area that is geologically active, there are no volcanoes or major earthquake faults. Nor are there steep and unstable slopes with land slide danger. Therefore the risk rating for geological risk is zero. The audit team concurs that geologic risk is insignificant	
ON	Other natural risks include floods; however there are no large rivers in the project vicinity and the land's gentle to moderate slopes encourage drainage. The audit team concurs that other natural risks are insignificant	
Total Natural Risk (as applicable, F + PD + W + G + ON)		3.25

In summary, the overall risk rating that was determined for the project, in accordance with the VCS Non-Permanence Risk Tool, was 11. The above risk rating is in conformance with the VCS rules.

3.2 Application of Methodology

3.2.1 Title and Reference

The VCS approved methodology applied to the project (hereafter termed "the methodology") is entitled Consolidated afforestation and reforestation baseline and monitoring methodology AR-ACM0001 "Afforestation and reforestation of degraded land" Version 05.2.0. The methodology can be found at <http://cdm.unfccc.int/methodologies/DB/X4VOLW3Y7IJCH9WXSBC2Q0JKG9UZ>.

Note that on 23 November 2012, the CDM executive board adopted a new Methodology AR-ACM0003 and version 03.0.0 of the A/R Methodological tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities". AR-ACM0003 replaces AR-ACM0001 effective 23 November 2012, however CDM has extended a grace period ending 18 January 2013 during which time projects using AR-ACM0001 will be accepted. The updated version of the A/R Methodological tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities" applies the same calculation methods and equations as the previous versions, for the equations that apply to this project. The tool added procedures for determination of a confidence deduction which the previous version of the tool lacked. These new procedures are utilized by the project proponent for determining a confidence deduction, as described in Section 3.2.6.5 of this report.

3.2.2 Applicability

The audit team's conclusions and the justification for such conclusions regarding the conformance of the project to the applicability conditions of the methodology are summarized below.

Applicability Condition	Audit Team Findings
Project activity is implemented on degraded land	Asubima Forest Reserve has been classified as degraded in the Ghana Forest Service national management plan for 1998. The audit team was provided a letter from the Director of the Forestry

Applicability Condition	Audit Team Findings
	Commission dated 5 October 2009 attesting that Asubima Reserve has been degraded for 25 years due to fires and agricultural use.
Drainage of organic soils not allowed	There are no organic soils in the project area
The land is not in wetland 1 category	The project area is not wetland.
Litter shall remain on site	The PD so states, and no instances of litter removal were observed
Poughing/ripping is: i) Done along contours; ii) Limited to first 5 years from initial site preparation; and iii) Not repeated for at least 20 years.	The applicability conditions relating to ploughing/ripping are explicit criteria for project instances in the FORM Ghana grouped project, as stated in section 1.13.1 of the PD. In all instances of planting on slopes observed by the audit team during the site visit, the rows of trees were aligned in parallel to the slope contours. According to the on-site manager, it is only done when necessary to break up hardpan and rocky soils to prepare for planting, and is not widely applied. Since the rotation length is 20 years to 40 years, ripping within 5 years of initial site preparation would make no sense, nor would repeating the ploughing/ripping operation prior to the end of the 20 year rotation. Ripping is expensive and would negatively impact growth by damaging root systems. The audit team considers it highly unlikely that ploughing/ripping would be applied outside of the time period where site preparation activities are conducted or where not absolutely required for successful planting. The audit team finds that the applicability condition is met.

In summary, the project fully conforms to the applicability conditions of the methodology, and each of the applicability conditions is specifically addressed in the PD.

3.2.3 *Project Boundary*

The findings of the audit team with respect to the GHG sources, sinks and reservoirs included in the project boundary are as follows.

Source		Gas	Included?	Validation Findings
Baseline	Above-ground biomass	CO ₂	Yes	Required by methodology
	Below-ground biomass	CO ₂	Yes	Required by methodology
	Soil Organic Carbon	CO ₂	No	Not required by methodology; expected to decline in baseline scenario therefore excluding is conservative
Project	Above-ground biomass	CO ₂	Yes	Required by methodology
	Below-ground biomass	CO ₂	Yes	Required by methodology
	Soil Organic Carbon	CO ₂	Yes	Optional pool in methodology
Sinks				
Project	Burning of woody biomass	CO ₂	No	Accounted for in C stock changes
		CH ₄	Yes	Required by methodology if fire used as management tool
		N ₂ O	Yes	Required by methodology if fire used as management tool
	Leakage	CO ₂	Yes	Required by methodology; not considered insignificant

In summary, the definition of the project boundary is in conformance with the VCS rules.

3.2.4 Baseline Scenario

To identify the baseline scenario the Project Proponent followed the procedures in the “Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities”, as required by the methodology and described in Section 2.5 of the PD.

Four plausible land use alternatives were identified and analyzed in the stepwise manner prescribed by the tool. Six implementation barriers were identified, and their significance in terms of preventing implementation of the identified land use alternatives was adequately demonstrated. Continuation of pre-project land use, a mosaic of illegal subsistence farming and grassland with scattered trees and patches of degraded forest, was identified as the baseline scenario

In summary, the determination of the baseline scenario has been conducted in accordance with the VCS rules.

3.2.5 Additionality

Under the methodology, the combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities is used to demonstrate additionality. In accordance with the tool, since the baseline scenario is the only scenario not prevented by one or more of the identified barriers, a common practice analysis is performed.

The Project Proponent demonstrates that no similar project activities are occurring in the project area. While there are existing teak plantations in the region, they are much smaller scale and do not apply similar methodologies such as monitoring and prevention of encroachment, thinning and pruning to obtain high quality wood, fire prevention, and engaging and involving the surrounding communities. The Project is the only FSC certified plantation in West Africa. In accordance with the provisions of the tool, since similar project activities cannot be observed, the Project is additional.

In summary, the demonstration of additionality has been conducted in accordance with the VCS rules.

3.2.6 Quantification of GHG Emission Reductions and Removals

3.2.6.1 Quantification of baseline emissions

Table 6 in section 2.3.2 of the PD specifies above-ground and below-ground biomass as the only carbon pools accounted in the baseline, as allowed by the methodology. To evaluate baseline quantification requirements in these pools, the Project Proponent applies the CDM “guidance on conditions under which the change in carbon stocks in existing live woody vegetation is insignificant (v01)”, described in section 3.1.3 of the PD. The PD lists 3 conditions applicable to the project under which changes in carbon stocks in existing live woody vegetation are deemed insignificant. The audit team finds that the CDM guidance was interpreted correctly and that the assumption that baseline GHG emission reductions and removals are zero is appropriate and in conformance with VCS requirements.

3.2.6.2 Quantification of project emissions

To quantify project emissions removals and reductions, the project area is divided into 2 strata: 1) mosaic of agriculture, degraded grassland, and scattered trees; and 2) patches of degraded riparian forest along watercourses. In the mosaic stratum there are 3 existing biomass pools: Remnant indigenous trees (RIT), Remnant teak (RT), and invasive York (IY). In the riparian stratum there are 2 biomass pools: Mixed degraded forest (MDF), and invasive York (IY). Estimates for initial stocking in each of the pools were developed using inventory methodologies that are described in detail in section 3 of the PD. The audit team performed a thorough review of the inventory methods and assumptions and the calculation methods and assumptions, including assessment of the appropriateness of all parameters available at validation.

The largest proportion of total GHG removals for the project will be in teak trees. The parameters used for prediction of teak biomass from measurement of breast-high diameters and total height are derived from studies on teak plantations in the neighboring country of Ivory Coast, and calibrated against destructive sampling measurements from a 64 ha pilot plantation established in 2001, owned and managed by FORM Ghana, but not included in the VCS project area. Values for form factor, biomass expansion factor, wood density, and carbon fraction applied to the ex ante estimates as well as the ex

post calculations are appropriate. Biomass estimation methods for other tree species are drawn from IPCC LULUCF guidelines and are appropriately applied to the trees in the project area.

The methodology specifies that where burning of biomass for site preparation is included, emissions of CH₄ and N₂O must be accounted for, using the tool “Estimation of non-CO₂ emissions resulting from burning of biomass attributable an A/R CDM project activity”. Under the provisions of clause 7 (a) of this tool, for land areas where slash and burn is a common practice and fire has been used in the area at least once during the period of ten years preceding the start of the A/R CDM activity, emissions from site preparation activities can be considered as zero. That these conditions apply to the project area is well documented, therefore the audit team accepts the Project Proponents’ claim that such emissions can be set to zero.

The PD includes detailed description of ex ante and ex post quantification methodologies for the carbon pools being accounted, including calculation equations and parameters, in accordance with the methodology and VCS requirements.

3.2.6.3 Quantification of leakage

Under the applicability conditions of the methodology, leakage due to displacement of agricultural activities is the only form of leakage that must be considered. The methodology requires that the CDM tool “Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity” be used to estimate leakage. Application of the “Guidelines on conditions under which increase in GHG emissions attributable to displacement of pre-project crop cultivation activities in A/R CDM project activities is insignificant” determined that leakage due to pre-project agricultural activities cannot be ignored.

Section 3.2.2.1 of the PD includes a detailed discussion of leakage calculation methods which are applied to the teak plantations, the indigenous tree plantations, and the planted buffers. The methods described in the PD to quantify leakage are consistent with the leakage tool required by the methodology. Since agricultural activities are not occurring within the degraded forest stratum, there is no potential for leakage.

The audit team has concluded that the description of leakage quantification methods is in conformance with the methodology and with the VCS requirements.

3.2.6.4 Summary of GHG emission reductions or removals

For purposes of calculating net GHG emissions, the project area is stratified by 4 reforestation typologies and planting year, as described in section 3.2.2 of the PD. Net GHG emissions reductions are calculated in each year for each of the selected pools for each of the planting typology/planting year strata, in accordance with the methodology. Calculation equations are provided and are clearly referenced to the equations contained in the methodology.

In Section 3.3.3.1, the PD includes acknowledgement of the requirement in AFOLU Requirements 4.5.4 that limits the maximum amount of GHG credits to the long term average over the crediting period for ARR projects that include harvesting. Methodologies for calculating long term average are described for the two reforestation scenarios that include harvesting and estimates for long term averages for each scenario are provided based on the ex ante calculations.

The audit team has concluded that the description of the methods for calculation of net GHG benefits is adequate and conforms to the methodology and to the VCS requirements,

3.2.6.5 Uncertainties associated with the calculation of emissions

As allowed by the methodology and discussed in section 3.2.6.1 of this report, baseline emissions are zero, and there is no associated uncertainty. Changes in soil organic carbon (SOC) are calculated using the CDM tool “Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities”. As this tool is based on conservative assumptions, there is no uncertainty associated with estimated SOC changes.

Uncertainty associated the calculation of net GHG emissions is a function of the uncertainty associated with estimates of tree biomass. Methods for accounting for uncertainty are described in section 4.2.2 of the PD. The PD defines the maximum allowable margin of error as 10% at the 90% confidence level, in accordance with the requirements of the methodology AR-ACM0001 version 5.2.0. The Project Proponent proposes to follow the procedures described in Version 3.0.0 of the CDM tool “Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities” to apply an uncertainty deduction in cases where the margin of error exceeds the maximum allowance. The application of these procedures is demonstrated in the workbook used in calculation mean tree biomass in mixed degraded forest at project initiation.

The audit team has concluded that the uncertainty provisions described in the project plan are consistent with the methodology and conform to the VCS requirements

3.2.7 Methodology Deviations

The Project deviates from the procedures outlined in the Methodology and the associated methodological tool in its procedures for estimating biomass in teak and York trees at the initiation of project activities. The methodological tool calls for biomass estimates under the stock change method to be based on measurements on sample plots. However, such plot measurements were not collected in advance of project initiation, and since the pre-existing teak and York trees were felled during preparation for planting, the plots cannot be installed retro-actively.

During the felling process, the project proponent kept a count of all teak and York trees felled. To estimate biomass in pre-existing teak, the project proponent assumed that the felled teak corresponded in size to 5 year old teak trees; 13.6 cm dbh and 12.6 meters in height, and the York trees felled were similar in size to York trees measured on plots in the riparian buffer zones. These procedures are described in detail in Section 3.1.1 of the PD along with the proponent’s arguments that the methods will result in conservative estimates of GHG removals. The audit team carefully considered the arguments made in the PD, in light of observations made during the site visit. The only other available methods would rely on remote sensing data or measurements on proxy areas, neither of which could be guaranteed to lead to more accurate and/or conservative estimates of biomass stocking at the time of project initiation.

The audit team concluded that the procedures described in the PD make the best use of the available data, and are highly unlikely to result in an overstatement of net GHG removals.

3.2.8 Monitoring Plan

3.2.8.1 Data and parameters available at validation

The data and parameters available at validation are included in the PD in the table format provided in the PD template. All parameters are identified and described. The source of data, value applied, and justification is included. The audit team reviewed the parameter values and justifications and found them to be credible and conservative where uncertainty exists.

The audit team has concluded that the description of data and parameters available at validation is adequate and conforms to the VCS requirements.

3.2.8.2 Data and parameters monitored

Data and parameters monitored include plantation area boundaries, monitoring plot area, and tree measurements. These are described in the PD using the table format provided in the PD template.

The audit team has concluded that the description of data and parameters monitored is adequate and conforms to the VCS requirements.

3.2.8.3 Applicability and eligibility of monitoring equipment and procedures

Section 4.3 of the PD describes the monitoring plan and procedures. Roles and responsibilities of monitoring staff are described in section 4.3.1 of the PD. Plot layout and measurement procedures are described in section 4.3.2. Section 4.3.3 of the PD described quality assurance and quality control procedures. Quality assurance procedures include an annual internal audit in which 5% of the permanent sample plots are remeasured and analyzed. Additional details regarding monitoring plot layout and measurements, monitoring of biodiversity, forest health, water quality, and social benefits are provided in the client supplied document "P 13 monitoring plantation growth and biodiversity aspects 2012-11-09.doc".

The audit team has concluded that the monitoring plan and procedures, including quality control and assurance are adequate and conform to the VCS requirements.

3.3 Environmental Impact

A detailed social and environmental impact assessment was conducted in 2007 by the Forestry Research Institute of Ghana, associated with Kwame Nkrumah University of Science and Technology, prior to implementation of project activities. The assessment concluded that the project would bring overwhelming positive environmental and social benefits to the area and will enhance water, soil, forest and general ecological integrity (bio-diversity) as well as provide sustainable sources of income and other goods and services for local people.

The report points out that the issues of benefit sharing and land access are key issues that the project management has to deal with expeditiously and decisively. The Project Proponent has appointed a full time staff member to manage relations with local farmers including temporary intercropping agreements and employs many local people in tree nursery and forest management operations.

The audit team concludes that issues relating to social and environmental impacts are adequately addressed in the PD and are implemented in practices. In addition, the project's FSC certification provides an extra layer of assurance the environmental and social aspects of the project are addressed and managed appropriately.

3.4 Comments by stakeholders

A stakeholders committee consisting of traditional landowners, farmers, a forestry commission representative and others was set up in 2009. The committee's existence and practice of holding quarterly meetings were confirmed by the Forestry Commission District Manager. The Project includes an ongoing outreach program to local stakeholders. No significant problems are known to exist, and none were reported by the Forestry Commission District Manager.

4 VALIDATION CONCLUSION

The project conforms to the validation criteria for projects, as set out in the VCS Version 3 guidance documents referenced in Section 1.2 of this report. No qualifications or limitations exist with respect to the validation opinion reached by the audit team. The project is likely to achieve the estimated GHG emission reductions and removals that are described in the PD.

APPENDIX A: LIST OF FINDINGS

NIR 2012.1 dated 08/16/2012

Standard Reference: VCS AFOLU Requirements v3.2, Sec 3.1.3

Document Reference: PD v1 Sec 1.4; Monitoring Report v1.0 Sec 1.4

Finding: The Standard requires that an implementation partner identify its roles and responsibilities with respect to the project, including but not limited to, implementation, management and monitoring of the project. Please include such information so that the roles and responsibilities of FORM Ghana Ltd. with respect to the Project and to the initial instance are clearly defined. In addition, please disclose the nature of the relationship, if any, between FORM Ghana Ltd. and FORM International B.V., and include sufficient information in sections 1.3 and 1.4 of the PD and Monitoring Report so that the respective roles and responsibilities of both parties are clearly defined.

Client Response: PD section 1.3 and 1.4 v2.0:

Monitoring Report Sec 1.3 and 1.4 v2.0:

"FORM Ghana is responsible for plantation establishment and maintenance. This includes, but is not limited to terrain preparation, plant propagation, planting, thinning, pruning, weeding, clear cutting, security and fire management.

Form international is contracted by FORM Ghana to deliver management support and technical assistance. This includes, but is not limited to developing and managing the VCS certification and is as such responsible for all technical aspects of the VCS certification. This includes mapping and GIS, managing of the monitoring and analysis of data, training of FORM Ghana personnel and managing the FSC certificate. In table 16 below the different roles of the monitoring staff are elaborated. The monitoring manager and quality control officer are part of Form international staff, while the rest of the team is part of the FORM Ghana staff."

Auditor Response: In the 20120818 version of the PD and the 20120817 version of the Monitoring Report, the roles and responsibilities of FORM Ghana Ltd. and FORM International B.V. are clearly defined.

Closing Remarks: The Client's response adequately addresses the finding.

NIR 2012.2 dated 08/16/2012

Standard Reference: VCS AFOLU Requirements v3.2, Sec 3.1.3

Document Reference: PD v1 Sec 1.4; Monitoring Report v1.0 Sec 1.4 and 2.1

Finding: Section 2.1 of the Monitoring Report identifies SFI regarding callable financial resources. Please identify SFI. If SFI has any role in the project, either directly or via a relationship with FORM Ghana Ltd, please add such information as required by the Standard to the PD and Monitoring reports.

Client Response: PD section 1.4 v2.0:

Monitoring Report Sec 1.4 v2.0:

"Sustainable Forestry Investments B.V. (SFI)

Owner and shareholder of FORM Ghana, but has no active role in VCS implementation."

Auditor Response: In the 20120818 version of the PD and the 20120817 version of the Monitoring Report, contact information and a description of roles and responsibilities of SFI are provided.

Closing Remarks: The Client's response adequately addresses the finding.

NIR 2012.3 dated 08/16/2012

Standard Reference: N/A

Document Reference: PD v1 Sections 1.5 and 1.6; Monitoring Report Section 1.5 and 1.6

Finding: The PD identifies start date and crediting period endpoints using a date code that can be interpreted as either MM-DD-YYYY or DD-MM-YYYY. Please use an unambiguous identifier to specify these dates.

Client Response: Section 1.5 and 1.6 of PD v2.0:

Section 1.5 and 1.6 of monitoring report v2.0:

"Start date is 01-March-2008

End date is 01-March-2048"

Auditor Response: Updated date formats are unambiguous

Closing Remarks: The Client's response adequately addresses the finding.

NIR 2012.4 dated 08/16/2012

Standard Reference: Methodology Sec 5.2

Document Reference: Monitoring Report Sec 2.1

Finding: The Methodology requires use of the tool "Estimation of non-CO2 GHG emissions from burning of biomass attributable to an A/R CDM project activity". The Monitoring Report refers to a tool identified as "estimation of non-CO2 GHG emissions resulting from burning of biomass and forest fires". Please ensure that Methodology tools are identified using the correct title.

Client Response: Section 2.1 of the monitoring report v2.0:

"Following the CDM tool : "estimation of non-CO2 GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity (version 0.4.0.0)" non CO2 emissions shall be accounted for if the accumulated area affected in a given year is more than 5% of the project area. 42.5 hectares is 3% of the project area (1506 hectares) and non CO2 emissions are therefore not accounted for."

Auditor Response: The 20120817 version of the MR correctly identifies the CDM tool

Closing Remarks: The Client's response adequately addresses the finding.

NIR 2012.5 dated 08/16/2012

Standard Reference: VCS Monitoring Report Template v3.1, Sec 2.1; VCS Program Definitions v3.2

Document Reference: Monitoring Report Sec 2.1

Finding: The guidance in the first bullet point item in section 2.1 of the Monitoring Report Template is to "Describe the implementation status of the project activity(s)". Project Activity is defined in VCS Program Definitions as activity that results in GHG emission reductions or removals. This section of the monitoring report describes the status of validation and verification but does not describe the status of implementation of activities that result in GHG removals, such as planting and related management activities. Please include such discussion in this section of the report.

Client Response: Monitoring report section 2.1 v2.0:

"1290 hectares of teak and 216 hectares of indigenous plantation and buffer restoration are realized in Asubima Forest Reserve since the project start in March 2008.

A pilot plantation of 64 hectares planted in 2001 and a patch of illegally planted farmer's teak situated in Asubima Forest Reserve are also under Project Proponent's management. These are, however, outside the scope of this audit, see table 1 below.

In 2011 and 2012 planting has started in Afrensu Brohuma Forest Reserve just south of Asubima Forest Reserve. A total area of 1783 is either planted with teak or indigenous species or managed as buffer zone are restoration following the same management principles as described in the PD.

In total, an area of 3468 hectares of reforestation is currently under FORM Ghana management.

Management of the planted areas is done according to the management plan and teak also according to the yield tables. Until now no thinning has been done yet (except the 2001 area outside the VCS scope), but is planned for the 2008 plantation after the 2012 growth season. Pruning is done yearly in the 2008 and 2009 planted areas. Weeding of grasses is done to reduce weed pressure on tree growth. "

Auditor Response: The 20120817 version of the MR adequately describes the implementation status of project activities.

Closing Remarks: The Client's response adequately addresses the finding.

NIR 2012.6 dated 08/16/2012

Standard Reference: N/A

Document Reference: Protocol 13

Finding: Protocol 13 includes guidance on taking dbh measurements on eccentric trees specifying crews take 2 measurements perpendicular to each other and then averaging the results. The guidance does not specify any additional consideration regarding the 2 measurement points other than requiring that they be perpendicular. If there are additional specifications regarding measurement points for eccentric trees, please include them in the relevant documents.

Client Response: Perpendicular DBH measurements are taken and the broadest and thinnest part of the tree at breast height. These two measurements are then averaged. This was already the procedure and is now added in writing to Protocol P13 Annex 3 2012-08-22.

Auditor Response: Protocol P13 Annex 3 has been amended as described. Dbh measurement procedures for eccentric trees are now fully described.

Closing Remarks: The Client's response adequately addresses the finding.

NIR 2012.7 dated 08/16/2012

Standard Reference: N/A

Document Reference: PD Sec 4.3.3

Finding: The PD, section 4.3.3 indicates that quality assurance/quality control procedures are established. If the procedures and/or guidelines are written, please provide documentation.

Client Response: Internal auditing and data storage as described in the PD section 4.3.3 are the written quality control procedures. Which is done additionally as quality control, but was not yet written is:

-Hard copies of data sheets are kept on file by plant year and plot number

-Data sheets are cross-checked by the monitoring supervisor on mistakes before sending to the monitoring manager

-The monitoring manager performs quality control on the data by checking the height-diameter ratio and filtering out mistakes in this way.

These additional checks are added to the written procedures in PD v2.0 section 4.3.2 and 4.3.3, Monitoring report v2.0 section 3.3.2 and 3.3.3 and P13 monitoring protocol 2012-08-22, section 2.4.2

Auditor Response: The most recent version of the Monitoring data spreadsheet, Ex Post 2012 Confidential 20120809.xlsx, contains numerous records containing a blank cell in the Dbh column and a height greater than 2 meters in the height column. For example Plot 2, tree 139, plot 313, trees 87, 35, and 40. In addition, it was disclosed during the site visit that at least some errors in transcribing data from plot sheets to spreadsheets occurred while the monitoring manager was on leave. Please provide additional assurance that QA/QC procedures are sufficiently robust.

Client Response 2: See Corrective action report Form Ghana VCS project 20121019.

Project documents updated:

'P 13 monitoring plantation growth and biodiversity aspects 2012-11-09, section 2.4.2'

'FORM Ghana VCS Project Description 20121109, section 4.3.2 and 4.3.3'

'FORM Ghana VCS Monitoring Report 20121109 section 3.3.2 and 3.3.3'

'Ex Post 2012 Confidential 20121109'

The updated quality procedures described in the PD have been followed in updating 'Ex post 2012 Confidential 20121109' so that the plot data used for the calculations are the best representation of conditions in the field that is practicable. The height diameter analysis was performed by the monitoring manager and data entries that were outside the allowed range have been checked by the monitoring

supervisor in Ghana. The updates provided by the monitoring supervisor have been used in the calculations. Overall, thirteen trees in thirteen different plots were >1.3m high but had no DBH recorded on the hard copy sheet. Therefore it is assumed that a mistake was made during field measurement. These trees have been conservatively excluded in the calculations and therefore do not add to the emission removals over which credits are claimed. Remeasurement of the specific plots was in these cases not appropriate compared to the scale of the error as the errors are not material. Since the amount of carbon sequestered has changed due to the corrections made the relevant tables and figures in the monitoring report and ex post calculations have been updated.

Auditor Response 2: Additional language has been added to sections 4.3.2. And 4.3.3 of the 20121109 version of the PD specifies data management and data checking procedures to address the quality control problems identified by the audit team. The QA procedures now include a requirement that 2 people on staff are trained and qualified to implement the data checking procedures. These provisions have also been added to the field protocol (P 13 monitoring plantation growth and biodiversity aspects 2012-11-09.doc) and to the 20121109 version of the Monitoring Plan. The apparent transcription errors have been removed from the 20121109 version of the Ex Post 2012 calculation workbook.

Closing Remarks: The Client's response adequately addresses the finding.

OFI 2012.8 dated 08/16/2012

Standard Reference: Guidance on conditions under which the change in carbon stocks in existing live woody vegetation are insignificant (Version 01), Section II.2. (i)

Document Reference: PD Sec 3.13 (i)

Finding: The PD argues that because existing trees and shrubs are "partly" allowed to remain, condition (i) of the guidance document is met. The guidance document does not include the word "partly" and furthermore requires specific evidence laid out in Section II.3 to demonstrate that the condition is met, which is not provided. The guidance document requires only one of the 6 identified conditions be met in order to determine change of carbon stocks to be insignificant. Inclusion of this argument does not lead to a material error since other conditions are identified that do meet the standard.

Client Response: Because indigenous trees are allowed to remain, but remnant teak and invasive yorke trees are cut the word 'partly' was used. PP acknowledges that this condition of the guidance document is therefore not met and PD v1.0 section 3.1.3 (i) is deleted.

Auditor Response: Since this finding is an OFI, no response is required; however the subject section of the PD has been removed.

Closing Remarks: The Client's response adequately addresses the finding.

NIR 2012.9 dated 08/16/2012

Standard Reference: VCS AFOLU Requirements 3.2 section 4.5.4

Document Reference: PD section 3.2.2.1 and PD section 1.8.2

Finding: The reference in the PD to the section in AFOLU requirements concerning calculation of the long term average became outdated with release of AFOLU Requirements v3.2. Please cite the correction section of the requirements.

Client Response: PD v2.0 section 1.8.2 and 3.2.2.1:

"Following AFOLU requirement 4.5.4, carbon removals due to harvesting are appropriately accounted for by claiming a maximum amount of sequestered carbon equal to the project's long term average CO₂ sequestration and by the guarantee of immediate reforestation in the year following the harvest."

PD v2.0 section 3.2.2.1:

"This long term average is calculated following AFOLU requirement 4.5.4."

Auditor Response: The reference to AFOLU Requirement 4.5.4 has been updated in the PD

Closing Remarks: The Client's response adequately addresses the finding.

NIR 2012.10 dated 08/16/2012

Standard Reference: VCS AFOLU Requirements 3.2 section 4.5.4

Document Reference: PD section 3.2.2.1

Finding: The parameter table in PD section 3.2.2.1 identifies PEt and BEt as Pet and Bet (possibly due to MS Word's automatic correction feature). For consistency and readability, please follow the VCS convention.

Client Response: This is updated. See PD v2.0 section 3.2.2.1

Auditor Response: The table has been updated.

Closing Remarks: The Client's response adequately addresses the finding.

NIR 2012.11 dated 08/16/2012

Standard Reference: N/A

Document Reference: PD sections 3.2.2.1, 1.8.1, 3.2.1

Finding: In the discussion of methods for determining Ctree_bsl1 in section 3.2.2.1 of the PD, it is disclosed that remnant indigenous trees (RIT) are protected and therefore their carbon stocks are included in initial C stocking for the teak plantation stratum. The discussion in PD section 1.8.1 does not mention retention of RIT, nor does PD section 3.2.1 mention retention of RIT during clear felling. Table 4 does not include a requirement for RIT retention. The audit team requests an explanation of the treatment of RIT in the teak plantations. If RIT are, in fact, reserved during clear felling, please clearly indicate such in the PD sections describing management and silviculture for the relevant strata. If retention of RIT is a legal requirement, please indicate such in Table 4 of the PD.

Client Response: Cutting any tree in a forest reserve is only allowed after written permission by competent forest authority as written in "Act 624 forest protection act in Ghana".

This is updated in table 4 of the PD.

FORM Ghana has signed a land lease contract with Forestry Commission which states that "the lessee shall not fell or remove any trees within the plantation area except as provided for in the approved reforestation plan" The reforestation plan only concerns planted teak and indigenous species by PP and not remnant indigenous trees. Since PP has not planted these trees PP has no rights over these trees and is as such not allowed to cut any remnant indigenous trees without a specific permit from Forestry Commission.

Further, PP has adopted a protocol that is relevant for all personnel of FORM Ghana.

Protocol P17 states: "In spite of the degradation of the area some trees still persist as isolated elements in the landscape of Asubima. These trees cannot be felled and have to be preserved. FORM Ghana must protect these trees from damage due to plantation preparation works and from damage by outsiders.

The protection of these trees is done by surveillance of the plantation. The current way of working makes it unlikely that trees will be damaged during terrain preparation."

Section 1.8.4.2 of PD v2.0:

"Final harvesting

After 20 years, all remaining teak trees are harvested with the final harvesting. Stumps are treated with round-up, because establishment of the new plantation is done by planting new seedlings/stumps, not

through coppicing. Expected rotation time of indigenous trees is 40 years. During final harvest remnant indigenous trees will not be felled. "

Section 3.2.1 of PD v2.0:

"In the teak and indigenous trees plantation clear felling, thinning and pruning are part of the management and therefore a long term average is applied. Remnant indigenous trees will not be felled during harvesting operations."

Auditor Response: In 20120818 version of the PD the treatment of remnant indigenous trees is now clearly explained.

Closing Remarks: The Client's response adequately addresses the finding.

NIR 2012.12 dated 08/16/2012

Standard Reference: N/A

Document Reference: PD section 3.1.1.

Finding: The PD states that remnant Indigenous trees were measured on a "representative part of the project area". Please explain how this sample area was determined, and why other areas were not sampled.

Client Response: Inventory of RIT was done during the dry season of 2009. Most of 2008 planted area and part of the 2009 planting area were inventoried at that time. As the project expanded new areas were included to the planted area. At this stage it was found that the inventoried area was a large and representative sample of 15% of the total area of Asubima. It was therefore not found necessary to do a full inventory of the remnant indigenous trees.

Auditor Response: Since the remnant indigenous trees (RIT) are functionally excluded from the project accounting pools, as made clear in Proponent's Response to NIR 11, there is no risk of material error due to sampling bias in the RIT inventory. Therefore, a statistically valid and unbiased inventory for RIT is not required. Examination of high resolution imagery during the site visit showed no apparent difference in the distribution of RIT within the sampled area compared to the remainder of the teak plantation strata.

Closing Remarks: The Client's response adequately addresses the finding.

NIR 2012.13 dated 08/16/2012

Standard Reference: N/A

Document Reference: Monitoring Report Sec 4.2.2.; Ex Post 2012 Confidential 20120809.xlsx

Finding: The value for total change in selected carbon pools in the monitoring report, page 32 is not the same value as in the spreadsheet, Overview Ex Post cell C35. Please explain.

Client Response: The value for total change in selected carbon pools (ΔC_{actual}) shall be 4814 t CO₂ as stated in the spreadsheet "Overview Ex post Confidential 20120809" cell C35. When updating the monitoring report this particular value was overlooked and is now updated in the monitoring report page 33, section 4.2.2.

Auditor Response: The value for total change in selected carbon pools in the Ex Post Confidential 20120809 spreadsheet is now reflected in the 20120817 version of the Monitoring Report.

Closing Remarks: The Client's response adequately addresses the finding.

NCR 2012.14 dated 08/16/2012

Standard Reference: AFOLU Non-Permanence Risk Tool v3.1 Section 2.5.1

Document Reference: Non-Permanence Risk Report V1 section 4.1

Finding: The AFOLU Non-Permanence Risk Tool specifies that the overall risk rating shall be rounded up to the nearest whole percentage. The Non-Permanence Risk Report v1 applies the calculated value of the risk rating, 10.25% to the estimated net GHG benefit, rather than the rounded value of the risk rating.

Client Response: See Corrective action report Form Ghana VCS project 20121019.

Project documents updated:

'FORM Ghana VCS Non-Permanence Risk Report 20121109 section 4'

'Ex Post 2012 Confidential 20121109'

Auditor Response: The overall risk rating in the 20121019 version of the risk report is now rounded up to 11%

Closing Remarks: The Client's response adequately addresses the finding.

NCR 2012.15 dated 09/24/2012

Standard Reference: N/A

Document Reference: Protocol 13, section 2.4.2

Finding: The protocol describes the procedure used to lay out sample plots using temporary pegs placed 15.96 meters from plot center. During the site visit, the audit team observed an instance where a tree near the plot border, but further than 15.96 meters from plot center was included in the sample. In this case, the monitoring crew assistant supervisor was observed making an ocular estimate of the plot boundary by projecting the plot circumference between 2 pegs. The audit team does not find this procedure to be sufficiently robust to determine whether a borderline tree should be included in the sample.

Client Response: See Corrective action report Form Ghana VCS project 20121019.

Project documents updated:

'P 13 monitoring plantation growth and biodiversity aspects 2012-11-09 section 2.4.2, Field measurements procedure & section 2.4.4'

'FORM Ghana VCS Project Description 20121109, section 4.3.2'

'FORM Ghana VCS Monitoring Report 20121109 section 3.3.2'

Auditor Response: The 20121109 version of the PD includes language specifying that, for trees near the border of the plot, distance to plot center be measured. Such language has also been added to the Monitoring Report, 20121109 version, and the most recent version of the field protocol (P 13 monitoring plantation growth and biodiversity aspects 2012-11-09.doc)

Closing Remarks: The Client's response adequately addresses the finding.

NIR 2012.16 dated 09/24/2012

Standard Reference: VCS Standard, Section 2.4.1; Accuracy

Document Reference: Protocol 13, section 2.4.2

Finding: The protocol describes the procedure for laying out plots by measuring 15.96 meters from plot center. While this procedure is acceptable on level terrain, significant underestimation of plot size can occur on sloping terrain. Please include in the protocol procedures to lay out plots on sloping terrain so as to reduce bias and uncertainty to the extent practical.

Client Response: See Corrective action report Form Ghana VCS project 20121019.

Project document updated:

'P 13 monitoring plantation growth and biodiversity aspects 2012-11-09, section 2.4.2, Field measurements procedure & Annex 3'

'FORM Ghana VCS Project Description 20121109, section 4.3.2'

'FORM Ghana VCS Monitoring Report 20121109 section 3.3.2'

Auditor Response: The 20121109 version of the PD now includes instructions for laying out plots on sloping terrain. The instructions have also been added to the 20121109 version of the Monitoring Report and the most recent version of the field protocol (P 13 monitoring plantation growth and biodiversity aspects 2012-11-09.doc)

Closing Remarks: The Client's response adequately addresses the finding.

NIR 2012.17 dated 09/24/2012

Standard Reference: N/A

Document Reference: Protocol 13, Annex 3

Finding: The protocol describes the procedure for measuring DBH of leaning trees. However, no information is provided regarding height measurement of leaning trees. Please include procedures for measuring height on leaning trees.

Client Response: See Corrective action report Form Ghana VCS project 20121019.

Project document updated:

'P 13 monitoring plantation growth and biodiversity aspects 2012-11-09, Annex 3'

Auditor Response: Instructions on measuring height of leaning trees have been added to the most recent version of the field protocol (P 13 monitoring plantation growth and biodiversity aspects 2012-11-09.doc)

Closing Remarks: The Client's response adequately addresses the finding.

NIR 2012.18 dated 12/14/2012

Standard Reference: CDM Methodology AR-ACM0001 Version 05.2.0; VCS Standard v3.3, Section 4.1.4; CDM Methodology Panel Guidance, 32nd Meeting Report, Annex 14, Table 4

Document Reference: Monitoring Report 20121109, section 4.2.2

Finding: The sampling error around the estimate of C stocks in planted teak fails to meet the precision requirements of the methodology. The Monitoring Report, section 4.2.2 proposes to account for this by applying a confidence deduction, citing Section 4.1.4 of the VCS Standard which refers to the CDM Meth Panel guidance as an example. Table 4 of the Meth Panel guidance document contains values for uncertainty deductions; however the values are based on 95% confidence limits and not the 90% confidence limits specified by the methodology. Therefore, please justify why and demonstrate how these uncertainty deductions can be used for your project within the guidelines of the proposed methodology.

Client Response: We use CDM methodology AR-ACM0003 to apply the confidence deduction method instead of the CDM meth Panel guidance example. This is justified as it is based on the same 90% confidence interval and 10% allowable error as AR-ACM0001. In addition, the method is found in an approved CDM tool, it qualifies as a "recognized statistical approach", and therefore conforms to the language of the section of the VCS Standards that we are following.

The demonstration of the application and above justification can be found in "FORM Ghana VCS Monitoring Report 20130114, section 4.2.2" and the excel sheet "Ex Post 2012 Confidential 20130114"

Auditor Response: The project developer proposes using the AR tool specified by AR-ACM0003, which is the most recent version of the CDM A/R Methodological tool "estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities. A new version of this tool, AR-TOOL14 Version 03.0,0 was adopted on 23 November 2012. The audit team reviewed the PD and Monitoring report and confirmed that the confidence deduction is based on AR-TOOL14, which is a recognized statistical approach as required by the VCS Standard. Examination of the Ex Post 2012 Confidential 20130114 spreadsheet found that the deduction was applied in conformance with the tool.

Closing Remarks: The Client's response adequately addresses the finding.

NIR 2012.19 dated 12/17/2012

Standard Reference: CDM tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities" version 02.2.0

Document Reference: PD 20121109, section 3.1.1

Finding: The PD states that the average age of remnant teak felled during plantation preparation was 5 years, and uses this age as the basis for accessing the teak yield tables, and therefore initial stocking. Please provide additional explanation regarding the survey undertaken to determine the average age of teak, including quantitative evidence and precision estimates around teak volume or demonstration that the value used will not lead to an overestimate of net GHG benefit.

Client Response: The explanations and quantitative evidence of the survey are presented in the PD, section 3.1.1. Figures are presented of actual stem numbers cut down during land preparation. The age of the trees was conservatively estimated at 5 years, based on expert judgement made by the FORM Ghana Management team. No tree measurement data is available. The evidence and supportive arguments for this age are as follows:

1. The tree size of a 5 year old teak tree in the yield table is 13.6 cm DBH and dominant height 12.6 meters. These sizes were considered to be upper limits for the felled trees based on observations in the field. Most trees were smaller than these limits.
2. Many of these trees were coppices with multiple stems. All stems (also of the same tree) are separately included in the numbers presented in table 8 of the PD. This means that stem size in the ex ante calculations is overestimated, because the size of multiple stems of five year old coppices are smaller than those of single 5 year old stems, due to competition between individual stems of the coppicing tree.
3. During the site visit PP showed the teak stumps and new coppices from these stumps to the SCS auditors in the plantation area. Their amount was relatively sparse, whereas the ex ante stem number given is on average 49 trees/ha. This number is much higher than expected based on field observations. This is due to the multiple stems of the coppices. Realistically, the counted number can be reduced with a factor 2 to 5 to arrive at actual numbers of individual stumps. This was not done however; a higher stem number was accepted for conservativeness.
4. Experience from managing the project area since 2008 shows that in general planted teak trees are cut down illegally before they reach 5 years. The tree sizes are then interesting for illegal loggers and hardly any trees are not harvested this way. During the site visit the auditors have also seen various examples of what the landscape looks like in the fringes of the project area, and examples of illegally felled teak and indigenous trees have been observed.

Based on the above arguments, the 5 year age and pertaining tree size are considered to provide a conservative figure, justified by direct and indirect evidence, which will rather underestimate than overestimate the net GHG benefit.

The above argumentation is added to "FORM Ghana VCS Project Description 20130114 section 3.1.1"

Auditor Response: During the site visit, the audit team observed many teak trees which had been cut prior to planting and stumps of teak trees. We agree with the proponent's estimate that the largest of these trees were around 13 cm dbh and 12 meters in height. We also observed that a large proportion of teak arising from stump sprouts were multiple stemmed, in which individual stems were smaller than single-stemmed stump sprouts. Most teak plantations surrounding the project are composed primarily of multi-stem stump sprouts from earlier harvest. Based on observations made during the site visit, the audit team finds that the arguments made by the project proponents are reasonable and in accordance with observations made during the site visit. We find that estimates of teak stocking based on this assumption are highly likely to overestimate teak stocking at the time of project initiation, which is conservative. In addition, the audit team finds that no better estimation method, in terms of accuracy or conservativeness, is available.

Closing Remarks: The Client's response adequately addresses the finding.

NIR 2012.20 dated 12/17/2012

Standard Reference: CDM tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities" version 02.2.0

Document Reference: PD 20121109, section 3.1.1

Finding: According to the PD, section 3.1.1, average volume of invasive york (IY) trees used in the calculation of pre-project stocking in IY was derived from sample plots installed in 2008. Please explain why it is appropriate to apply estimates based on data on IY collected from buffer zone plots to estimate pre-project stocking in the teak plantation areas. Please provide precision estimates around york volume or demonstration that the value used will not lead to an overestimate of net GHG benefit.

Client Response: York was sampled in buffer zone plots, which provided the best estimate of York densities and sizes in the area. York trees were not measured outside the buffers, but stem densities were known from felling data presented in table 9 in the PD.

York density and sizes in the buffer zone plots were 40 trees/ha with an average tree height of 6.6 meters and 8.7 cm DBH. York density in the plantation areas was 12 trees/ha, based on the felled data presented in table 9 in the PD. The size of these trees was smaller than the buffer zone trees, based on field observation. These observations can be substantiated by understanding the land use dynamics in the area: Trees in the buffers are felled less frequently compared to areas outside the buffers, because these other areas were farmed intensively by illegal farmers with only 1 or 2 year fallow period. As explained in the leakage description in the PD on page 56: "Looking at the satellite photos in the baseline emission (Figure 3), all areas have been completely cleared for farming, except some patches of riparian forest. Most of the cleared areas consist of fallow land. Social surveys showed that an average farmer actively farms about 2.5 ha. In total, 54% of the degraded area was farmed actively and 33% was fallow land." During farm preparation, farmers cut down the York (a weed to farmers too). In practice this means that every 1 or 2 years an area is cleared for agriculture and York does not get the time to reach the tree sizes it has in the buffer. York grows slightly faster than teak does, but will also need 3 to 4 years to reach the sizes found in the buffer areas. This is longer than the fallow period known in this area. In addition, these areas burned almost entirely each year, also severely damaging or killing the aboveground York biomass. The buffers were affected to a lesser extent by fires due to the higher vegetation cover and higher humidity near the rivers.

Another observation is that York performs better in the buffer areas than outside these areas. In the buffer site conditions are very good for York, with moist and light soils. Away from the buffers, soil moisture declines and there the York is seen mostly in association with better, moister soils. Orwa 2009 (one of the references in the PD) also describes the preference of York for moist and light soil types. This difference in performance between buffer areas and areas outside the buffers was not quantified, but is an expert observation, substantiated by the ecology of the species.

These arguments demonstrate that it is conservative to use the York tree sizes found in the buffer

(Baseline carbon stock stratum 2) as a proxy for the York tree sizes in the areas outside the buffer (Baseline carbon stock stratum 1) based on field observations, the baseline land use dynamics (farming and fire) and the ecology of the York tree.

The above argumentation is added to "FORM Ghana VCS Project Description 20130114 section 3.1.1"

Auditor Response: The proposition that york trees were both more numerous and larger in the buffer zones than in the planting areas at project initiation is reasonable and in conformance with observations made during the site visit. The audit team observed many indigenous farming operations, noting that tree cover in the farmed areas, which correspond to the pre-project condition, is much lower than in the buffer areas as a result of clearing the land to reduce competition. The audit team finds that applying the count of trees felled during site preparation to the average biomass of york trees in the buffer zones is highly unlikely to underestimate york biomass at project initiation, and is therefore conservative. In addition, we find that the estimation method used by the project proponent is the best method available, given the lack of other data.

Closing Remarks: The Client's response adequately addresses the finding.

NIR 2012.21 dated 12/17/2012

Standard Reference: CDM tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities" version 02.2.0

Document Reference: PD 20121109, section 3.1.1

Finding: Section 3.1.2 of the PD describes methods used to estimate C stocks in mixed degraded forest (MDF) areas. However, no value is given for precision of the estimate, as required by the methodology. Please provide precision estimates around C stocks or demonstration that the value used will not lead to an overestimate of net GHG benefit.

Client Response: Uncertainty biomass in our baseline stratum 2 is 324%, which is the relative Ebtrees/Ubtrees following the CDM tool 14. The uncertainty deduction is applied to dCtree and is based on Ubtrees. However, as this stratum is only validated now and not yet verified no dCtree can be calculated and strictly speaking no uncertainty deduction can be applied at this stage. However, we need to define the error and way to tackle it at validation as well, to have it clear for the verification. Therefore we propose to apply an inverse of the deduction of 37% on btree or Ctree as table 8 depicts for errors larger than 100%. This would mean that the btree of baseline 2 could be validated at $41.7 \times (1+0.37)$ is 57.1 t d.m. ha⁻¹yr⁻¹. At the time of verification the uncertainty is calculated again and an additional confidence deduction might be applied on the measurements at t2. This would seem the most conservative way to deal with variance in the mixed degraded forests.

The calculations are updated in "Guiding document calculations CONFIDENTIAL 20130114". The baseline level is also updated in "Ex ante overview CONFIDENTIAL 20120702". The precision and calculation method is added to "FORM Ghana VCS Project Description 20130114 section 3.1.2"

Auditor Response: The audit team finds that following the CDM tool AR-Tool14 for accounting for uncertainty of the estimate conforms to the VCS Standards. The calculation workbooks "Guiding document calculations CONFIDENTIAL 20130114.xlsx" and "Ex ante overview CONFIDENTIAL 20120702.xlsx" have been updated accordingly as has section 3.1.2 of the PD.

Closing Remarks: The Client's response adequately addresses the finding.