




Validation opinion for post registration changes

Title of project activity:		
Commercial reforestation on lands dedicated to extensive cattle grazing activities in the region of Magdalena Bajo Seco, Colombia		
CDM reference number:	DNV project No.:	
4861	PRJC-339152-2011-CCS-ITA	
Date:	Validation of the changes were conducted:	
21/03/2013	<input type="checkbox"/> Prior to the commencement of a verification of the project activity <input checked="" type="checkbox"/> When performing a verification of the project activity	
Work carried out by (name & signature):	Work verified by (name & signature):	Approved by (name & signature):
 Andres Espejo	 Edwin Aalders	 Edwin Aalders

Overview of post registration changes

Type of post registration change		Are the changes of a type specified in Appendix 1 of the CDM Project Standard? Note: In case of "No", prior approval by the EB is required
A: Temporary deviations from the registered monitoring plan and/or monitoring methodology (refer to section A)		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> No post registration change of this type
Applicable period for proposed deviations (inclusive):	From DD/MM/YYYY start date of the earliest included deviation to DD/MM/YYYY end date of the latest included deviation)	
B: Corrections (refer to section B)		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> No post registration change of this type
C: Changes to the start date of the crediting period (refer to section C) <i>Prior approval by the CDM EB is not required in case of (a) bringing forward the start date up to one year earlier or (b) postponing the start date by up to one year (by up to two years for project activities in LDCs).</i>		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> No post registration change of this type
Proposed start date of the crediting period:	DD/MM/YYYY (changed from DD/MM/YYYY)	
D: Permanent changes from the registered monitoring plan or applied methodology		<input checked="" type="checkbox"/> Yes

(refer to section D)	<input type="checkbox"/> No <input type="checkbox"/> No post registration change of this type
E a): Changes to the project design of a registered project activity (refer to section 0)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> No post registration change of this type
E b): Changes to the programme design of a registered PoA (refer to section 0)	Note: All changes to the programme design of a registered PoA require prior approval by the EB. <input checked="" type="checkbox"/> No post registration change of this type
F. Changes specific to afforestation or reforestation project activities (refer to section 0F)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> No post registration change of this type

A. Temporary deviations from the registered monitoring plan and/or monitoring methodology

A.1 Description of deviation (including the reason for requesting a deviation)

Not applicable since there are no temporary deviations identified.

A.2 Assessment of deviation

Assessment that the deviation does not require a revision of monitoring plan or the changes from the project activity as described in the registered project design document

Not applicable since there are no temporary deviations identified.

Assessment of the impact of the deviation on the estimates of the emissions reductions for the proposed project activity with the use of approved methodology as existing and with the deviation

Not applicable since there are no temporary deviations identified.

B. Corrections

B.1 Description of corrections

B.1.1 Correction 1

The registered PDD has been modified in order to correct a mistake in the value defined ex-ante for the “Average pre-existing stock non-tree pre-project biomass on land to be planted before the start of a proposed A/R CDM project activity for baseline stratum i , stand model k , time t ” ($B_{pre,ikt}$) assumed originally in the registered PDD.

In version 7 of the PDD /35/ which was initially registered under the UNFCCC /35/ the PDD defined ex-ante the values of “Average pre-existing stock non-tree pre-project biomass on land to be planted before the start of a proposed A/R CDM project activity for baseline stratum i , stand model k , time t ” ($B_{pre,ikt}$) for the three baseline strata: Clean pastures (BLS1); Pastures with fallows (BLS2); and Fallows (BLS3). As per the applicable methodology A/R.AM0004 Version 4 /49/ this parameter would be used to estimate the decrease in the carbon stock in the living biomass carbon pools of non-tree vegetation in the year of site preparation ($E_{biomassloss}$).

According to Section C.5.2 of the registered PDD /35/ the value for the mentioned parameter for the three baseline strata were sourced from Dufour (2005) /33/ based on *in-situ* data, and would be as follows:

Table 1. Aboveground biomass of pre-existing non-tree vegetation in baseline scenarios. *Tr*: Trunks (t d.m. ha⁻¹); *Br*: branches (t d.m. ha⁻¹); *L*: leaves (t d.m. ha⁻¹); *Bu*: bush (t d.m. ha⁻¹); *Li*: litter (t d.m. ha⁻¹); *Dw*: deadwood (t d.m. ha⁻¹); *R*: roots (t d.m. ha⁻¹); $B_{pre,ik}$: Average pre-existing stock of non-tree pre-project biomass before the start of the proposed A/R CDM project activity for baseline stratum i (t d.m. ha⁻¹).

Scenario	Shrubs and fallows			Others			Total ($B_{pre,ik}$)
	<i>Tr</i>	<i>Br</i>	<i>L</i>	<i>Bu</i>	<i>Li</i>	<i>Dw</i>	
BLS1	0.28	0.16	0.28	0.28	0.28	0.28	3.60
BLS2	5.32	3.18	5.59	5.32	5.59	5.32	16.97
BLS3	4.09	4.36	9.72	4.09	9.72	4.09	20.57

However, Annex-4 of version 7 of the PDD /35/ provides values which should be considered in the monitoring plan which differs from the above values:

Table 2: Parameters used to calculate ex-post carbon stocks in A/R CDM project activities

Parameter	Value	Source
$B_{cleanpasture}$	18.74	Pre-existing stock for clean pasture, from Dufour (2005)
$B_{rastrojo}$	26.70	Pre-existing stock for rastrojo, from Dufour (2005)
CF_i	0.5	According to the applied methodology, IPCC default value
R_i	0.27	Table A1.3.8 of IPCC GPG LULUCF 2003

In version 9 of the PDD /35/ which includes the post-registration changes /35/, the above values were modified in order to make them in line with the applicable methodology A/R.AM0004 Version 4 /49/ and consistent with the results provided in Dufour (2005) /33/. Furthermore, the project participant has included in the above values the belowground biomass component provided in Dufour (2005) /33/. As a result the ex-ante calculations of net anthropogenic GHG removals by sinks were updated /37/ by updating these values and deleting the root-shoot ratio for existing non-tree vegetation.

B.1.2 Correction 2

The ex-ante calculations have been modified in order to correct a mistake in the root-shoot ratio considered for the existing trees.

According to the ex-ante calculations provided with version 7 of the PDD /37/ the root shoot ratio of existing trees is 0.27.

In the ex-ante calculations of version 09 of the PDD /37/ the root-shoot ratio has been considered equal zero as the value of the average pre-existing stock tree biomass on land to be planted before the start of a proposed A/R CDM project activity for baseline stratum i , stand model k , time t (B_{ikt}) of 1.66 t d.m. ha⁻¹ applied, already includes the belowground biomass.

B.2 Assessment of corrections

B.2.1 Correction 1

In line with paragraphs 257-259 of the VVS /46/, DNV conducted an assessment of the changes in order to confirm whether the corrected information reflects the actual project information and the corrected parameters reflect the application of the applied methodology.

According to the applied methodology A/R-AM0004 Version 04, Section III, subsection 5, the decrease in the carbon stock in the living biomass carbon pools of non-tree vegetation in the year of site preparation ($E_{biomassloss}$) would have to be estimated in order to determine the project sum of changes in living biomass carbon stocks ($\Delta C_{P, LB}$). As such, the $E_{biomassloss}$ represents only the loss of living non-tree biomass and it would be determined out from the “Average pre-existing stock non-tree pre-project biomass on land to be planted before the start of a proposed A/R CDM project activity for baseline stratum i , stand model k , time t ” ($B_{pre,ikt}$) which does not include litter and dead wood.

The values assumed in version 7 of the PDD /35/ for $B_{pre,ikt}$, included also dead wood and litter which was not correct as the $E_{biomassloss}$ shall consider only the living biomass. Furthermore, the ex-ante calculations /37/ applied a root-shoot ratio to the above value in order to determine the total non-tree biomass. However, the project participant has actual values of below ground biomass provided by the baseline survey /33/.

Hence, the project participant modified the PDD /35/ and the ex-ante calculations /37/ in order to correct the inconsistencies which existed in the PDD. Furthermore, the project participant has deleted the root-shoot ratio applied to non-tree biomass as $B_{pre,ikt}$ already includes the below ground biomass component. The project participant has updated the ex-ante and ex-post calculations applying a $B_{pre,ikt}$ (Average pre-existing stock non-tree pre-project biomass on land to be planted before the start of a proposed A/R CDM project activity for baseline stratum i , stand model k , time t ; t d.m. ha⁻¹) which includes both the aboveground and below ground biomass. This would be equal to 1.81 t d.m. ha⁻¹ for Clean pastures (BLS1), 17.18 t d.m. ha⁻¹ for Pastures with fallows (BLS2) and 21.49 t d.m. ha⁻¹ for Fallows (BLS3) as evidenced by the revised PDD /35/ and by the baseline study conducted by Thomas Dufour in the project area /33/.

DNV checked the revised PDD and confirmed that the inconsistencies have been corrected. Furthermore, DNV checked Dufour (2005) /33/ and confirmed that the values reported in the modified PDD are correct and consistent with the mentioned reference which was used initially. Furthermore, DNV confirmed that the applied values already consider the belowground biomass so the root-shoot ratio should be considered zero in the ex-ante calculations.

This correction would not require prior-approval from the board as it is a type of change included in Appendix 1 of the PS /47/, i.e. since it is a correction on project information that does not affect the design of the project activity.

B.2.2 Correction 2

DNV confirmed that the value of the average pre-existing stock tree biomass on land to be planted before the start of a proposed A/R CDM project activity for baseline stratum i, stand model k, time t (B_{ikt}) of 1.66 t d.m. ha⁻¹ for the project area sourced from Thomas Dufour /33/ already considered the below-ground biomass. Therefore, the ex-ante calculations provided with version 07 of the PDD double counted the belowground biomass in it estimates and it would be correct not to consider it. According to the ‘Guidelines on accounting of specified types of changes in AR CDM project activities from the description in registered PDD’ (version 02.0) /53/ “Changes in parameters, equations, or methods used in tree biomass estimation, if the applicability of the changed parameters, equations, or methods is demonstrated at verification using the “Tool for demonstration of applicability of allometric equations and volume equations in A/R CDM project activities” when available, or if the changed parameters, equations, or methods do not result in a decrease in precision of the estimate of tree biomass” are considered as minor. Since this is an increase in the accuracy of the estimates, this change is considered as a minor change.

The ex-ante calculations have been revised accordingly.

C. Changes to the start date of the crediting period

No changes have occurred to the project activity that would result in a less conservative baseline

Not applicable since there is no change in the start date of the crediting period.

Substantive progress has been made by the project participants to start the project activity

Not applicable since there is no change in the start date of the crediting period.

D. Permanent changes from the registered monitoring plan or applied methodology

D.1 Description of the revision of the monitoring plan

The project participant has made the following changes to PDD which are specific to afforestation or reforestation project activities:

Section in PDD	Changes made	Ref.														
E.4. Monitoring of the actual net GHG removals by sinks: (Including Annex 4)	<p>This section has been modified in order to include provisions for the calculation “Above-ground and below-ground biomass”; the estimation will be done following the BEF method for <i>Gmelina arborea</i>, <i>Eucalyptus tereticornis</i>, <i>Bombacopsis quinata</i> and <i>Tabebuia rosea</i> and the allometric method for <i>Tectona grandis</i>.</p> <p>The project participant has included a table the latest volume equations and allometric equations used.</p> <ul style="list-style-type: none">▪ <i>Gmelina arborea</i>: Volume equation for age ≤ 4 years it has been sourced from López <i>et al.</i> (2011) /9/ while for stands with age ≥ 5 years it has been sourced from Vallejo (1991) /10/.▪ <i>Tectona grandis</i>: Allometric equation sourced from Torres (2004) /11/.▪ <i>Bombacopsis quinata</i>: Volume equation sourced from CIRAD-Forêt (2003) /12/.▪ <i>Tabebuia rosea</i>: Volume equation sourced from Tabares (2002) /11/.▪ <i>Eucalyptus tereticornis</i>: Sourced from López <i>et al.</i> (2011) /13/.	1														
	<p>The following densities have been changed for ex-post purposes:</p> <table><tr><th rowspan="2">Species</th><th colspan="2">Basic density</th></tr><tr><th>Version 7 of PDD</th><th>Version 9 of PDD</th></tr><tr><td><i>Gmelina arborea</i></td><td>Allometric method</td><td>0.53</td></tr><tr><td><i>Bombacopsis quinata</i></td><td>0.39</td><td>0.45</td></tr><tr><td><i>Tectonia grandis</i></td><td>0.5</td><td>Allometric method</td></tr></table> <p>Furthermore, the BEF has been changed from 3.4 provided in Version 7 of the PDD to a value of 2.7 provided in Version 9 of the PDD. The value of 2.7 is a conservative value as per the ‘Guidelines on conservative choice and application of default data in estimation of net anthropogenic GHG removals by sinks’ (version 2).</p>	Species	Basic density		Version 7 of PDD	Version 9 of PDD	<i>Gmelina arborea</i>	Allometric method	0.53	<i>Bombacopsis quinata</i>	0.39	0.45	<i>Tectonia grandis</i>	0.5	Allometric method	2
	Species		Basic density													
Version 7 of PDD		Version 9 of PDD														
<i>Gmelina arborea</i>	Allometric method	0.53														
<i>Bombacopsis quinata</i>	0.39	0.45														
<i>Tectonia grandis</i>	0.5	Allometric method														
	<p>In section E.4.1 the following parameter was included:</p> <ul style="list-style-type: none">▪ Tree height - H	3														

D.2 Assessment of the revision of the monitoring plan

DNV checked the registered PDD Version 07 dated 28 April 2011 and confirmed that the following changes were made in the modified PDD Modified version 09 dated 14 February 2013 and that these would be acceptable by the EB as per the ‘Guidelines on accounting of specified types of changes in AR CDM project activities from the description in registered PDD’ (version 02.0) /53/. DNV’s assessment of these changes are listed below:

Ref.	Assessment of changes from PDD
1	<p>DNV checked the PDD and confirmed that it has been updated in order to include site-specific group-of-species-specific allometric or volume equations which will be used for the estimation of tree total biomass. The following equations will be used:</p> <ul style="list-style-type: none"> ▪ <i>Gmelina arborea</i>: Volume equation for age ≤ 4 years it has been sourced from López <i>et al.</i> (2011) /9/ while for stands with age ≥ 5 years it has been sourced from Vallejo (1991) /10/. ▪ <i>Tectona grandis</i>: Allometric equation sourced from Torres (2004) /11/. ▪ <i>Bombacopsis quinata</i>: Volume equation sourced from CIRAD-Forêt (2003) /12/. ▪ <i>Tabebuia rosea</i>: Volume equation sourced from Tabares (2002) /11/. ▪ <i>Eucalyptus tereticornis</i>: Sourced from López <i>et al.</i> (2011) /13/. <p>According to the ‘Guidelines on accounting of specified types of changes in AR CDM project activities from the description in registered PDD’ (version 02.0) /53/ “<i>Changes in parameters, equations, or methods used in tree biomass estimation, if the applicability of the changed parameters, equations, or methods is demonstrated at verification using the “Tool for demonstration of applicability of allometric equations and volume equations in A/R CDM project activities” when available, or if the changed parameters, equations, or methods do not result in a decrease in precision of the estimate of tree biomass</i>” are considered as minor. According to the tool for ‘Demonstrating appropriateness of allometric equations for estimation of aboveground tree biomass in AR CDM project activities’ (version 1.0.0) and the tool for ‘Demonstrating appropriateness of volume equations for estimation of aboveground tree biomass in AR CDM project activities’ (version 01.0.1) “<i>a species-specific or group-of-species-specific ... equation derived from trees growing in edapho-climatic conditions similar to those in the project area is considered appropriate, and hence can be used for ex post estimation of tree biomass, if at least one of the following conditions is satisfied: (a) The equation is used in the national forest inventory, or the national GHG inventory, of the host Party; (b) The equation has been used in commercial forestry sector of the host Party for ten years or more; (c) The equation was derived from a data set of at least 30 sample trees, and the value of coefficient of determination (R^2) obtained was not less than 0.85</i>”.</p> <p>DNV checked the publications from which the above equations are sourced /12//14//13//9//10//11//11/ and confirmed that all equations were based on a data set of at least 30 sample trees and the coefficient of determination is in all cases > 0.85 as required by the tool for ‘Demonstrating appropriateness of allometric equations for estimation of aboveground tree biomass in AR CDM project activities’ (version 1.0.0) and the tool for ‘Demonstrating appropriateness of volume equations for estimation of aboveground tree biomass in AR CDM project activities’ (version 01.0.1). Therefore, DNV can conclude that this change does not result in a decrease in precision of the estimate of tree biomass as accepted by the ‘Guidelines on accounting of specified types of changes in AR CDM project activities from the description in registered PDD’ (version 02.0) /53/.</p>
2	<p>The species <i>Gmelina arborea</i> was planned in the registered PDD to be estimated through allometric equations; however, in the modified PDD the aboveground biomass will be estimated through the BEF method so the basic density would be used in this case. DNV</p>

Ref.	Assessment of changes from PDD
	<p>checked the supporting evidence for the basic density of the <i>Gmelina arborea</i> /21/ and confirmed that it shows a basic density that ranges from 0.42 to 0.64 t/m³. Therefore, a value of 0.53 would be reasonable. Since this value is species-specific and for the same edapho-climatic conditions as the project area. DNV is able to confirm that this change do not result in a decrease in precision of the estimate of tree biomass; hence this change would not require the prior-approval from the board as per the ‘Guidelines on accounting of specified types of changes in AR CDM project activities from the description in registered PDD’ (version 02.0) /53/.</p> <p>The density for <i>Bombacopsis quinata</i> was also changed in order to use a most precise value since in the PDD the project participant assumed as value a default value sourced from Table A1.3.9 of IPCC GPG LULUCF 2003 /45/. The basic density has been set to 0.45 t/m³ as confirmed through Cordero & Boshier (2003) /15/ which is this basic density for this species and for the same edapho-climatic conditions as the project area. DNV is able to confirm that this change do not result in a decrease in precision of the estimate of tree biomass; hence this change would not require the prior-approval from the board as per the ‘Guidelines on accounting of specified types of changes in AR CDM project activities from the description in registered PDD’ (version 02.0) /53/.</p> <p>The BEF was changed from 3.4 to 2.7 which is considered a conservative IPCC value (c.f Table A1.3.10 of IPCC GPG LULUCF 2003) /45/ as per the ‘Guidelines on conservative choice and application of default data in estimation of net anthropogenic GHG removals by sinks’ (version 2). DNV deems that it would be appropriate to use the BEF of 2.7 since it is conservative as ‘Guidelines on conservative choice and application of default data in estimation of net anthropogenic GHG removals by sinks’ (version 2). DNV is able to confirm that this change do not result in a decrease in precision of the estimate of tree biomass but an increase in the conservativeness and its use is demonstrated through the tool for ‘Demonstrating appropriateness of volume equations for estimation of aboveground tree biomass in AR CDM project activities’ (version 01.0.1) which requires the application of the ‘Guidelines on conservative choice and application of default data in estimation of net anthropogenic GHG removals by sinks’ (version 2). Hence this change would not require the prior-approval from the board as per the ‘Guidelines on accounting of specified types of changes in AR CDM project activities from the description in registered PDD’ (version 02.0) /53/.</p>
3	<p>The project participant has added the parameter “H, Tree Height” to the monitoring plan. DNV confirmed that the monitoring of this parameter would be necessary as the volume tables to be used for determining the mean volume require the use of tree height data /12//14//13//9//10//11/.</p> <p>This change would be considered as minor as per the ‘Guidelines on accounting of specified types of changes in AR CDM project activities from the description in registered PDD’ (version 02.0) /53/, since these guidelines state that “<i>Changes in parameters, equations, or methods used in tree biomass estimation, if the applicability of the changed parameters, equations, or methods is demonstrated at verification using the “Tool for demonstration of applicability of allometric equations and volume equations in A/R CDM project activities” when available, or if the changed parameters, equations, or methods do not result in a decrease in precision of the estimate of tree biomass</i>” are considered as minor.</p>

DNV confirmed that the proposed revision of the monitoring plan ensures that the level of accuracy or completeness in the monitoring and verification process is not reduced as a result of the revisions.

DNV confirmed that the proposed revision of the monitoring plan is in accordance with the approved monitoring methodology applicable whilst ensuring the conservativeness of the removals.

The proposed revision of the monitoring plan ensures that the level of accuracy or completeness in the monitoring and verification process is not reduced as a result of the revisions

As discussed above, DNV confirmed that the proposed revision of the monitoring plan ensures that the level of accuracy or completeness in the monitoring and verification process is not reduced as a result of the revisions.

The proposed revision of the monitoring plan is in accordance with the approved monitoring methodology applicable to the project activity whilst ensuring the conservativeness of the emission reductions calculation

As discussed above in section D.2, DNV confirmed that the proposed revision of the monitoring plan is in accordance with the approved monitoring methodology applicable whilst ensuring the conservativeness of the emission reductions.

The findings of previous verification reports, if any, have been taken into account

There were no findings of previous verification reports as this request for changes has been requested as part of the first periodical verification which is being conducted by DNV.

E. Changes to the project or programme design of a registered project activity or PoA

E.1 Description of the changes as compared to the description in the registered PDD and description of the changes to the monitoring plan

At the time of the validation the proposed project activity was not fully implemented as evidenced by the validation report /36/ and the registered PDD /35/ which indicate that at least 2/3 of the total planned area (i.e. 4 373 ha) was under the control of the project participant. At the time of the current verification the project participant has established control of a total area of 3 137.32 ha /25/, which is equal to $\approx 72\%$ of the area initially planned. From this area, only 11.8 ha have not been planted yet /23//22/.

The project participant has updated the project area in Section A.2 of the PDD.

E.2 Assessment of the changes to the project design (*applicable to project activities only*)

DNV was able to confirm that this change in the project boundary would be a reduction in project area from 4 373 ha to 3 137.32 ha /23//39/, and that this changes would not have an impact in the baseline identification or the additionality demonstration, so it would be considered as a minor change not requiring prior approval from the board as per paragraph 4(n) of the ‘Guidelines on accounting of specified types of changes in AR CDM project activities from the description in registered PDD’ (version 02.0) /53/.

E.3 Assessment of the impact of the changes to the project design (*applicable to project activities only*)

In the case of a project activity, do the changes adversely impact any of the following?

- ☐ The applicability and application of the applied methodology under which the project activity has been registered
- ☐ The additionality of the project activity
- ☐ The scale of the project activity
- ☒ None of the above

Assessment of impacts of the changes on the applicability and application of the applied methodology under which the project activity has been registered

No impacts on the applicability and application of baseline methodology since the changes do not affect the applicability of the methodology or the identification of the baseline scenario.

Assessment of impacts of the changes on the additionality of the project activity

No impacts on additionality have been identified.

Assessment of impacts of the changes on the scale of the project activity

No impacts on the scale of the CDM project activity have been identified.

E.4 Assessment of the change to a PoA (*applicable to PoAs only*)

In the case of a PoA, do the changes relate to:

- ☐ Changes to programme boundary to expand geographical coverage or to include additional host Parties
- ☐ Changes to the eligibility criteria under the circumstances indicated in the “Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for

programme of activities” (e.g. to implement changes decided by the Board if an issue related to environment integrity is identified)

- ☐ If a PoA includes more than one generic CPA-DD, addition of specific actual case CPA-DDs corresponding to generic CPA-DDs for which a specific case CPA-DD has not been submitted at the time of request for registration of the PoA
- ☐ Changes to apply the provisions of the most recent versions of the “Standard for sampling and surveys for CDM project activities and programme of activities”

Note: No other types of changes are permitted

F. Changes specific to afforestation or reforestation project activities

There are some changes specific to afforestation or reforestation project activities which are described above.

G. Validation opinion

It is DNV's opinion that the proposed corrections to the PDD accurately reflects the actual project information and that the corrected parameters reflect the application of the applied methodology and/or monitoring plan.

It is DNV's opinion that the proposed revision of the monitoring plan ensures that the level of accuracy or completeness in the monitoring and verification process is not reduced as a result of the revisions. Furthermore, DNV confirms that the revised PDD reflects the application of the approved guidance from the Board regarding the permanent changes from the provisions of the registered monitoring plan and methodology.

It is DNV's opinion that the registered PDD reflects the application of the approved guidance from the Board regarding the proposed or actual changes from the provisions of the registered monitoring plan and methodology and as per the applicable provisions of the project standard.

H. references

H.1 Documentation provided by the project participants

- /1/ Andres Sierra and Thomas Dufour: “Validation opinion for post registration changes” (UNFCCC Registration Ref. No. 4861) Monitoring Report for the period: 2 August 2000 to 30 October 2011, Version 01 dated 30 October 2011 uploaded in the UNFCCC website and version 03 dated 14 June 2012 submitted to the UNFCCC.
- /2/ ONF International: GHG accounting spread sheet “Carbon Accounting and Monitoring of Afforestation and Reforestation Activities CAMARA” with the net anthropogenic GHG removals calculations, version 1.2, March 2012
File: 12-03-12_CAMARA_Core_v1.2_PRC.xlsx
- /3/ Corporación Nacional de Investigación y Fomento Forestal (CONIF): Forest inventory raw data and aggregated values, year 2011
File: Datos_parcelas.xls; Var_agregadas.xlsx
- /4/ Corporación Nacional de Investigación y Fomento Forestal (CONIF): Magdalena Bajo Seco Forest Inventory, Final report, September 2011
File: Informe_final_ConifV_09_12_2012.docx
- /5/ Corporación Nacional de Investigación y Fomento Forestal (CONIF): Standard Operating Procedure (SOP) for the establishment and measurement of permanent plots and tree volume estimation, November 2008
File: Protocolo PPC CONIF.pdf
- /6/ ONF International: Auditing results conducted by ONF international on the data collection and the data transfer, year 2011
File: Excel file (Datos_auditoria_PRC_2011).
- /7/ ONF Andina (Daughter company of ONF International): Standard Operating Procedure (SOP) for the installation of permanent sampling plots for the monitoring and estimation of dendrometric variables, Prot_01, year 2011
- /8/ ONF Andina (Daughter company of ONF International): Standard Operating Procedure (SOP) for various monitoring and management activities, year 2011
- /9/ LÓPEZ A.M.; BARRIOS, A.; NIETO V.; TRINCADO G. 2011. Monitoreo y modelamiento de crecimiento como herramienta para el manejo de plantaciones forestales comerciales. Corporación Nacional de Investigación y Fomento Forestal CONIF® – Ministerio de Agricultura y Desarrollo Rural. Bogotá D.C. 100p.
-Report including volume equations for *Gmelina arborea*, year 2011
- /10/ CIRAD-Forêt: Volume equations for *Gmelina arborea* included in the report “Capacidad del programa de reforestación comercial realizado en la zona Atlántica de Colombia de generar empleo y fomentar el desarrollo rural, desde la plantación hasta la transformación y comercialización de los productos”, March 2003
- /11/ Julián Bernardo Tabares: Volume equations for *Tectonia grandis* and *Tabebuia rosea* cited in “MODELOS DE CRECIMIENTO DE LAS CINCO ESPECIES FORESTALES (*Tectonia Grandis*, *Gmelina Arborea*, *Bombacopsis Quinata*, *Eucalyptus Tereticornis* y *Tabebuia Rosea*) CONTEMPLADAS EN EL PROYECTO PILOTO “SIG REFORESTACIÓN PRODUCTIVA”, 2002”
- /12/ CIRAD-Forêt: Volume equations for *Bombacopsis quinatum* included in the report “Capacidad del programa de reforestación comercial realizado en la zona Atlántica de Colombia de generar empleo y fomentar el desarrollo rural, desde la plantación hasta la transformación y comercialización de los productos”, March 2003

- /13/ LÓPEZ A.M.; BARRIOS, A.; NIETO V.; TRINCADO G. 2011. Monitoreo y modelamiento de crecimiento como herramienta para el manejo de plantaciones forestales comerciales. Corporación Nacional de Investigación y Fomento Forestal CONIF® – Ministerio de Agricultura y Desarrollo Rural. Bogotá D.C. 100p.
-Report including volume equations for *Eucalyptus tereticornis*, year 2011
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- /22/ ONF Andina (Daughter company of ONF International): *ESRI Geodatabase of the proposed project activity including information of all the polygons that are part of the proposed project activity*, March 2012
File: ONF.db
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File: Parcelas_final.shp; lotes_area_controlada.shp; Carreteras.shp
- /24/ Supporting evidence of control: *Title of land, forestry contract, and carbon rights contract, the following allotments were checked:*
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- /26/ ONF Andina (Daughter company of ONF International): *Summary of total project area and distribution of area per species and phase of the project*, March 2012

- File: Balance_Monitoring_SIG.xlsx*
- /27/ ONF Andina (Daughter company of ONF International): *Certificates of final receipt of work including the field data sheets for the forest establishment and management monitoring and certification of works*, Various dates.
- /28/ ONF Andina (Daughter company of ONF International): *Database of forest establishment and forest management activities in the allotments that are part of the proposed project activity*, March 2012
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- /30/ Corporación Nacional de Investigación y Fomento Forestal (CONIF): *Reforestation plan of the watershed of Magdalena river – Final report: Technical and economical – Phase 1*, March 2003
- /31/ Corporación Nacional de Investigación y Fomento Forestal (CONIF): *Reforestation plan of the watershed of Magdalena river – Final report: Technical and economical – Phase 1*, January 2004
- /32/ Corporación Nacional de Investigación y Fomento Forestal (CONIF): *Reforestation plan of the watershed of Magdalena river – Final report: Technical and economical – Phase 1*, year 2005
- /33/ Thomas Dufour - ONF International: *"Reboisement Commercial dans la Région du Magdalena Bajo, Colombie La Composante Carbone: Niveau de référence et plan de surveillance"* (In English : Commercial reforestation in the region of Magdalena Bajo Seco. The carbon component : Reference level and monitoring plan), January 2005
- /34/ Danny Alexander Torres Vélez: *MODELACIÓN DEL CRECIMIENTO Y PRODUCCIÓN EN VOLUMEN Y BIOMASA DE LA TECA*, Universidad Nacional de Colombia – Sede Medellín Departamento de Ciencias Forestales 2004

H.2 Other project documents or documents used by DNV to verify the information provided by the project participants

- /35/ ONF International and Carbono & Bosques: *Submitted CDM-PDD “Validation opinion for post registration changes”*,
 -Modified version – Version 09, 14 February 2013
 -Initially registered - Version 07, 28 April 2011
- /36/ TUV-SUD: CDM Validation report – Validation of the CDM project: *Validation opinion for post registration changes*, Report N°1539392, Revision N°3 24 May 2011
- /37/ ONF International: *TARAM v.1.4 Excel spreadsheet with calculations of net anthropogenic removals*
- /38/ ONF International: *Ex-ante volume projections of proposed project activity, Year 2011*
File: CalculosVolumenPRC_Validación 2011.xls
- /39/ ONF Andina (Daughter company of ONF International): *Geographical dataset (ESRI shapefile) with geographical information on the project boundary provided as an Appendix to the registered PDD*, 2011
- /40/ Instituto Nacional de Pesquisas Espaciais (INPE): *Images of the Thematic Mapper sensor carried on the satellite LANDSAT 5*:
 - LANDSAT_5_TM_20081023_233_085_L2

- /41/ United States Geographic Service (USGS) *Images of the E Thematic Mapper sensor carried on the satellite LANDSAT 7*:
- LANDSAT_7_ETM_20110313_172009053
- /42/ Jérôme Chave, Helene C. Muller-Landau, Timothy R. Baker, Tomás A. Easdale, Hans ter Steege, and Campbell O. Webb. 2006. Regional and phylogenetic variation of wood density across 2456 neotropical tree species. *Ecological Applications* 16:2356–2367.
- /43/ DNV: Re-measured tree dimensions obtained during the verification on-site inspection of the following plots:
-Melina_111; Teca_38; Teca_40; Teca_31; Melina_16; Melina_165; Melina_31
-Obtained 25-26 April 2012
- /44/ DNV: Check on mistakes in the transfer of data from the field data sheets to the data base conducted in 158 records of the following plots:
-Melina_155; Melina_165; Melina_166; Roble_139
- /45/ IPCC: Good Practice Guidance for Land Use, Land-Use Change and Forestry, YEAR 2003

H.3 Methodologies, tools and other guidance by the CDM Executive Board

- /46/ CDM Executive Board: 'Clean Development Mechanism Validation and Verification Standard' (version 03.0)
- /47/ CDM Executive Board: 'Clean Development Mechanism Project Standard' (version 02.1)
- /48/ CDM Executive Board: 'Clean Development Mechanism Project Cycle Procedure' (version 03.0)
- /49/ CDM Executive Board: *A/R-AM0004* 'Afforestation or reforestation on degraded land allowing for silvopastoral activities', version 04
- /50/ CDM Executive Board: 'Calculation of the number of sample plots for measurements within A/R CDM project activities' (version 2), Annex 19, EB46
- /51/ CDM Executive Board: 'Procedure to determine when accounting of the soil organic carbon pool may be conservatively neglected in CDM A/R project activities' (version 1), Annex 15, EB33
- /52/ CDM Executive Board: 'Guidelines for completing the monitoring report form (CDM-MR)' (Version 02.0), Annex 20, EB66
- /53/ CDM Executive Board: 'Guidelines on accounting of specified types of changes in AR CDM project activities from the description in registered PDD' (version 02.0)
- /54/ CDM Executive Board: 'Guidelines on application of specified versions of AR CDM methodologies in verification of registered AR CDM project activities' (version 01.1)
- /55/ CDM Executive Board: 'Guidance on conditions under which the change in carbon stocks in existing live woody vegetation are insignificant' (version 1), Annex 16, EB46
- /56/ CDM Executive Board: 'Guidelines on conditions under which increase in GHG emissions attributable to displacement of pre-project crop cultivation activities in A/R CDM project activity is insignificant' (version 1), Annex 14, EB51
- /57/ CDM Executive Board: 'Guidelines on conditions under which increase in GHG emissions related to displacement of pre-project grazing activities in A/R CDM project activity is insignificant' (version 1), Annex 13, EB51
- /58/ CDM Executive Board: 'Guidelines on conservative choice and application of default data in estimation of net anthropogenic GHG removals by sinks' (version 2), Annex 23, EB50

- /59/ CDM Executive Board: 'Guidance on conditions under which the change in carbon stocks in existing live woody vegetation are insignificant' (version 1), Annex 16, EB46
- /60/ CDM Executive Board: 'Demonstrating appropriateness of allometric equations for estimation of aboveground tree biomass in AR CDM project activities' (version 1.0.0), Annex 28, EB65
- /61/ CDM Executive Board: 'Demonstrating appropriateness of volume equations for estimation of aboveground tree biomass in AR CDM project activities' (version 01.0.1), Annex 24, EB67
- /62/ CDM Executive Board: Decision on the non-application of the 'Guidelines on conservative choice and application of default data in estimation of net anthropogenic GHG removals by sinks' (version 2), EB67

H.4 Persons interviewed during the verification

- /63/ Andres Sierra – Carbon Project Responsible – ONF Andina, 24-27 April 2012
- /64/ Enrique Villamil – Responsible of forest establishment and management – ONF Andina, working for A.W. FABER CASTELL&TH REFORESTATION S.A.S, 24-26 April 2012
- /65/ Cristóbal Castillo – Forest Inventory – CONIF, 25-26 April 2012
- /66/ Graciano Camarga Barazas – CORMAGDALENA, 25-26 April 2012
- /67/ Edgar Gutiérrez – Responsible of monitoring of forest establishment and management – ONF Andina, 24 April 2012
- /68/ Juan Carlos Rubiano – GIS responsible – ONF Andina, 24 April 2012

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