

REFORESTING DEGRADED LANDS IN CHILE THROUGH THE USE OF MYCORRHIZAL INOCULATION VALIDATION REPORT



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Summary:

Environmental Services, Inc., (ESI) was contracted by Mikro-Tek Inc. (Mikro-Tek) on 30 July 2012 to conduct the project validation of Reforesting Degraded Lands In Chile Through The Use Of Mycorrhizal Inoculation (Project Description (PD) dated 19 April 2013).

As stated in the PD, “Mikro-Tek works with local land owners and provides an advanced propagation technology, mycorrhizal inoculation, to help restore and convert degraded grassland (Figure 1.1) into productive forests in several regions of Chile. The application of this technology, funded by Mikro-Tek’s investment, permits successful plantation establishment on sites that would otherwise not be sufficiently productive to incentivize reforestation efforts by landowners. This grouped project promotes reforestation of land that would remain as degraded grassland in the absence of carbon finance.”¹

This PD is for a subset of the Mikro-Tek project in Chile and initially applies to 48 instances comprising approximately 3,007 hectares (ha). The main species planted are *Eucalyptus globulus* and *Pinus radiata*.

The validation objective included an assessment of compliance with Verified Carbon Standard (VCS) Requirements Document (Version 3 and associated updates) and the likelihood that implementation of the planned Greenhouse Gas (GHG) project will result in the GHG emission removal enhancements as stated by the project developer (ISO 14064-3:2006). This validation assessed the GHG emission removals through Agriculture, Forestry, and Other Land Use (AFOLU) criteria, specifically Afforestation, Reforestation, and Revegetation (ARR).

The scope of the validation included the GHG project and baseline scenarios; physical infrastructure, activities, technologies and processes of the GHG project; GHG sources, sinks and/or reservoirs; types of GHGs; and time periods covered. The geographic validation scope was defined by the project boundary, which included multiple project areas (grouped), the carbon reservoir types, management activities, growth and yield models, inventory program, and contract periods.

The validation criteria followed the guidance documents provided by VCS and included the following: VCS Program Guide (04 October 2012, v3.4), VCS Standard (04 October 2012, v3.3), Program Definitions (04 October 2012, v3.4), Agriculture, Forestry and Other Land Use (AFOLU) Requirements (04 October 2012, v3.3), AFOLU Non-Permanence Risk Tool (04 October 2012, v3.2), the Grouped Project PD entitled “*Reforesting Degraded Lands In Chile Through The Use Of Mycorrhizal Inoculation*” (dated 19 April 2013), and Clean Development Mechanism (CDM) AR-ACM0003 Version 1.0.

A summary of all findings is included in Appendix A. There are no restrictions of uncertainty.

ESI confirms all validation activities including objectives, scope and criteria, level of assurance and the PD are complete and in adherence to the VCS Version 3 and all associated updates as documented in this report. ESI concludes without any qualifications or limiting conditions that the PD “*Reforesting Degraded Lands In Chile Through The Use Of Mycorrhizal Inoculation*” (dated 19 April 2013) meets the requirements of VCS Version 3 and all associated updates.

¹ Mikro-Tek, *Reforesting Degraded Lands In Chile Through The Use Of Mycorrhizal Inoculation*, Version 1.2, dated 17 April 2013.

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1 INTRODUCTION

1.1 Objective

The validation objective for this project included an assessment of compliance with the Verified Carbon Standard (VCS) Requirements Document (v3.3, 04 October 2012) and the likelihood that implementation of the planned Greenhouse Gas (GHG) project would result in the GHG emission removal enhancements as stated by the project developer (ISO 14064-3:2006). This validation assessed the GHG emission removals through an Agriculture, Forestry, and Other Land Use (AFOLU) project, specifically, an Afforestation, Reforestation, and Revegetation (ARR) grouped project.

1.2 Scope and Criteria

The scope of the validation included:

- the GHG project and baseline scenarios
- physical infrastructure, activities, technologies and processes of the GHG project
- GHG sources, sinks, and/or reservoirs
- types of GHG's
- time periods covered

The geographic validation scope was defined by the project boundary, which will include multiple project areas (grouped), the carbon reservoir types, management activities, growth and yield models, inventory program, and contract periods. The scope of “*Reforesting Degraded Lands in Chile Through The use Of Mycorrhizal Inoculation*” was outlined by the project developer prior to the validation initiation and is re-defined as follows:

Baseline Scenario	Degraded land: abandoned pasture
Activities/Technologies/Processes	VCS Grouped ARR
Sources/sinks/Reservoirs	Carbon Pools: Above-ground biomass Below-ground biomass Soil organic carbon Emission Sources: None included
GHG Type	CO ₂
Time Period	01 June 2003 – 31 December 2012
Project Boundary	48 parcels (initial instances) – approximately 3,007 ha (7,426 acres) located in Chile in Regions VI, VII, and VIII in the communes of Lolol, Estrella, Vichuquen, Pumanque, Quilleco, Hualane, and Chepica. Grouped project geographic boundary includes Regions RM, V, VI, VII, and VIII.

1.3 Level of assurance

The level of assurance was used to determine the depth of detail that the validator placed in the Validation Sampling Plan to determine if there are any errors, omissions, or misrepresentations (ISO 14064-3:2006). Environmental Services, Inc., (ESI) assessed the project (general principles, data, sampling descriptions, documentation, calculations, etc.) to provide *reasonable*

assurance to meet the project level requirements of the VCS Program. The evidence used to achieve a *reasonable* level of assurance is specified in the following sections.

1.4 Summary Description of the Project

As stated in the Project Description (PD), in 2003, Mikro-Tek initiated the grouped project “Reforestation Degraded Lands in Chile through the use of Mycorrhizal Inoculation”. In this reforestation project, Mikro-Tek works with local land owners and provides an advanced propagation technology, mycorrhizal inoculation, to help restore and convert degraded grassland (Figure 1.1) into productive forests in several regions of Chile. The application of this technology, funded by Mikro-Tek’s investment, permits successful plantation establishment on sites that would otherwise not be sufficiently productive to incentivize reforestation efforts by landowners. This grouped project promotes reforestation of land that would remain as degraded grassland in the absence of carbon finance”².

This PD is for a subset of the grouped Mikro-Tek project in Chile and initially applies to 48 instances comprising approximately 3,007 hectares (ha). The main species planted are *Eucalyptus globulus* and *Pinus radiata*.

2 VALIDATION PROCESS

2.1 Method and Criteria

The validation process closely followed ESI’s procedures for VCS validations outlined within our Management System Manual. In addition, the validation process was detailed in a separate Validation and Sampling Plan, which was approved by the Project Proponent on 12 November 2012.

For this validation, the sample size for the desktop portion of the validation included a complete review of the PD and supporting documents.

The field validation included an onsite review of a sample of initial instances, within the Grouped Project Geographic Boundary. A risk based approach was used to select the instances in order to allow a review across wide geographic range of sites sufficient to provide the necessary sample size to meet a reasonable level of assurance; as directed by the professional judgment of the Lead Validator.

The project areas visited during the validation included MikroTek0003, MikroTek0009, MikroTek0025, MikroTek0037, MikroTek0039, MikroTek0041, MikroTek0046 and MikroTek0048. This achieved a sample of approximately 36% of the total acreage in the project which well exceeded the targeted 5% in the sampling plan. Each project area was visited, sampled and photographed to ensure tree planting activities occurred as stated in the PD.

The validation criteria followed ISO 14064-3 and the guidance documents provided by VCS and included the following:

- VCS Program Guide (04 October 2012, v3.4)
- VCS Requirements Document (04 October 2012, v3.3)
- Program Definitions (04 October 2012, v3.4)
- AFOLU Requirements (04 October 2012, v3.3)

² Ibid

- AFOLU Non-Permanence Risk Tool (04 October 2012, v3.2)
- Grouped Project Description (PD) entitled “*Reforestation Degraded Lands In Chile Through The Use Of Mycorrhizal Inoculation* (Project Description (PD) dated 19 April 2013)
- Clean Development Mechanism (CDM) AR-ACM0003 Version 1.0 (see Section 2.1.1 below for additional information related to the validation process and this methodology)

2.1.1 Validation under AR-ACM0001 and AR-ACM0003

The *Reforestation Degraded Lands in Chile Through The use Of Mycorrhizal Inoculation* project was initially (06 March 2013) validated by ESI under the CDM Methodology AR-ACM0001 (Version 5.2). However, after submittal to the VCS, the project proponent was informed that this methodology was no longer valid as of 22 November 2012 and had passed the two month grace period which expired on 12 January 2013, after which the methodology could not be used. As of 23 November 2012, AR-ACM0003 Version 1.0 became the only valid and applicable CDM Approved Consolidated Methodology for Afforestation/Reforestation (A/R) project activities.

Initial review indicated many parallels in the requirements and procedures of AR-ACM0003 and AR-ACM0001. As such, the project proponent updated the initially validated PD (dated 18 February 2013) to conform to AR-ACM0003 (PD Dated 29 March 2013). ESI then carefully examined the two methodologies to determine any critical differences and reviewed the PD to ensure there were no potential errors, omissions, or misrepresentations related to AR-ACM0003. The critical differences between AR-ACM0001 and AR-ACM0003, material discrepancies found in the PD (Dated 29 March 2013) related to the identified differences, and the resolution actions taken by the project proponent (included in PD dated 19 April 2013) are included below:

<u>Critical Differences between AR-ACM001 and AR-ACM0003</u>	<u>Material Discrepancies</u>	<u>Resolution</u>
AR-ACM0003 does not allow for the assumption that the changes in carbon stocks in above- and below-ground biomass are conservatively zero or in a steady state.	PD contained references to the steady state in carbon stocks in above- and below-ground biomass in the baseline.	References to the steady state in carbon stocks in above- and below-ground biomass in the baseline were removed from the PD. Additionally, it was demonstrated that any naturally occurring trees existing prior to the project were delineated and removed from the project boundary. Further, only one existing baseline shrub (<i>Acacia caven</i>) was encountered during the inventory of on-site carbon stocks. When expanded to a per unit area basis, this baseline shrub equates approximately three stems per hectare in the project area. Estimates of crown area of these shrubs indicate that crown cover is less than 5 % in the project area and, thus, the shrub biomass per hectare is considered

		negligible and hence accounted as zero.
The CDM Tool “Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities” was updated to Version 3.0 on 23 November 2012 (the same day that AR-ACM0003 was put into force).	PD contained references to Version 2.1.0 of this tool.	PD was updated to refer to Version 3.0 of the tool.
AR-ACM0003 refers to the CDM Tool “Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities” for the precision requirements of the inventory for carbon stocks. Part of the 23 November 2012 revision to the tool included defined Uncertainty Deductions when the precision threshold is exceeded.	PD contained a methodology deviation allowing for the confidence deduction to be calculated as: mean biomass carbon stock – ((90% confidence interval as percentage of mean – 10%)* mean biomass carbon stock). The CDM Tool “Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities” calls for a 6% Uncertainty Deduction.	The methodology deviation was removed from the PD.
The revised CDM Tool “Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities” (Version 3.0) requires the use of the CDM tool ““Demonstrating appropriateness of allometric equations for estimation of aboveground tree biomass in A/R CDM project activities.”	This tool was not referred to in the PD. Additionally, it was not used to evidence the appropriateness of the selected biomass equations for ex-post estimation of tree biomass.	The tool was appropriately added to the PD in Section 2.1. Additionally, compliance with the tool and the appropriateness of the selected biomass equations for ex-post estimation of tree biomass was adequately demonstrated in the PD.

2.2 Document Review

A detailed review of all project documentation was conducted to ensure consistency with, and identify any deviation from, VCS program requirements (VCS, Version 3 and associated updates), and the CDM methodology (AR-ACM0003 Version 1.0). Initial review focused on the PD and included an examination of the project details, data and parameters, quantification of GHG emission reductions and removals, and supporting documents.

Please see Appendix B for a complete list of documents and files provided by the client during validation, including any items associated with the risk analysis.

2.3 Interviews

Interviews were conducted at multiple levels of the Mikro-Tek program to assess understanding of program requirements and to determine if monitoring conducted in the field was implemented in accordance with the PD. Interviews included discussions with senior management, field managers, and foresters. The following is a list of the main interviewees:

Name	Title
Mark Kean	President Mikro-Tek, Inc./ Project Proponent
James Eaton	Senior Manager, TerraCarbon, LLC./ Consultant
Alfredo Unda	Chile Project Manager/ Forester
Italo Fazzi	Project Forester

2.4 Site Inspections

Site inspections occurred on 26 November – 1 December 2012. Eight of the project areas were visited in the field for a total of approximately 36% of the total acres in the project. During the field review, the following aspects of the project were assessed:

- pre-project conditions, as evidenced by condition of adjacent or nearby non-project areas, site-preparation activities, and related
- current project conditions, including: reported tree species, reported planting density, and related

Direct field observation of tree density (tree spacing), and species was performed at each site, sufficient to satisfy the professional discretion of the Lead Validator.

2.5 Resolution of Any Material Discrepancy

During the validation process, there was a risk that potential errors, omissions, and misrepresentations would be found. The actions taken when errors, omissions, and misrepresentations were found included: notifying the client of the issue(s) identified, and expanding our review to the extent that satisfied the Lead Validator's professional judgment.

During the course of the validation, twenty-seven (27) Non-Conformity Reports (NCRs) /Clarifications (CLs) were identified. One Opportunity for Improvement (OFI) was also identified. All NCRs/CLs were satisfactorily addressed. The NCRs/CLs provided necessary clarity to ensure the project was in compliance with the requirements of the VCS for GHG projects. For a complete list of all NCRs/CLs and their resolutions, please refer to Appendix A.

3 VALIDATION FINDINGS

3.1 Project Design

The scope of *Reforestation Degraded Lands in Chile Through The use Of Mycorrhizal Inoculation* was outlined in Section 1.2 of this report. This grouped project is seeking registration under the VCS Version 3 (and associated updates) as an ARR grouped project and has been developed in

compliance with the AFOLU Requirements (04 October 2012, v3.3). Additionally, the project is in compliance with the CDM AR-ACM0003 Version 1.0.

3.1.1 Project Proponent and Other Entities

This grouped project will be implemented by Mikro-Tek. Information regarding the project proponent is included below:

Roles and Responsibility	Personnel/Position	Contact Details
Supply the mycorrhizal inoculum, as well as the associated technologies for their application and management. Project management, implementation, and registration including budgeting, hiring of project personnel and contractors. Implement monitoring and verification plan, including the hiring of monitoring/inventory staff, technical consultants and VCS verifiers, as needed. Ensuring that offsets are registered following verification, investor relations, and marketing. Maintain electronic database of GIS coverages detailing parcel boundaries and plot locations, archive raw field measurements and analysis in hard and electronic copies.	Mark Kean, President	Mikro-Tek Inc. P.O. Box 2120 115 Sandy Falls Road, Timmins, Ontario P4N7X8Canada +705 268 3536

In addition to the project proponents, there are other individuals and organizations that will play an operative role in the project. These parties are presented below:

Roles and Responsibility	Personnel/Position	Contact Details
Ongoing management of the project area. Oversee contracted monitoring and inventory staff in the field. Serve as a liaison and translator for the landowners and Mikro-Tek, including establishing meetings with landowners and relevant stakeholders, arranging site visits, providing information and documentation such as previous studies, photographs, and satellite images related to the project.	Alfredo Unda, Forester, Manager Chile Projects.	Diego de Almagro, 2081, Ste. #64 Providencia, Santiago Chile 562-899-69931
Develop PDD and design monitoring plan in consultation with Mikro-Tek staff.	James Eaton, Senior Manager, Forestry and Technical Services	TerraCarbon LLC 5901 N. Sheridan Rd. Peoria, Illinois 61614 U.S.A.

	David Shoch, Senior Manager, Forestry and Technical Services	+434 326 1144
Owners of project property responsible for managing and conducting all silvicultural and forestry aspects of the project in accordance with the approved CONAF Forestry Plan and the Business Collaboration Agreement with Mikro-Tek, the Project Proponent.	Individual property owners	Located in project database in the Business Collaboration Agreement.

3.1.2 Project Start Date

The project start date is June 1, 2003 marking the start of planting of the first project instance by Mikro-Tek.

3.1.3 Project Crediting Period

The project crediting period for this grouped project is 40 years. It started June 1, 2003 and will continue through May 31, 2043.

3.1.4 Project Scale and Estimated Net GHG Emission Reductions or Removals

Project	Yes
Large Project	No

Estimated net GHG emission reductions for *Reforestation Degraded Lands in Chile Through The use Of Mycorrhizal Inoculation* are listed below:

Year	Annual estimates of net emission reductions (t CO ₂)
2003	0
2004	2,515
2005	10,247
2006	20,015
2007	30,391

2008	41,851
2009	52,806
2010	58,835
2011	62,476
2012	75,240
2013	82,366
2014	70,521
2015	40,092
2016	23,031
2017	25,229
2018	29,641
2019	33,090
2020	16,208
2021	0
2022	0
2023	0
2024	0
2025	0
2026	0
2027	0
2028	0
2029	0
2030	0
2031	0

2032	0
2033	0
2034	0
2035	0
2036	0
2037	0
2038	0
2039	0
2040	0
2041	0
2042	0
2043	0
Total net emission reductions (t CO ₂)	674,554
Number of crediting years	40

3.1.5 Project Activities

The validation affirmed the following project activity assertions of the PD. “The Reforesting Degraded Lands in Chile through the use of Mycorrhizal Inoculation project will achieve GHG removals by planting trees that sequester atmospheric CO₂ in live aboveground biomass, belowground biomass, and soil. The project activity involves site preparation and planting of mycorrhizal inoculated trees.

Mycorrhizae provide a natural, biological means of maintaining plant health, increasing the plant's resistance to soil-borne pathogens, and reducing the need for chemicals and fertilizers. A large body of published scientific literature, and experimental trials, have shown that plants colonized by mycorrhizal fungi are generally larger, healthier and better able to withstand environmental stresses such as cold or heat, transplant shock, moisture excess, and drought. In addition, mycorrhizae improve plant nutrition and therefore play a significant role in high yield crop production thus limiting environmental problems associated with crop production such as soil erosion, soil nutrient depletion and water pollution with fertilizers, use of pesticides and animal wastes.

Mycorrhizal inoculation technology was not commercially available in Chile prior to 1999. In that year, Mikro-Tek undertook a project to isolate local mycorrhizal species and strains and screen for effectiveness for enhanced nutrient uptake and seedling vigor. Vigor was assessed using Mikro-Tek's chlorophyll fluorescence stress test procedures as described in the Ontario Ministry of Natural Resources Forest Research Report No. 145. The most beneficial mycorrhizal strains, selected through this process, were then field tested for effectiveness on the target host tree species. The initial tree species tested (Radiata Pine, Eucalyptus, and Quillay) were identified in consultations with the Chilean forestry organizations, Corporacion Nacional Forestal (CONAF) and Instituto Forestal (INFOR) as well as with forestry companies and small-scale local landowners. A complete technical description, and the three year results of field trials in which Mikro-Tek's selected mycorrhizal strains were used, are presented in a report entitled "Demonstration of Increase in Carbon Sink in Chilean Forestry Plantations Using Mycorrhizal Inoculation, Years 1 to 3 – Field Results – Jan 2006".

The project areas are in extremely dry areas that lack natural seed sources. Forest establishment using traditional planting techniques has a high chance of failure due to dry conditions. These conditions will be offset by implementing the above described mycorrhizal inoculation technology through a technology transfer arrangement between Mikro-Tek and the various landowners. By using mycorrhizal inoculated seedlings, the cost of which is funded by Mikro-Tek in exchange for the resulting carbon credits (subject to a revenue sharing arrangement with the landowner), plantation establishment becomes an attractive land use option to landowners. The project promotes reforestation on land that would otherwise remain as degraded grassland.

Production of containerized seedlings is a process that takes place prior to the targeted planting months of June, July and August in an off-site nursery complex. It takes approximately six months to grow the seedlings and during that time, the mycorrhizal inoculum is applied following Mikro-Tek's inoculation procedures.

Sub-soiling is carried out using either a tractor or animals (horses or oxen), depending on the slope of the land. This involves the drawing of a single plow blade through the soil, to loosen a section 15 cm wide by 30 cm deep, following the general contour of the site. On relatively flat land, the sub-soil contour ditches are spaced approximately 4 meters apart, and on steeper slopes where animals are used, they are spaced approximately 3 meters apart. The mycorrhizal inoculated seedlings are then planted along the sub-soiling ditches at spacing intervals ranging from 2 meters to 2.7 meters in order to obtain an overall targeted planting density of 1,250 trees per hectare.

For *Pinus radiata*, harvesting is expected to occur at year 20 followed by complete replanting using the same species and the original planting density of 1,250 trees per hectare. *Eucalyptus globulus* is harvested around year 10, and reestablished either through coppicing or replanting at the original planting density of 1,250 trees per hectare.

While the crediting period of this project is 40 years, the project area will be continually managed as forest land in conformance with the CONAF requirement that reforestation is mandatory after harvest."

3.1.6 *Project Location*

The initial project instances, as listed in Table 1.1, are located in Region VI, VII, and VIII in the communes of Lolol, Estrella, Vichuquen, Pumanque, Quilleco, Hualane, and Chepica. The project boundaries for the sites MikroTek0026 and MikroTek0032 can be found in Figure 1.2. Detailed

project instance boundaries for all sites will be archived as GIS files located in the project database.”³

As required by the VCS, both the project area boundaries and the grouped project geographic boundary were presented to the validator in Google Earth KML files. Boundaries were confirmed during the site visit for the project areas that were sampled. Additionally, the grouped project geographic area boundary was confirmed and is consistent with the requirements for VCS grouped projects. All future project activity instances will be located within Region RM, V, VI, VII, and VIII, (the grouped project geographic boundary). The general location of the project areas, as well as the grouped project geographic boundary, is shown in the PD (see Section 1.9).

3.1.7 Project Compliance with Applicable Laws, Statutes, and other Regulatory Frameworks

All relevant information on Mikro-Tek's compliance with laws, statutes, and other regulatory frameworks can be found in the PD (Section 1.11) and referenced supporting documents.

Compliance with these laws was confirmed (with reasonable assurance) during validation for the initial instances.

3.1.8 Ownership and other Programs

3.1.8.1 Right of Use

As stated in the PD, “The project area of each project instance is under clear title as outlined in the Business Collaboration Agreement, and land ownership documentation has been checked by CONAF as a prerequisite for the CONAF subsidy. Mikro-Tek has reserved the rights to forest carbon in the project area through a Business Collaboration Agreement between Mikro-Tek and the landowners. Relevant language demonstrating the transfer of carbon rights from the land owner to Mikro-Tek as found in each Business Collaboration Agreement includes:

The land owners agree to "To transfer the rights to all Emission Reductions to be generated by the Project to Mikro-Tek" and

Mikro-Tek and the landowners agree that "Mikro-Tek shall have full title to the Emissions Reductions generated by the Project and the exclusive right to sell all or part of these Emission Reductions".

Further, the Business Collaboration Agreement sets forth the terms of the revenue sharing agreement between the land owner and Mikro-Tek.

As a compensation for the joint business activity set forth herein, Mikro-Tek and the land owner agree to equally share (50/50%) the Net Proceeds effectively received through the sale of Emissions Reductions generated by the Project.

A copy of the Business Collaboration Agreement and the site map from the CONAF approved forestry plans for each project property is contained in the project database.”⁴

³ Ibid

⁴ Ibid

Validators have reviewed sample contracts and found them to be adequate and accurate. Further, site visits have confirmed the right of use for the project areas visited.

3.1.8.2 Emission Trading Programs and other Binding Limits

No emission reductions generated by the project are part of an emissions trading program.

3.1.8.3 Participation under other GHG Programs

Project Instances MikroTek0041 and MikroTek0048 have been registered under the CDM; however no emission reductions (tCERs or ICERs) have been issued or will be applied for. No other project lands have been registered, nor is registration under any other GHG program being sought.

This was confirmed by the validator on the CDM website.

3.1.8.4 Other Forms of Environmental Credit Sought or Received

The project has not created wetland mitigation, water quality, air pollution, other non-VCS GHG emission reduction, or any another form of environmental credit.

3.1.8.5 Rejection by other GHG Programs

The project has not been rejected from any other greenhouse gas program.

3.1.9 Additional Information Relevant to the Project

3.1.9.1 Eligibility Criteria for Grouped Projects

As stated in the PD, "All project instances will be located on degraded lands within the geographic boundary of the following Chilean Regions RM, V, VI, VII, and VIII.

Grouped projects provide for the inclusion of new project instances subsequent to the initial validation of the project. New project instances will demonstrate compliance with the following criteria.

1) Compliance with all eligibility requirements from the VCS AFOLU Requirements document version 3.3, applicability conditions of methodology AR-ACM0003 version 1.0, and conditions permitting accounting for soil carbon using the CDM "Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities":

- The grouped project instance area was not cleared of native ecosystems within the 10 year period prior to the project start date.
- The grouped project instance area was not forested at the time of planting.
- Implementation of the grouped project instance activity does not violate any law.
- Clear title and rights to carbon are demonstrated for each grouped project instance.
- In order to participate in the CONAF (Corporacion Nacional Forestal) subsidized forestry program, each grouped project instance has the title and forestry plan approved by CONAF. This approval process ensures that in part project lands will be replanted after harvest and thus project lands will be maintained as forest into the future.

- The grouped project instance activity is implemented on degraded lands, which are expected to remain degraded or to continue to degrade in the absence of the project; hence the land cannot be expected to revert to a non-degraded state without human intervention. Degraded status will be demonstrated by applying the CDM tool for the identification of degraded lands.
 - The grouped project instance activity involves machine or hand planting, with or without site preparation. Encroachment of natural tree vegetation that leads to the establishment of forests is not expected to occur.
 - No project instances will use flooding irrigation as part of the project activity.
 - The grouped project instance is not located on organic soils.
 - No project instances will lead to a decrease in the availability of fuelwood.
 - The grouped project instance does not fall into the wetland category, as defined by the IPCC.
 - Organic litter from vegetation will remain on site and will not be removed.
 - Any site preparation involving ploughing/ripping/scarification, implemented as part of the grouped project instance activity, will:
 - a. Be done in accordance with appropriate soil conservation practices (e.g., follows the land contour);
 - b. Be limited to the first five years from the year of initial site preparation;
 - c. Not be repeated, if at all, within a period of 20 years; and
 - d. Not cover more than 10 per cent of area in each of the following types of land:
 - i. Land containing organic soils; and
 - ii. Land which, in the baseline, is subjected to land-use and management practices and receives inputs as listed in appendices 1 and 2 of AR-ACM0003 methodology.
- 2) Use mycorrhizal inoculated seedlings for planting with specific mycorrhizal inoculum supplied by Mikro-Tek and applied as per their directions.
- 3) The pre-existing land use of the grouped project instance area is either pasture/grassland, cultivation, or abandoned nonforest lands which have previously been in agriculture.
- 4) Face investment and/or technological barriers to reforestation, demonstrated through a barriers analysis.
- 5) If new project instances are added which use biomass burning during the course of site preparation or as a forest management activity, emissions from biomass burning will be accounted for appropriately using the CDM Tool “Estimation of non-CO2 greenhouse gas (GHG) emissions resulting from burning of biomass attributable to an A/R CDM project activity”.

Each new grouped project instance will be given a unique identifier and incorporated into the overall project accounting tracking system. The project maintains an electronic database of GIS coverages detailing parcel boundaries and monitoring plot locations (once established), and maps archived in both digital and hard copy form. Original field monitoring data sheets, GIS data layers, reports of analyses and supporting spreadsheets will be stored in both hard copy and digital form at the Mikro-Tek Office in Timmins, Ontario for at least 2 years beyond the project crediting period. Given the extended timeframe and the pace of production of updated versions of software and new hardware for storing data, electronic files will be updated periodically or

converted to a format accessible to future software applications. Adherence to these procedures will ensure smooth transitions and maintain “institutional memory” in the event of changes in personnel responsible for the monitoring plan.”⁵

For the sites visited, all eligibility criteria were reviewed and found to be in conformance. Eligibility is confirmed for the instances included in the grouped project PD.

3.1.9.2 Leakage Management for AFOLU Projects

There is no leakage attributable to the project activity since there is no displacement of agricultural production or displacement of households from within the project boundary.

Leakage was evaluated by the validation team at every opportunity during the site. Leakage was determined to not be an issue and can be considered to be negligible.

3.1.9.3 Commercially Sensitive Information

No commercially sensitive information has been excluded from this project description.

3.1.9.4 Further Information

There is no further additional information, which would have a bearing on the eligibility of the project relating to net GHG emissions reductions or removals, or quantification of net GHG emissions reductions or removals, that has not been included in the PD and its supporting documentation.

3.2 Application of Methodology

3.2.1 Title and Reference

The project is applying the CDM Methodology AR-ACM0003 Version 1.0 and all associated tools including:

- Approved CDM “Combined tool to identify the baseline scenario and demonstrate the additionality in A/R CDM project activities, Version 1”
- Approved CDM tool “Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity”
- Approved CDM tool “Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities”; Version 3.0
- Approved CDM “Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities”, Version 01.1.0
- Approved CDM tool “Demonstrating appropriateness of allometric equations for estimation of aboveground tree biomass in A/R CDM project activities”, Version 1.0
- Approved CDM “Tool for the identification of degraded or degrading lands for consideration in implementing CDM A/R project activities”, Version 1

⁵ Ibid

3.2.2 Applicability

The validation confirmed the project met the following applicability conditions of AR-ACM0003 as stated in the PD:

The land subject to the project activity does not fall in wetland category.	The project instance area is not considered to be a wetland as defined by the Intergovernmental Panel on Climate Change. The project instance area prior to reforestation was used for agriculture and thus is not considered to be a wetland, as per the IPCC definition.
Soil disturbance attributable to the afforestation and reforestation (A/R) clean development mechanism (CDM) project activity does not cover more than 10 per cent of area in each of the following types of land: (i) Land containing organic soils; (ii) Land which, in the baseline, is subjected to land-use and management practices and receives inputs as listed in appendices 1 and 2 of AR-ACM0003 methodology.	Sub-soiling results in an area of disturbance less than 15 cm wide and is done every 3 to 4 meters, resulting in a disturbance of 5% (or less) of the soil surface. The project area does not include any organic soils (see Figure 3.1). Further, a local forester familiar with all of Mikro-Tek's planted sites has confirmed that "there are no organic soils present in the project area" (I. Fazzi, pers. comm).

3.2.3 Project Boundary

The appropriate carbon pools and GHG emission sources (as specified by AR-ACM0003) are accounted for and included in the project boundary. As shown in the PD, the project and baseline GHG sources included in or excluded from the project boundary, and justification, are shown below:

Source		Gas	Included?	Justification/Explanation
Baseline	Above-ground biomass	CO2	No	The project area was delineated in such a way as to exclude existing baseline tree biomass. Baseline shrub biomass was demonstrated to compose less than 5% of crown cover and is thus negligible as per the CDM tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities".
	Below-ground biomass	CO2	No	The project area was delineated in such a way as to exclude existing baseline tree biomass. Baseline shrub biomass was

				demonstrated to compose less than 5% of crown cover and is thus negligible as per the CDM tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities".
	Dead-wood	CO2	No	Assumed to be equal to zero for the life of the project.
	Litter	CO2	No	Assumed to be equal to zero for the life of the project.
	Soil organic carbon	CO2	No	Assumed to be equal to zero for the life of the project. Soil organic carbon stocks are expected to remain at a steady state or decrease in the baseline scenario.
	Burning of woody biomass	CO2	No	GHG emissions in the baseline can be conservatively ignored.
		CH4	No	
		N2O	No	
	Above-ground biomass	CO2	Yes	Required. Largest pool affected by project activity.
	Below-ground biomass	CO2	Yes	Required. Expected to increase due to project activity.
	Dead-wood	CO2	No	This pool is not expected to decrease, or increase less, due to the project activity.
	Litter	CO2	No	This pool is not expected to decrease, or increase less, due to the project activity.
Project	Soil organic carbon	CO2	Yes	This pool is included and expected to increase due to project activity. Numerous studies have demonstrated that comparable reforestation activities lead to increased soil organic matter, and thus this pool should not be a source of emissions in the with-project case.
	Burning of	CO2	No	No burning was involved as part of project implementation.

	woody biomass	CH ₄	No	Hence, in conformance with the methodology, no emission sources are included in the project boundary.
		N ₂ O	No	

3.2.4 Baseline Scenario

Based on validator research, review of project documents, and site visits conducted, the findings support the justification that of the three credible alternative land uses, (abandoned [i.e., natural] pasture, productive agricultural land, and reforestation without incentives from carbon credits) continuation of the pre-project land use – abandoned pasture – is the most likely baseline scenario. Further justification for this is provided in the additionality discussion in section 3.2.5 below.

3.2.5 Additionality

The validator confirmed that the project activity is additional based on the approved CDM “Combined tool to identify the baseline scenario and demonstrate the additionality in A/R CDM project activities” as required by AR-ACM0003. The validator confirms the additionality analysis in the PD (section 2.5) which sufficiently explains the barriers that have, and will continue to, inhibit reforestation (technological and ecological barriers) and use as productive agricultural land (ecological and investment). The only baseline scenario that does not face barriers is the pre-project land use (abandoned pasture) which would remain the most likely land use for the project areas in the absence of carbon finance. Additionally, the PD sufficiently demonstrates that plantation establishment by small to medium landowners is not common practice within the project region.

3.2.6 Quantification of GHG Emission Reductions and Removals

3.2.6.1 Quantification of Baseline Emission Reductions and Removals

The validator confirmed that baseline GHG removals by sinks have been estimated in accordance with AR-ACM0003. Baseline carbon stocking in aboveground and belowground woody biomass has been adequately demonstrated to be equal to zero. Additionally, dead wood, litter, and soil organic carbon are optional pools that are not included and are assumed to be equal to zero for the life of the project in the baseline. Hence, the baseline GHG removals are equal zero throughout the life of the project.

3.2.6.2 Quantification of Project Emission Reductions and Removals

The validator confirmed that project emission reductions have been estimated in accordance with the AR-ACM0003. Similar to the baseline, the procedure for quantifying project emission reductions or removals entails estimating the change in carbon stocking of woody biomass over the project crediting period. Because the baseline GHG removals for the project equals zero (see Section 3.2.6.1 above), project emissions are insignificant/neglected (see Section 3.2.3 above), and leakage (as indicated in Section 3.2.6.3 below) is set to zero for the entire project crediting period, the project emission reductions are equal to the net GHG emission reductions. Project emission reductions for the 40 year crediting period the initial grouped project instances are expected to generate 674,554 t CO₂-e net emissions reductions and are presented in Section 3.1.4 above.

3.2.6.3 Quantification of Leakage

Project proponents used the required tool: "Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity" to calculate (ex-ante) the leakage associated with displacement of agricultural activities resulting from the project. The results of the tool provided the leakage estimates (for the initial project instance) below:

Year of verification	Conversion factor (tC to t CO ₂)	Forest cover, (f)	Crediting period (yr, Tcred)	Dt (fraction of project area subject to displacement)	Delta Ct (t C)	Annual estimate of leakage (t CO ₂)
2003	3.67	0.202	40	0.00	0	0
2004	3.67	0.202	40	0.00	762	0
2005	3.67	0.202	40	0.00	3,867	0
2006	3.67	0.202	40	0.00	9,933	0
2007	3.67	0.202	40	0.00	19,142	0
2008	3.67	0.202	40	0.00	31,824	0
2009	3.67	0.202	40	0.00	47,826	0
2010	3.67	0.202	40	0.00	65,655	0
2011	3.67	0.202	40	0.00	84,587	0
2012	3.67	0.202	40	0.00	107,387	0
2013	3.67	0.202	40	0.00	132,346	0
2014	3.67	0.202	40	0.00	153,716	0
2015	3.67	0.202	40	0.00	165,865	0
2016	3.67	0.202	40	0.00	172,844	0
2017	3.67	0.202	40	0.00	180,489	0
2018	3.67	0.202	40	0.00	189,471	0
2019	3.67	0.202	40	0.00	199,499	0

2020	3.67	0.202	40	0.00	204,410	0
2021	3.67	0.202	40	0.00	204,410	0
2022	3.67	0.202	40	0.00	204,410	0
2023	3.67	0.202	40	0.00	204,410	0
2024	3.67	0.202	40	0.00	204,410	0
2025	3.67	0.202	40	0.00	204,410	0
2026	3.67	0.202	40	0.00	204,410	0
2027	3.67	0.202	40	0.00	204,410	0
2028	3.67	0.202	40	0.00	204,410	0
2029	3.67	0.202	40	0.00	204,410	0
2030	3.67	0.202	40	0.00	204,410	0
2031	3.67	0.202	40	0.00	204,410	0
2032	3.67	0.202	40	0.00	204,410	0
2033	3.67	0.202	40	0.00	204,410	0
2034	3.67	0.202	40	0.00	204,410	0
2035	3.67	0.202	40	0.00	204,410	0
2036	3.67	0.202	40	0.00	204,410	0
2037	3.67	0.202	40	0.00	204,410	0
2038	3.67	0.202	40	0.00	204,410	0
2039	3.67	0.202	40	0.00	204,410	0
2040	3.67	0.202	40	0.00	204,410	0
2041	3.67	0.202	40	0.00	204,410	0
2042	3.67	0.202	40	0.00	204,410	0
2043	3.67	0.202	40	0.00	204,410	0

Prior to the project, the land use of the project area was abandoned pasture; hence, there is no expected displacement of agricultural production from within the project boundary. Total leakage due to displacement of agricultural activities is estimated as 0 t CO₂-e through year 40 of the crediting period.

The validator confirms that the tool was used appropriately and that all assumptions used are appropriate.

3.2.6.4 Summary of Net GHG Emission Reductions or Removals

The validator confirmed that net GHG emission reductions and removals have been estimated in accordance with AR-ACM0003 Section 5.7. As described in Section 3.2.6.2 above, the net GHG emission reductions are equal to the calculated project emission reductions. The net GHG emission reductions for the 40-year project crediting period (totaling 674,554 t CO₂-e) are presented in Section 3.1.4 above.

3.2.6.5 Uncertainties Associated with the Calculation of Emission Reductions or Removals

As stated in PD Section 4.3.1.1, "In the event that monitoring of biomass yields a precision of the estimates exceeding $\pm 10\%$ of the mean at a 90% confidence level, as required by the methodology, an appropriate confidence deduction will be applied as suggested by VCS." The confidence deduction, if appropriate, will be applied at the time of verification.

3.2.7 Methodology Deviations

No methodology deviations from AR-ACM0003 were requested or identified during the validation.

3.2.8 Monitoring Plan

The following are the primary data and parameters that were monitored prior to, and made available and assessed during validation:

- Location of project area
- Boundary of project area
- Area of planting "field"
- Baseline strata
- Number of trees
- Biomass allometric equations, coefficients, ratios and parameters
- Leakage calculations
- Risk calculations
- Total CO₂

The monitoring plan procedures and equipment were comprehensive and were found to be applicable to the parameters monitored. They were appropriately designed and provided reasonable assurance that the sequestration occurring from GHG sources, sinks, and reservoirs was (baseline) and will be (project scenario) accurately assessed. In accordance with the conditions of AR-ACM0003, project emissions were considered insignificant and therefore neglected.

The monitoring plan includes a Quality Assurance/Quality Control (QA/QC) plan to control for errors in measurement and data analysis. Application of the QA/QC plan will provide documentation and consistency in data archiving to permit efficient third-party auditing and evaluation against measurement and quantification standards over the life of monitoring.

Mikro-Tek is responsible for the registration, monitoring, measurement, and reporting of sequestration within the timeframe required by VCS-AFOLU-ARR requirements.

3.3 Environmental Impact

As stated in section 5.0 of the PD, “No environmental impact assessment was required prior to project implementation. Further, each site has a forestry plan approved by Corporación Nacional Forestal (CONAF) and is in compliance with applicable laws, see Section 1.11.

In March 2003, the Chilean Environmental Agency (CONAMA) commissioned a “National Strategy Study for the CDM in Chile” which provided principals to guide CDM LULUCF activities in the forestry sector. Mikro-Tek has incorporated the environmental criteria outlined in that report. Specifically that the project improves eroded and deteriorated soils; protects waterways and their sources; and uses forest species common in Chile that were known not to present any negative environmental impacts.

Further the project incorporated mycorrhizal inoculation technology, which has been shown to provide additional environmental benefits including:

- enhanced survival and growth of plants on eroded and nutrient-poor sites;
- optimized productivity of land aided by improved water and nutrient-use efficiency;
- improved biological health of the soil, including improved organic content, soil structure, porosity and water holding capacity;
- enhancement of the plants’ resistance to various environmental stresses such as heat and drought; and
- an increase in the forest’s ability to adapt to climate change, and better withstand extreme weather events.

No negative impacts have been envisioned for the project activity, reforestation of degraded lands.”⁶

This information was confirmed to a reasonable level of assurance during the validation event through the site visits.

3.4 Comments by stakeholders

As the Reforesting Degraded Lands in Chile Through The use Of Mycorrhizal Inoculation project is implemented on private lands, no external stakeholder consultation regarding public acceptance was undertaken or required by law prior to grouped project implementation. A stakeholder analysis was conducted in conjunction with the feasibility study to gauge initial interest in the project and mycorrhizal inoculation. The analysis included three main groups: Chilean country CDM and Forestry authorities, Large-Scale Forestry Companies, and Small-Scale Forestry Groups. Feedback was positive and it was decided to move forward with the project.

⁶ Ibid

4 VALIDATION CONCLUSION

ESI confirms all validation activities including objectives, scope and criteria, level of assurance and the PD are complete and in adherence to the VCS Version 3 and all associated updates as documented in this report. ESI concludes without any qualifications or limiting conditions that the PD "*Reforestation Degraded Lands in Chile Through The use Of Mycorrhizal Inoculation*" (Project Description (PD) dated 19 April 2013) meets the requirements of VCS Version 3 and all associated updates.

Report Submitted to:	Voluntary Carbon Standard Association 1730 Rhode Island Ave. NW, Suite 803 Washington, D.C. 20036 Mikro-Tek Inc. 115 Sandy Falls Road Timmins, Ontario P4N7X8 Canada
Report Submitted by:	Environmental Services, Inc. Corporate Office 7220 Financial Way, Suite 100 Jacksonville, FL 32256
ESI Lead Validator Name and Signature:	 Shawn McMahon Lead Validator
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Date:	23 April 2013

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APPENDIX A – NCR/CL/OFI SUMMARY

Item No.	VCS Standard 3.3 Requirements (04 October 2012)	Round 1 NCR/LC/OFI	Response from Client	Round 2 NCR/LC/OFI	Response from Client	Satisfied (Y or N)
	3.10.1 Project location shall be specified in the project description as follows:					
1	2) Project location for grouped projects shall be specified using geodetic polygons to delineate the project's geographic area or areas (see Section 3.4.2 for further information on geographic areas for grouped projects) and provided in a KML file.	NCR: Please provide a KML file of the project's geographic area. Please address the boundary issues identified in the on-site visit.	The boundaries of project instances, MikroTek0003, MikroTek0007, and MikroTek0039, (i.e., those site found in UTM Zone 18S) have been revised in response to this finding. These boundary delineation were ground truthed using a series of GPS boundary points collected by Italo Fazzi, a local forester, on January 12th, 2013. Maps of the revised project boundary, GIS shape files of the revised project boundary (MikroTek_PA_20130116.shp) and groundtruthing points (GPSgroundtruth2013.01.12.shp), and a Google earth file of the project boundary (MikroTek_PA_20130116.kmz) have also been provided as part of the response to this finding. A kmz file and shapefile for the project region has also been added to the project database as part of the response to this finding. The project area has been updated throughout the PD as a result of the revised project boundary. GHG quantification calculations will also be updated as a result of this change.	The changes in area for the three affected instances are not included in Table 1.1 of the monitoring report. Please address. The changes in area in Monitoring report Section 1.1 do not match those in PD Section 1.1. Please modify text in Monitoring report to match.	Table 1.1 in the monitoring report has been updated to reflect the change in the project area. The text in section 1.1 of the monitoring report in relation to area has been revised to match that in the PD.	y
	3.11 OWNERSHIP AND OTHER PROGRAMS					
	Right of Use					
2	3.11.1 The project description shall be accompanied by documentary evidence establishing conclusively one or more of the following rights of use (see VCS document Program Definitions for definition of right of use) accorded to the project proponent(s): 1) A right of use arising or granted under statute, regulation or decree by a competent authority. 2) A right of use arising under law. 3) A right of use arising by virtue of a statutory,	NCR: Please provide supplemental documentation to meet the requirements of VCS Standard Section 3.11.1	Morales E. 2003 document: states on page 14 that one of the pre-requisites of Forest Law 701 is Land Ownership. CONAF Procedures document: states in Section 1 under Scope of Applicant and Legal Context that the application is submitted by the land owner, and Section 1.1.5.5 under Production of Technical Report (last bullet) states that the a land title document is generated, reviewed and approved by CONAF personnel. In the Mikro-Tek file entitled, VCS PD Partner Files, there is a Business Collaboration Contract and a notarised	PD (Section 1.12.1) Indicates that the CONAF forestry plans are included in the project database but these could not be located. Please clarify where these can be found.	Section 1.12.1 of the PD has been revised from "A copy of the Business Collaboration Agreement, and CONAF approved forestry plans for each project property is contained in the project database" to read "A copy of the Business	y

	property or contractual right in the plant, equipment or process that generates GHG emission reductions and/or removals (where such right includes the right of use of such reductions or removals and the project proponent has not been divested of such right of use). 4) A right of use arising by virtue of a statutory, property or contractual right in the land, vegetation or conservational or management process that generates GHG emission reductions and/or removals (where such right includes the right of use of such reductions or removals and the project proponent has not been divested of such right of use). 5) An enforceable and irrevocable agreement with the holder of the statutory, property or contractual right in the plant, equipment or process that generates GHG emission reductions and/or removals which vests the right of use in the project proponent. 6) An enforceable and irrevocable agreement with the holder of the statutory, property or contractual right in the land, vegetation or conservational or management process that generates GHG emission reductions or removals which vests the right of use in the project proponent. 7) A right of use arising from the implementation² or enforcement of laws, statutes or regulatory frameworks that require activities be undertaken or incentivize activities that generate GHG emission reductions or removals.		Voluntary Participation Form signed by each of the project partners which outlines the specific land ownership details for each property.		Collaboration Agreement and the site map from the CONAF approved forestry plans for each project property is contained in the project database" The site maps have already been provided as part of the project database.	
	3.16 MONITORING					
	Data and Parameters					

3	3.16.1 Data and parameters used for the quantification of GHG emission reductions and/or removals shall be provided in accordance with the methodology.	NCR: Please provide evidence that biomass estimates derived from equations are in dry units.	Section 3.6 on processing of samples of the publication, Gayoso et al. 2002, mentions that samples were oven dried. Further Section 4.3 of Gayoso et al 2002, also states basic wood density is used to transform estimates of wet volume to dry biomass. Both these statements above support the fact the allometric equations taken from Gayoso return estimates of biomass in dry units. Further, it is standard convention to list biomass estimates in units of dry mass. Gayoso, J.; Guerra, J.; Alarcón, D. 2002. Contenido de carbono y funciones de biomasa en especies nativas y exóticas. Proyecto FONDEF D981076 Medición de la capacidad de captura de carbono en bosques de Chile y promoción en el mercado mundial. 157 p.	Addressed.		y
	Content of Project Description					
	3.18.2 The project description shall include the following:					
4	d) A description of the project activities, a specification of the project location and geographic boundaries, and a description of conditions prior to project initiation.	NCR: Please Include all initial project instances in Figure 1.2 or justify why only two were included	As described in the PD, "The project boundaries for the sites MikroTek0026 and MikroTek0032 can be found in Figure 1.2. Detailed project instance boundaries for all sites will be archived as GIS files located in the project database." While the project location is described in Section 1.9 of the PD, the geographical extent of the project is further discussed in Section 1.13.1.1 of the PD. Due to the number of project instances (and a desire to save space in the PD), GIS files have been provided for a detailed review of project boundaries. Figure 1.2 has been included as a demonstration of the project boundaries that can be found in the project database.	Addressed.		y

5	f) Additional information relevant to the project, including eligibility criteria for new instances of project activities for grouped projects, a description of any leakage management plan or mitigation measures and any further information which may relate to the eligibility of the project, risks to net GHG emission reductions or removals, the quantification of net GHG emission reductions or removals, and an indication of commercially sensitive information that has been excluded from the public project description.	CL: Please indicate in PD section 1.13.3 that no commercially sensitive information has been excluded from the PD	Section 1.13.3 has been revised to state: "No commercially sensitive information has been excluded from this project description."	Addressed.	y
4.1 GENERAL REQUIREMENTS					

6	1) Models shall be publicly available, though not necessarily free of charge, from a reputable and recognized source (e.g., the model developer's website, IPCC or government agency). 2) Model parameters shall be determined based upon studies by appropriately qualified experts that identify the parameters as important drivers of the model output variable(s). 3) Models shall have been appropriately reviewed and tested (e.g., ground-truthed using empirical data or results compared against results of similar models) by a recognized, competent organization, or an appropriate peer review group. 4) All plausible sources of model uncertainty, such as structural uncertainty or parameter uncertainty, shall be assessed using recognized statistical approaches such as those described in 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 1, Chapter 3. 5) Models shall have comprehensive and appropriate requirements for estimating uncertainty in keeping with IPCC or other appropriate guidance, and the model shall be calibrated by parameters such as geographic location and local climate data. 6) Models shall apply conservative factors to discount for model uncertainty (in accordance with the requirements set out in Section 4.1.4), and shall use conservative assumptions and parameters that are likely to underestimate, rather than overestimate, the GHG emission reductions or removals. Note – The criteria set out in (2)-(6) above are targeted at more complex models. For simple models, certain of these criteria may not be appropriate, or necessary to the integrity of the methodology. Such criteria may be disregarded, though the onus is upon the methodology developer to demonstrate that they are not appropriate or necessary.	NCR: Please provide evidence of meeting the requirements of the Section 4.1.6 Items 2 through 6	VCS has clarified that most allometric models are simple models and meeting the requirements of the Section 4.1.6 Items 2 through 6 is not warranted for simple models. 2) The allometric models used were developed by Jorge Gayoso, who has much experience developing allometric models for Chilean forestry species. This straightforward model predicts live aboveground biomass as a function of diameter at breast height. Jorge Gayoso is part of the Forestry Faculty at the Austral University in Chile. He is Co-Director of a project on carbon measurement in forests, where he leads the methodological component for the determination of carbon stocks and sequestration potential for various Chilean forests. 3) As discussed in Finding 10, the allometric models have been appropriately reviewed and tested by an appropriate peer review group. 4 and 6) Model uncertainty has been limited in this project due to the use of a simple allometric model which predicts biomass as a function of one parameter, dbh. Further the model is species specific and appropriate for the geographic region. Further assessment of model uncertainty and the use of discounts for model uncertainty are not warranted. 5) The allometric models used have been developed using data collected for a range of Chilean forests. Hence, these species specific allometric models are appropriate for application throughout the project region, as the base data is representative of a variety of forest conditions.	Addressed.	y
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4.5 Baseline Scenario						
7	2) Data collected from secondary sources shall be available from a recognized, credible source and must be reviewed for publication by an appropriately qualified, independent organization or appropriate peer review group, or be published by a government agency.	NCR: Please provide evidence of peer review and publication of the documents containing allometric biomass equations and root to shoot ratios	Both the Gayoso 2008a and Gayoso 2008b publications were summary results from part of a larger research project, Proyecto FONDEF D98i1076 "Medición y Monitoreo de la Captura de Carbono en Ecosistemas Forestales y Promoción en el Mercado Mundial del Carbono" directed by Jorge Gayoso. As such, these results were original presented in the following (and attached publication): Gayoso, J.; Guerra, J.; Alarcón, D. 2002. Contenido de carbono y funciones de biomasa en especies nativas y exóticas. Proyecto FONDEF D98i1076 Medición de la capacidad de captura de carbono en bosques de Chile y promoción en el mercado mundial. 157 p. Biomass equations and root to shoot ratios cited in Gayoso 2008a and Gayoso 2008b can also be found on page 43 (in Table 23 or "Cuadro 23") and page 47 (in Table 28 or "Cuadro 28"), respectively, of Gayoso et al. 2002. As indicated on page 4 of Gayoso et al. 2002, an appropriate peer group reviewed and commented on the publication. This peer group included professional with much experience in forestry, forest ecology, and the derivation of allometric equations, including: Mark Powell, Matt Delaney, Sandra Brown, Gabriel Loguercio, Edgar Ortiz, Omar Maserá and Robert Jandl.	Addressed.		y
8	3) Data shall be from a time period that accurately reflects available technologies and/or current practice, and trends, within the sector. Selection of the appropriate temporal range shall be determined based on the guidance provided in the GHG Protocol for Project Accounting, Chapter 7 (WRI-WBCSD).	CL: Please provide root to shoot ratio documents in English so the methods can be validated	Both Gayoso, J. 2008a. Eucalyptus sp. Resultados Proyecto FONDEF D98i1076.pdf and Gayoso, J. 2008b. Pinus radiata. Resultados Proyecto FONDEF D98i1076.pdf have been translated into English and provided in Microsoft Word format as part of the response to this findings. Translated versions include: -Gayoso, J. 2008a. Eucalyptus sp. EN version -Gayoso, J. 2008b. Pinus radiata EN version These allometric equations were part of a larger research project, Proyecto FONDEF D98i1076 "Medición y Monitoreo de la Captura de Carbono en Ecosistemas Forestales y Promoción en el	Addressed.		y

			Mercado Mundial del Carbono" directed by Jorge Gayoso. The equations developed as part of this work, including those for Eucalyptus globulus and Pinus radiata, use data that reflect current conditions and common practices occurring throughout Chilean forests. Further, CONAF is developing a book (expected to be available released in 2013) of allometrics functions for Chile, and this publication will incorporate Gayoso's work from the above mentioned research project (Jorge Gayoso, personnel statement). As the methods for sampling root biomass for development of root to shoot ratios were not explicit in either Gayosa 2008a or Gayoso 2008b (as mentioned in the response to Finding 10), Section 3.5 of the publication Gayoso et al., 2002 was also provided in English, as a response to this finding. Gayoso, J.; Guerra, J.; Alarcón, D. 2002. Contenido de carbono y funciones de biomasa en especies nativas y exóticas. Proyecto FONDEF D9811076 Medición de la capacidad de captura de carbono en bosques de Chile y promoción en el mercado mundial. 157 p.			
9	4) Where sampling is applied in data collection, or models are used in the methodology, the requirements set out in Section 4.1.4 shall be adhered to. The methodology developer shall demonstrate that sampling results provide an unbiased and reliable estimate of the true mean value (i.e., the sampling does not systematically underestimate or overestimate the true mean value).	CL: In addition to Item 11 above, please provide justification for use or non-use of discounts for ratio uncertainty	Similar to Finding 9, ratio uncertainty has been limited in this project due to the use of a simple ratios which predicts belowground biomass as a function of one parameter, aboveground biomass. Further the root to shoot ratios are species specific and appropriate for the geographic region. Further assessment of uncertainty and the use of discounts for uncertainty are not warranted for these peer reviewed, species specific, and geographically appropriate ratios.	Addressed.		y
Item No.	VCS AFOLU Requirements Version 3.3 (4 October 2012)	Round 1 NCR/LC/OFI	Response from Client	Round 2 NCR/LC/OFI	Response from Client	Satisfied (Y or N)
	3.1 GENERAL REQUIREMENTS					
10	3.1.7 Activities that drain native ecosystems or degrade hydrological functions to generate GHG credits are not eligible under the VCS Program. Evidence shall be provided in the project description that any AFOLU project area	OFI: Include a statement in the PD about the requirements of AFOLU	The following statement was added to Section 1.10.3 of the PD: "Further, no project activities drained native ecosystems or degraded hydrological functions to generate GHG credits."	Addressed.		y

	was not drained or converted to create GHG credits. Such proof is not required where such draining or conversion took place prior to 1 January 2008. The onus is upon the project proponent to demonstrate this, failing which the project shall not be eligible.	requirement 3.7.1			
	3.4 PROJECT LOCATION				
	3.4.1 The project location shall be specified in the project description in terms of its project area. The spatial extent of the project shall be clearly specified to facilitate accurate monitoring, reporting and verification of GHG emission reductions and removals and to demonstrate that the project meets the eligibility criteria of the relevant project category. The project location description shall include the following information:				
11	1) Name of the project area (e.g., compartment number, allotment number and local name).	NCR: In Table 1.1: Include local name and allotment (Rol) # as required by VCS AFOLU Requirements section 3.4.1 (1)	The name of the project area provided in the PD is the Project-Instance Number. As mentioned on the site visit, information on the Rol# and local name has been provided in the excel document "MikroTek_PD_2012.10.19". Further, this information is also incorporated into the attribute table of GIS files already provided.	Addressed.	y
12	5) Details of ownership.	CL: Provide detail as to who the property owners of the project areas are as per AFOLU requirements section 3.4.1 (5). Including a table showing project instance # and owner would suffice. Please indicate where this has been provided in the PD.	Details of ownership for each project instance have been incorporated into Table 1.1. Further, the footnote "The owners of each project instance are identified in Table 1.1." has been added to Section 1.12 of the PD.	Addressed.	y

Item No.	AR-ACM0001-Consolidated afforestation and reforestation baseline and monitoring methodology AR-ACM0001 Afforestation and reforestation of degraded land" (Version 05.2.0) (25 November 2011) ⁷	Round 1 NCR/LC/OFI	Response from Client	Round 2 NCR/LC/OFI	Response from Client	Satisfied (Y or N)
	4. Applicability					
	The conditions under which the methodology is applicable are:					
13	(b) If at least a part of the project activity is implemented on organic soils, drainage of these soils is not allowed and not more than 10% of their area may be disturbed as result of soil preparation for planting (see AR-ACM0003 Section 2.2, paragraph 3.b)	CL: Please provide supplementary evidence indicating that the project area does not include organic soils	Please see Section Figure 3.1 of the PD for the recently added IPCC soil class map (added as part of the response to Finding 37). It documents that none of the project area is planted on organic soils. "Further, a local forester familiar with all of Mikro-Tek's planted sites has confirmed that "there are no organic soils are present in the project area" (I. Fazzi, pers. comm.)" has been added to Section 2.3 of the PD. Further, the CONAF Procedure (EN) document attached states in Section 1.1.2 (a) that the proposed planting sites are to be assessed for their qualification as "preferred forestry aptitude". All of the Mikro-Tek project sites were assessed as having fragile or degraded soils as described in Section 1.1.2(e) with either moderate, severe or very severe erosion levels, with none of the sites being classed as having organic soils.	Addressed.		y
	5. Actual net GHG removals by sinks					
	The actual net GHG removals by sinks shall be calculated as:					

⁷ AR-ACM0003 equivalent requirement is identified in parentheses.

14	See Equation 3 Page 6 (See AR-ACM0003, Equations 2 and 3, paragraphs 15 and 16)	CL: In the tables in Section 3.2.3, please provide clarity as to the use of equations 3, 4, and 5 of AR-ACM0001	Ex-ante, equation 3, 4, and 5 of the CDM methodology AR-ACM0001 can be simplified. As $GHGE=0$ and litter ($\Delta CLI_PROJ,t$), shrub biomass ($\Delta CSHRUB_PROJ,t$) and dead wood biomass (ΔCDW_PROJ) are not included in the project boundary. The simplified and combined equation 3, 4, and 5 can be written $\Delta CACTUAL = \Delta CP = \text{Sum}(\Delta CT) = \text{Sum}(\Delta CTREE_PROJ,t + \Delta CSOC_AL,t)$ $\Delta CTREE_PROJ,t$ is broken out separately between live tree biomass and belowground biomass in Table 3.5 and 3.6. In summary in Table 3.5 and 3.6 the columns entitled "Metric tons of CO2 (t CO2e/ha)"= $\Delta CACTUAL = \Delta CP = \text{Sum}(\Delta CT)$	Please add the last statement from your response to the PD as this will help clarify to other readers what the values in the table represent.	The following sentence "In summary in Table 3.5 and 3.6 the columns entitled "Metric tons of CO2 (t CO2e/ha)"= $\Delta CACTUAL = \Delta CP = \text{Sum}(\Delta CT)$ " has been added to Section 3.2.3 of the PD.	y
2.2 Precision requirements						
15	Maximum allowable relative margin of error of the mean for estimation of tree biomass is $\pm 10\%$ at 90% confidence level. (See CDM Tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities," Section 10)	NCR: Please provide evidence that the applied Confidence Deduction is conservative as per VCS Section 4.1.4 or Install more sample plots in order to meet the precision requirements of AR-ACM0001	The VCS Standard (v3.3) states in Section 4.1.4 that "Confidence deductions shall be applied using conservative factors such as those specified in the CDM Meth Panel guidance on addressing uncertainty in its Thirty Second Meeting Report, Annex 14." As the factor used in Annex 14 of the Thirty Second Meeting Report are only suggested for use and are only applicable for estimating uncertainty at a 95% confidence level they are not mandated nor appropriate for use on this project. As the mean biomass carbon stock 49.49 t C/ha was estimated with a precision level of $\pm 12.6\%$ of the mean at the 90% confidence, this value has been revised downward to 48.22 t C/ha. This value is calculated as: mean biomass carbon stock – ((90% confidence interval as percentage of mean - allowable error (i.e. 10%))* mean biomass carbon stock). In this instance, the conservatively reduced mean = 49.49 t C/ha – ((12.6%-10%)*49.49 t C/ha = 48.22 t C/ha. This value is conservative as it is 2.6% less than the mean.	We contacted VCS (Ben Block) by phone regarding the requirement in VCS Standard 3.3 section 4.1.4 to ensure that VCS rules would take precedence over the CDM methodology. While they stated that this is indeed the case (typically VCS rules trump CDM meth requirements) the section 4.1.4 of the Standard is for development of methodologies and therefore does not take	Submitted the following text to ESI via email on 2/15/2013 We understand from your last response that the CDM methodology takes precedence over VCS guidance provided in Section 4.1.4 of the standard. As you then state "we are left with the requirement in the methodology which states that the maximum allowable relative margin of error of the mean for estimation of tree biomass is $\pm 10\%$ at 90% confidence level." We therefore would like to propose the following deviation to the AR-ACM0001 CDM methodology: "In the event that monitoring of biomass yields a precision of the estimates exceeding $\pm 10\%$ of the	y

			precedence. Accordingly we are left with the requirement in the methodology which states that the maximum allowable relative margin of error of the mean for estimation of tree biomass is $\pm 10\%$ at 90% confidence level. If you can provide a demonstration that the confidence deduction is permitted by VCS somewhere else in their rules we will be glad to consider. mean at a 90% confidence level, as required by the methodology, an appropriate confidence deduction will be applied. This confidence deduction will be in line with VCS guidance provided in Section 4.1.4 of the VCS Standard. The confidence deduction will be calculated as: mean biomass carbon stock – ((90% confidence interval as percentage of mean – 10%)* mean biomass carbon stock)." This methodology deviation is warranted because variability is often quite high in young forest stands and monitoring to required precision levels is impractical. Use of the confidence deduction is warranted and does not negatively impact the conservativeness of the quantification of GHG emission reductions or removals. The conservativeness of the GHG emission accounting is maintained because the conservatively reduced tree biomass value is the lower bound of the desired confidence level minus the allowable error (10%), as explained below. As the mean biomass carbon stock 49.49 t C/ha was estimated with a precision level of $\pm 12.6\%$ of the mean at the 90% confidence, this value has been revised downward to 48.22 t C/ha. This value is calculated as: mean biomass carbon stock – ((90% confidence interval as percentage of mean - allowable error (i.e. 10%))* mean biomass carbon	
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					stock). In this instance, the conservatively reduced mean = $49.49 \text{ t C/ha} - ((12.6\% - 10\%) * 49.49 \text{ t C/ha}) = 48.22 \text{ t C/ha}$. This value is conservative as it is 2.6% less than the mean. Further, this methodology deviation should be allowed as this represents a deviation from a criteria and parameter related to monitoring (in line with section 3.5.1 of the VCS Standard) and the resulting value is conservative as a reduction from the mean is applied. Uncertainty or the margin of error is a monitoring parameter generated using data gathered in the course of the forest inventory.	
	2.3 Data requirements under the methodology					

16	Table 3 provides a list of the data and parameters that are required in order to apply this methodology. PPs should refer to the tools used in this methodology for full description of the data and parameters. For ex ante calculation of net anthropogenic GHG removals by sinks, PPs shall provide transparent estimations for the parameters that are monitored during the crediting period. These estimations shall be based on existing published data where possible, using a conservative approach. (See AR-ACM0003, Section 6.4)	CL: Please provide clarity as to why not all of the data and parameters required in table 3 of AR-ACM0001 are not included in the PD. Also, please clarify the source of Carbon fraction of biomass for tree species j and where it is used in Annex 1.	Not all of the data and parameters listed in Table 3 of the AR-ACM0001 methodology have been included in the PD, because Table 3 list a wide range of parameters which can be used for different methods for quantifying biomass (i.e. BEF and annual increment methods versus the method used-the allometric method), for pools not included in the project boundaries (i.e. litter, dead wood and shrubs), and for parameters not used in the allometric equations (i.e. height). More details can be found in the CDM tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities". The following text has been added to Table 4.1 of the PD to clarify that the default carbon fraction of biomass for tree species j, 0.5, was sourced from the: "CDM Tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities"; Version 2.1.0". This finding and the text provided is related to monitoring and it is unclear why Annex 1 is referenced here. The carbon fraction is not listed in Annex 1, nor should it be, as the source data used for the ex-ante estimates, provided by Calderón and Guerra, were carbon stocks rather than biomass stocks.	Addressed.		y
Item No.	A/R Methodological tool “Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities” (Version 01) (19 October 2007)	Round 1 NCR/LC/OFI	Response from Client	Round 2 NCR/LC/OFI	Response from Client	Satisfied (Y or N)
	II. PROCEDURE					
	7. If project participants claim that the afforestation or reforestation CDM project activity has a starting date after 31 December 1999 but before the date of its registration, then the project participants shall:					

17	Provide evidence that the starting date of the A/R CDM project activity was after 31 December 1999, and	NCR: Please provide evidence of the project start date: evidence may include: Planting records, receipts for seed/seedling purchase and installation, photographs documenting planting, planting plans and schematics, and related	Please see the attached import permit (i.e., Chile Import Permit 2002.pdf) for the mycorrhizal inoculum. This was the documentation required to ship our first batch of mycorrhizae, which was used to inoculated seedlings in the nursery. Seedlings were raised for at least 6 months in the nursery prior to planting in June 2003.	Addressed.	y
8. This step serves to identify alternative land use scenarios to the proposed CDM project activity that could be the baseline scenario, through the following sub-steps: Sub-step 1a. Identify credible alternative land use scenarios to the proposed CDM project activity					
18	10. For identifying the realistic and credible land-use scenarios; land use records, field surveys, data and feedback from stakeholders, and information from other appropriate sources, including Participatory rural appraisal (PRA) may be used as appropriate. If the baseline approach selected is 22b or c, then the project shall perform a survey of local experts or land owners/users on their plans for land management/investments during the period to the project start.	CL: Please discuss in the PD the source of the land use data provided to arrive at final land use decisions	The Chile land use statistics has been updated to make the information more straightforward and demonstrate how the values were transparently derived from the source data. The new file "Chile Statistics Revised 2013.01.17" has been provided as part of the response to this finding. Further, the following text has been added to Section 2.4 of the PD: - "Table 2.3 using data derived from the Chilean National Institute of Statistics (INE) for Region V, VI, VII, and VIII, and RM indicates the relative abundance of each land use class in the project region. Table 2.3. Land uses as a percentage of the project region. " - "The three scenarios identified above represent credible and realistic land use conversions from abandoned pasture (i.e., natural pasture). Other land use conversions from natural pasture are unlikely. Conversion from abandoned/natural pasture to infrastructure is highly unlikely given the remoteness of the project areas and the steepness of the terrain. Barren land (sandy, rocky, "sterile" land) is unsuitable for plants and trees."	Addressed.	y

19	11. All identified land use scenarios must be credible. All land uses within the boundary of the proposed A/R CDM project activity that are currently existing or that existed at some time since 31 December 1989 but no longer exist, may be deemed realistic and credible. For all other land use scenarios, credibility shall be justified. The justification shall include elements of spatial planning information (if applicable) or legal requirements and may include assessment of economical feasibility of the proposed alternative land use scenario.	NCR: Please indicate in the PD and supporting file that the identified alternative land use scenarios are applicable the grouped project's entire geographic boundary	As stated in Section 1.13.1.2, "New project instances will demonstrate compliance with the following criteria...The pre-existing land use of the grouped project instance area is either pasture/grassland, cultivation, or abandoned nonforest lands which have previously been in agriculture." Further, please see the response to Finding 30.	Addressed.	y
17. In applying sub-steps 2a and 2b, provide transparent and documented evidence, and offer conservative interpretations of this documented evidence, as to how it demonstrates the existence and significance of the identified barriers. Anecdotal evidence can be included, but this alone is not sufficient proof of barriers. The type of evidence to be provided may include:					
20	• Relevant legislation, regulatory information or environmental/natural resource management norms, acts or rules; • Relevant (sectoral) studies or surveys (e.g. market surveys, technology studies, etc.) undertaken by universities, research institutions, associations, companies, bilateral/multilateral institutions, etc.; • Relevant statistical data from national or international statistics; • Documentation of relevant market data (e.g. market prices, tariffs, rules); • Written documentation from the company or institution developing or implementing the A/R CDM project activity or the A/R CDM project developer, such as minutes from Board meetings, correspondence, feasibility studies, financial or budgetary information, etc.; • Documents prepared by the project developer, contractors or project partners in the context of the proposed project activity or similar previous project implementations; • Written documentation of independent expert judgments from agriculture, forestry and other land-use related Government / Non-Government bodies or individual experts, educational institutions (e.g. universities, technical schools, training centres), professional associations and others.	NCR: Please show process of obtaining data from INE website. Please include in the PD relevant evidential data supporting identified barriers for all regions within the geographic boundary of the grouped project. Additionally, in the PD, please refer to appropriate transparent and documented evidence justifying the ecological barriers and common practice.	Obtaining the 2007 land use data from INE is as easy as cutting and pasting the weblink below into your browser and hitting enter. http://www.ine.cl/canales/chile_estadistico/censos_agropecuarios/censo_agropecuario_07_comunas.php Then click on "Cuadro 2" for Table 2. I have provided a slightly more manageable version of this table (in the file Chile Statistics Revised 2013.01.17) as part of the response to this finding. I have revised the table from the previous version (Chile Land Use Statistics.xls) so it is more readily understandable and matches up better with the source data. The following statements were added to Section 2.5 of the PD in support of the investment barrier and the local conditions and technology barrier: "In a Chilean study for the CDM, Sanhueza et al. states that in respect to reforestation of deteriorated soils "the simple existence of current forestry incentives is not a sufficient stimulus for landowners to reforest these terrains." "At the start of this reforestation project in 2003, Sanhueza et al. stated that:	Addressed.	y

			Barriers for the implementation of CDM projects exist above all for the forestation of small farms. Farmers usually have a low level of education and a strong agricultural tradition. They use traditional production techniques and have poor technical and commercial knowledge and little access to state-sponsored training systems. The small farmer is generally located in dry lands and mountain slopes, which have serious restrictions for the traditional agricultural crops of the region...small farmers hardly benefited from state incentives in the past. As a consequence, in 1998 Chilean legislation (DL 701) was modified in order to provide a preferential treatment for small farmers. Nevertheless, in practice this appears insufficiently attractive, since forestation rates of small farms are still quite low."			
	STEP 4. Common practice analysis					
	32. The previous steps shall be complemented with an analysis of the extent to which forestation activity has already diffused in the geographical area of the proposed A/R CDM project activity. This test is a credibility check to demonstrate additionality which complements the barrier analysis (Step 2) and, where applicable, the investment analysis (Step 3).					
21	33. Provide an analysis to which extent similar forestation activities to the one proposed as the A/R CDM project activity have been implemented previously or are currently underway. Similar forestation activities are defined as that which are of similar scale, take place in a comparable environment, inter alia, with respect to the regulatory framework and are undertaken in the relevant geographical area, subject to further guidance by the underlying methodology. Other registered A/R CDM project activities shall not to be included in this analysis. Provide documented evidence and, where relevant, quantitative information. Limit your considerations to any period since 31 December 1989.	NCR: PD Section 2.5 - common practice analysis - please discuss appropriate documented and quantitative evidence for all regions included in the grouped project geographic boundary.	The following text and a new table, Table 2.4. Annual rate of conversion of pasture to forest plantations. has been added to Section 2.5 of the PD. "Industrial plantation forests are established throughout the country from Region V to Region X, with Radiata Pine and Eucalyptus being the most common forestry species. Plantation forest in the project region as a percentage of the total land account for: 3.4% of the land in Region V, 6.5% in Region VI, 9.2% in Region VII, 13.0% in Region VIII, and 0.6% in the Metropolitan Region. Mikro-Tek's project boundaries are set within this range from Region V to VIII. Plantation establishment in the project region is not common practice, despite past subsidies by the Chilean government, as mentioned above. Rates of conversion from 1997 to 2007 for both eucalyptus and Pinus radiata are listed in Table 2.4, below. In general, these rates are less than 1% a year or less except in the case of Region VIII, which is the most important region in Chile for	Addressed.		y

			industrial forest production. The vast majority (78%) of reforestation in Region VII and VIII is attributable to industrial forestry operations. Table 2.4. Annual rate of conversion of pasture to forest plantations."		
22	34. If forestation activities similar to the proposed A/R CDM project activity are identified, then compare the proposed project activity to the other similar forestation activities and assess whether there are essential distinctions between them. Essential distinctions may include a fundamental and verifiable change in circumstances under which the proposed A/R CDM project activity will be implemented when compared to circumstances under which similar forestations were carried out. For example, barriers may exist, or promotional policies may have ended. If certain benefits rendered the similar forestation activities financially attractive (e.g., subsidies or other financial flows) explain, why the proposed A/R CDM project activity cannot use the benefits. If applicable, explain why the similar forestation activities did not face barriers to which the proposed A/R CDM project activity is subject.	NCR: PD Section 2.5 - common practice analysis - please explicitly describe the essential distinctions between the project activities and other forestation activities that have occurred in the region. Explicitly Explain why other forestation activities did not face the implementation barriers that the project is subject to.	The following revised text has been added to Section 2.5 of the PD. "Although there have been other forestry projects established in the area, particularly by large well financed forestry companies, small-scale landowners with smaller parcels have been reluctant to initiate projects given limited financial resources and the associated risks of establishing forestry plantations on such lands. As stated above, "the simple existence of current forestry incentives is not a sufficient stimulus for landowners to reforest" (Sanhueza. et al., 2003). This is demonstrated by the very low rates of reforestation in Table 2.4. Landowners in the project are unwilling to undertake the financial risk for plantation development given the uncertainty of plantation establishment and the delay in receiving the government subsidy until plantation establishment can be confirmed one year after planting. MikroTek surmounts this barrier by financing and providing mycorrhizal inoculants. The mycorrhizal technology improves successful plantation establishment thereby reducing the risk of planting failure and the risk of cost recovery on the part of the landowners. Predominately, reforestation in these regions that takes place without the incentives provided by carbon credits is carried out by industrial forest owners or landowners with more ability and or willingness to absorb the risk associated with a failed planting that are distinguished from the landowners Mikro-Tek is working with by having significant available financial and technological resources, and a business-driven mandate to grow timber. This last item is a critical distinction, in that the land managers of the Mikro-Tek project area have not traditionally focused on forestry, as also described by Sanhueza et al above, and are averse to committing their limited financial	Addressed.	y

			resources to engaging in a new and potentially risky land use practice."			
Item No.	"Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities" (Version 01.1.0; 15 April 2011)	Round 1 NCR/LC/OFI	Response from Client	Round 2 NCR/LC/OFI	Response from Client	Satisfied (Y or N)
	Assumptions					
23	(a) Site preparation and planting take place within a year of each other;	NCR: Please provide evidence that site preparation and planting take place within one year of each other	"The general procedure before starting a project is that a representative of Mikro-Tek meets with the landowner and/or landowner's representative (forester or forestry contractor) to explain the project requirements and the process that needs to be followed for a carbon project. During this meeting Mikro-Tek and the landowner does a preliminary assessment of the proposed site to determine if the land would qualify as unproductive agricultural land as defined under the CONAF subsidy guidelines. This review is completed between six and twelve months before the proposed planting date in order to allow Mikro-Tek time to produce, ship, and apply the inoculum to the seedlings in the nursery prior to field planting. During this time period Mikro-Tek confirms, either by site visits, or by a reviewing the site documents with the landowners and/or their forestry contractors, to determine if the project has started. If the project meets these requirements (i.e. has not already started and can qualify for CONAF subsidy) then the inoculum is shipped to Chile and is applied to the seedlings approximately 6 months before the scheduled planting time, and the land preparation work is initiated. Site preparation is carried out by subsoiling (ploughing/ripping) a single planting line in the flats and on slopes less than 20%, and by hand digging	Addressed.		y

			planting holes on the steeper slopes. Both methods are done in the same year as planting to ensure that the ripped or dug holes are not filled in during the rainy season, which would require an additional expense to redo and would not be covered under the CONAF subsidy.		
24	II. ESTIMATING CHANGE IN SOC STOCK	CL: PD page 31 Indicates the rate of SOC accumulation has been calculated for the baseline scenario. Please clarify in the PD that this is calculated for the project scenario	The text of Section 3.2.2 has been revised to read "The rate of soil organic carbon accumulation (dSOC) has been calculated using Equations 3.1 and 3.2 for the project scenario."	Addressed.	y
6. To estimate the change in SOC stock in the project scenario, the areas of land meeting the applicability conditions of the tool are stratified according to:					

25	(a) Climate region and soil types given in Table 3;	NCR: Please provide soils information and evidence that the project area was stratified appropriately as indicated by PD Section 4.3.1.3. Provide soils information for verification. This needs to match the requirements of CDM SOC Change tool Section II.6.a Note soils information is requested in Item 26 above	The following text and Figure 3.1 was added to Section 3.2.2 of the PD "With a mean annual temperature of 16°C, the climate region for the project instances is classified as the warm temperate dry. IPCC default soil classes were determined using GIS by overlaying the project areas over a spatially explicit map of IPCC soil types (See Figure 3.1). While the project instances are dominated by high activity clays soils, two project instances, MikroTek0040 and MikroTek0044 in Region 8, are classified as having volcanic soil." Also in response to this finding, SOC calculations have been updated using the appropriate SOCref value. The citation and link for acquiring the spatially explicit IPCC soil class map has also been provided below: Batjes, N.H. 2010. IPCC default soil classes derived from the Harmonized World Soil Data Base (Ver. 1.1). Report 2009/02b, Carbon Benefits Project (CBP) and ISRIC- World Soil Information, Wageningen. http://www.isric.org/data/ipcc-default-soil-classes-derived-harmonized-world-soil-data-base-ver-11, accessed January 16, 2013. As the soils map also contains an organic class, it has further been used to demonstrate the project area contains no organic soils, as noted in the response to Finding 25.	As requested, please fix the link to http://www.rlc.fao.org/proyecto/gcp/rla/126/jpn/ciren/chi_clima.htm Accessed 13.October. 2011, as it takes us to http://www.rlc.fao.org/es/proyectos. – which does not include Climate data.	As the FAO link appears to be broken and a new version of the webpage cannot be located, we have used a new source to substantiate the average annual temperature in the project region. The average annual temperature of the project region is 12.8° C. Citation: Average yearly temperatures for a number of cities within the project region for the time frame May 2007 through April 2008. From: ANUARIO AGROMETEOROLOGICO REGIONES IV, V, METROPOLITANA, VI Y VII. DIRECTOR RESPONSABLE: ALEJANDRO MUÑOZ M. DIRECCION METEOROLOGICA DE CHILE. CASILLA 140, SUCURSAL MATUCANA, ESTACION CENTRAL. FONO 4364501 Accessed at: http://www.meteochile.gob.cl/agrometeorologia/documentos/Anuario_Agro_%202007-2008%28Agrometeorologia%29.pdf The mean annual temperature of the project region is between 10° C and 18° C (see IPCC2006, Figure 3A.5.2) and is therefore classified as warm temperate under the IPCC default climate region.	y
26	Equation 1	NCR: Please provide a review of the SOC stock calculations and use of the appropriate	The SOC calculations have been updated using the appropriate SOCref value. These changes are reflected in revisions to Section 3.2.2 of the PD. GHG quantification calculations will be updated as a result of this change.	Addressed.		y

		SOCref Value from Table 3 of the CDM Tool for SOC Stock change				
Item No.	A/R Methodological Tool: "Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity" (Version 1) (04 December 2009)	Round 1 NCR/LC/OFI	Response from Client	Round 2 NCR/LC/OFI	Response from Client	Satisfied (Y or N)
II. PROCEDURE						
27	(a) Estimate the area, Adt directly, e.g., using maps and/or land surveys and/or Participatory Rural Appraisal; and/or (b) Estimate the area, Adt indirectly from the data on number of head of livestock to be displaced (possibly converted to livestock equivalent units - LSU) divided by the appropriate sustainable stocking rate.	NCR: Please provide evidence supporting calculations of the area estimated to be subject to pre-project agricultural activities	The follow text has been added to section 3.3 of the PD. "None of the project area has been, nor will be (in the case of future project instances added as part of the grouped project) subject to pre-project agricultural activities. This is ensured as all project lands receive a CONAF subsidy, which specifically prohibits conversion of productive agricultural land. As part of the application process to receive the plantation establishment subsidy, CONAF approves all forest management plans to ensure the plans are in line with Chilean Law No.: 701 which preserve existing forests and subsidize the conversion of non-forest land to forest land. The law stipulates that lands to be planted have a preferential aptitude towards forests and have degraded soils. Further, lands that are used for intensive agriculture, orchards or ranching are excluded from the possibility of receiving the subsidy, hence Adt = 0 and therefore Dt = 0.	Addressed.		y
28	The region shall be the smallest territorial administrative division/s encompassing all areas of land included in the A/R CDM project activity for which data on forest cover are publicly available.	NCR: Please provide evidence that all regions of the grouped project are included in the calculations of fraction of land covered by forest	The value f had been recalculated to include all regions of the grouped project. Further the value has been revised in Section 3.3.2 of the PD. See the revised calculation in the excel workbook "MikroTek_PD_2012.01.18".	Addressed.		y

APPENDIX B – DOCUMENTS REVIEWED

Documents Received 19 October 2012

- MikroTek_PD_2012.10.19 clean.doc

Documents Received 24 October 2012

- Agreement Template
 - o Voluntary Participation Form (Eng) Nov 2 05.pdf
 - o Template Legal agreement (Eng) Dec 08.doc
- GIS Database
 - o MikroTek_PA_20121018.shx
 - o MikroTek_PA_20121018.dbf
 - o MikroTek_PA_20121018.prj
 - o MikroTek_PA_20121018.sbn
 - o MikroTek_PA_20121018.sbx
 - o MikroTek_PA_20121018.shp
 - o MikroTek_PA_20121018.shp.xml
- Project Document
 - o MikroTek_PD_2012.10.19.xlsx
 - o MikroTek_PD_2012.10.19 clean.doc
- References
 - o Validation_Report_Nerquihue [Final upload, version 6 Jan 27 2010].pdf
 - o Annex 1 Growth curves E globulus and P radiata Microtek.docx
 - o Carbon Sequestration through Mycorrhizal Inoculation Draft Concept Outline 2002.pdf
 - o CONAF Law DL-701.pdf
 - o CONAF Subsidy Info.pdf
 - o FAO 2009 Review of Pests and Disease Forestry Paper 156.pdf
 - o Gayoso, J. 2008a. Eucalyptus sp. Resultados Proyecto FONDEF D98i1076.pdf
 - o Gayoso, J. 2008b. Pinus radiata. Resultados Proyecto FONDEF D98i1076.pdf
 - o GTZ and CONOMA 2003 National Strategy Study for the CDM in Chile.pdf
 - o Kean et al 2002 Mikro-Tek Original Year One.pdf
 - o MikroTek 2006 Carbon Sink in Chilean Forests - Years 1 - 3.pdf
 - o MikroTek 2007 Mycorrhizal Inoculation Concept Paper.pdf
 - o Morales E. 2003 [Ownership & Management of Forest Plantations Chile].pdf
 - o OFRI & Mikro-Tek Forest Research Report No. 145.PDF
 - o PDD Mikro-Tek Nerquihue V7.doc
 - o Prado and Weber 2003 Implementation of Sustainable Forest Management Chile.pdf
 - o Chile Landuse Stats
 - Chile Land Use Statistics.xls
 - Chile 1997 Agricultural Statistics.xls
 - INE Statistics 2007
 - 17.xls
 - 2.xls
 - 3.xls
 - 10.xls
 - 11.xls
 - 16.xls
- Risk
 - o World Bank 2011 WGI Dataset.xls
 - o Chile Political Risk 2006-2010.xls
 - o CONAF 2011 historico-conaf_empresas-85_11.xls
 - o CONAF 2011 Occurrences of Fire by Region.xls
 - o Mikro-Tek Chile Cash Flow Analysis 2012.10.08.xls
- Supporting Documents (CDM, VCS)

- o VCS Standard, v3.3.pdf
- o AFOLU Non-Permanence Risk Tool, v3.2.pdf
- o AFOLU Requirements v3.3_0.pdf
- o AR-ACM0001 AR of degraded land AR-ACM0001 AR of degraded land V5.2.pdf
- o CDM 2009 Estimation increase GHG emissions attributable to displacement in AR.pdf
- o CDM 2009 GUIDELINES ON CONSERVATIVE CHOICE AND APPLICATION OF DEFAULT DATA.pdf
- o CDM Combined tool to identify the baseline scenario and demonstrate additionality.pdf
- o CDM PROCEDURES TO DEMONSTRATE THE ELIGIBILITY OF LANDS FOR AFFORESTATION AND REFORESTATION.pdf
- o CDM Tool for the identification of degraded lands for AR project.pdf
- o Tool for estimation of SOC due to AR CDM V1.1.pdf
- o Mikro-
Tek_InventoryData_2012.09.14.pdf
- MikroTek 2012 Monitoring Plots
 - o MikroTekMonitoringPlots_2012.09.28.shx
 - o MikroTekMonitoringPlots_2012.09.28.dbf
 - o MikroTekMonitoringPlots_2012.09.28.prj
 - o MikroTekMonitoringPlots_2012.09.28.sbn
 - o MikroTekMonitoringPlots_2012.09.28.sbx
 - o MikroTekMonitoringPlots_2012.09.28.shp
 - o MikroTekMonitoringPlots_2012.09.28.shp.xml
- SOPs
 - o Mikro-Tek_SOPs_2012.09.19 Espanol.doc
 - o Mikro-Tek SOPs 2012.09.19 English.doc

Documents Received 13 November 2012

- MikroTek 2012 Monitoring Data 2012.11.13.xls

Documents Received 20 November 2012

- MikroTek_2012_Monitoring_Report_2012.11.20.docx
- MikroTek 2012 Monitoring Data and Results 2012.11.13.xls
- Mikro-Tek 2012 Monitoring Report 2012.11.15.xlsx
- Field Data
 - o Mikro-
Tek_InventoryData_2012.10.16.pdf

Documents Received 29 November 2012

- MikroTek Polygon Check 2012.10.15.xls

Documents Received 25 January 2013

- MikroTek_PD_2013.01.22.doc
- 2012-12-27_Mikro-
Tek_Chile_Responses_2013.01.22.xls
- MikroTek_2012_Monitoring_Report_2013.01.22.docx
- MikroTek_PD_2012.01.22.xls

Documents Received 29 January 2013

- Support for Validation Findings 2013.01.21
 - o Section 3.5 Gayoso et al 2002.doc
 - o Batjes 2010 IPCC Soils Classes.pdf
 - o Chile Import Permits 2002.pdf
 - o CONAF Procedures - EN translation.pdf
 - o CV for Mikro-Tek Team.docx

- o FAO_2006a.pdf
- o Gayoso 2002 Contenido de carbono y funciones de biomasa en especies nativas y exóticas.pdf
- o Gayoso, J. 2008a. Eucalyptus sp. EN version.doc
- o Gayoso, J. 2008b. Pinus radiata EN version.doc
- o Mikro-Tek Chile Project_Cash_Flow_Analysis_& NPV Comp. (2003 to 2008) Dec 2012.xlsx
- o MikroTek_IPCCSoilTypes.jpg
- o Morales E. 2003 [Ownership & Management of Forest Plantations Chile].pdf
- o Nunez 2011 Mapping drought events in north-central Chile.pdf
- o Sanhueza, E. et al. 2003 [Chile's National Strategy Study CDM - english summary].pdf
- o Chile Landuse Stats
 - Chile Landuse Stats\Chile Statistics Revised 2013.01.17.xls
 - INE Statistics 1997
 - Chile 1997 Agricultural Statistics.xls
 - INE Statistics 2007
 - 17.xls"
 - 2.xls
- o Revised Boundary
 - Revised Boundary-MikroTek0039.jpg
 - MikroTek_PA_20130116.kmz
 - Revised Boundary-MikroTek0003.jpg
 - Revised Boundary-MikroTek0007.jpg
 - Ground Truthing Points
 - GPSgroundtruth 2013.01.12.shx
- GPSgroundtruth 2013.01.12.dbf
- GPSgroundtruth 2013.01.12.prj
- GPSgroundtruth 2013.01.12.sbn
- GPSgroundtruth 2013.01.12.sbx
- GPSgroundtruth 2013.01.12.shp
- Revised Project Boundary
 - MikroTek_PA_20130116.shx
 - MikroTek_PA_20130116.dbf
 - MikroTek_PA_20130116.prj
 - MikroTek_PA_20130116.sbn
 - MikroTek_PA_20130116.sbx
 - \MikroTek_PA_20130116.shp
 - MikroTek_PA_20130116.shp.xml

Documents Received 30 January 2013

- MikroTek_GeographicRegion.kmz

Documents Received 04 February 2013

- MikroTek_PD_2013.02.04.xls
- \2012-12-27_Mikro-Tek_Chile_Responses_2013.02.01.xls
- Mikro-Tek 2012 Monitoring Report 2013.02.04.xls
- MikroTek_2012_Monitoring_Report_2013.02.04.docx
- MikroTek_PD_2013.02.04.doc

Documents Received 10 February 2013

- VCS PD Partner Files
 - o Ulloa

- 1. Ulloa Voluntary Participation Form.pdf
 - 1. Ulloa Business Collaboration Agreement.pdf
 - 1. Ulloa CONAF Maps
 - 1. Ulloa Rol #16-10.tif
 - 1. Ulloa Rol # 16-119.tif
- o Nitsche
 - 2. Nitsche Voluntary Participation Form.pdf
 - 2. Nitsche Business Collaboration Agreement.pdf
 - 2. Nitsche CONAF Maps
 - Nitsche - Rol #18-22, 23.pdf
 - Nitsche - Rol # 38-90.pdf
 - Nitsche - 18-216.pdf
 - Nitsche - AD Rol # 18-22, 23.pdf
 - Nitsche - AD Rol # 38-90.pdf
 - Nitsche - Rol # 18-20.pdf
 - Nitsche - Rol # 18-216.pdf
- o Harris-Correa
 - 3. Harris-Correa Voluntary Participation Form.pdf
 - 3. Harris-Correa Business Collaboration Agreement.pdf
 - 3. Harris-Correa CONAF Maps
 - Harris-Correa Rol # 592-57 (592-110).jpg
- Harris-Correa 1 Rol # 15-13.JPG
 - Harris-Correa 2 Rol # 15-13.JPG
 - Harris-Correa Rol # 15-12.JPG
 - Harris-Correa Rol # 15-14.JPG
 - Harris-Correa Rol # 15-18.JPG
 - Harris-Correa Rol # 52-10.JPG
 - Harris-Correa Rol # 62-15.JPG
- o Garces
 - 4. Garces Voluntary Participation Form.pdf
 - 4. Garces Business Collaboration Agreement.pdf
 - 4. Garces CONAF Maps
 - 4. Garces Rol # 16-50 b.tif
 - 4. Garces Rol # 16-50 a.tif
- o Giglio
 - 5. Giglio Voluntary Participation Form.pdf
 - 5. Giglio Business Collaboration Agreement.pdf
 - 5. Giglio CONAF Maps
 - 5. Giglio Rol # 18-389.tif
- o Bulnes
 - 7. Bulnes Planting Summary.xls

- 7. Bulnes Business Collaboration Agreement.pdf
 - 7. Bulnes Voluntary Participation Form.pdf
 - 7. Bulnes CONAF Maps
 - Bulnes 35-89 (ex 35-63) (2).pdf
 - 7. Bulnes Rol # 45-21 b.tif
 - 7. Bulnes Rol # 45-21.tif
- o Catalan
 - 8. Catalan, Voluntary Participation Form.jpg
 - 8. Catalan Business Collaboration Agreement.pdf
 - 8. Catalan CONAF Maps
 - 8. Catalan Rol #27-40 p.tif
 - 8. Catalan Rol #27-40 map.pdf
- o Barroilhet
 - 9. Barroilhet Voluntary Participation Form.pdf
 - 9. Barroilhet Business Collaboration Agreement.pdf
 - 9. Barroilhet CONAF Maps
 - 9. Barroilhet Rol #56-6.pdf
 - 9. Barroilhet Rol #35-21.pdf
- o Toledo
 - 10. Toledo Business Collaboration Agreement.pdf
 - 10. Toledo Voluntary Participation Form.pdf
- 10. Toledo, Voluntary Participation Form (2).jpg
 - 10. Toledo CONAF Maps
 - 10. Toledo Rol #61-24.tif
- o Cuevas
 - 11. Cuevas Voluntary Participation Form.pdf
 - 11. Cuevas Business Collaboration Agreement.pdf
 - 11. Cuevas CONAF Maps
 - 11. Cuevas Rol #144-22.tif
- o Hernandez
 - 12. Hernandez Voluntary Participation Form.pdf
 - 12. Hernandez Business Collaboration Agreement.pdf
 - 12. Hernandez CONAF Maps
 - Hernandez 57-6.pdf
 - 12. Hernandez, Rol #57-25.tif
 - Hernandez 57-4.pdf
- o Baztan
 - 13. Baztan Business Collaboration Agreement.pdf
 - 13. Baztan Voluntary Participation Form.pdf
 - 13. Baztan CONAF Maps
 - Sector C 2 001.jpg
 - 13. Baztan Rol #1523-20 & 21.pdf

- Sector B 2
000.jpg
- o Vera
 - 14. Vera Voluntary Participation Form.pdf
- o Guzman – Vera
 - 15. Guzman-Vera Voluntary Participation Form.pdf
 - 15. Guzman-Vera Business Collaboration Agreement Rol #136-7.pdf
 - 15. Guzman-Vera Business Collaboration Agreement, Rol #136-2.pdf
 - 15. Guzman-Vera CONAF Repts. Rol #136-7.pdf
- o Undurraga (Julio Covarrubias)
 - 16. Undurraga-Covarrubias CONAF Maps
 - Nerquigue 2.pdf
 - 16. Undurraga-Covarrubias Rol # 16- 60 pdf
 - 6. Undurraga-Covarrubias Rol #16-60....pdf

Documents Received 05 April 2013

- MikroTek_PD_2013 03 29.doc

Documents Received 17 April 2013

- Gayoso 2002 Contenido de carbono y funciones de biomasa.pdf
- Inf Chile July 2012 Stem Density.xls
- MikroTek_PD_2013.04.17 clean.doc
- MikroTek_PD_2013.04.17 track change.doc

Documents Received 18 February 2013

- ProjectRegionTemp_2013.02.18.xls
- Anuario_Agro_ 2007-2008(Agrometeorologia).pdf
- ICF Feasibilty Study on Chile CDM Project.pdf
- MikroTek_2012_Monitoring_Report_2013.02.18 Clean.docx
- MikroTek_PD_2013.02.18 Clean.doc
- Post Round 1 Clarifications Responses 2013.02.18.xls
- POST-ROU.XLS