

# VERIFICATION REPORT



Document Prepared By TÜV Rheinland do Brasil Ltda. (On behalf of TÜV Rheinland (China) Ltd.)

|                      |                                                 |
|----------------------|-------------------------------------------------|
| <b>Project Title</b> | <i>Kamiranga</i> Ceramic Fuel Switching Project |
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|                            |                                                                                                          |
|----------------------------|----------------------------------------------------------------------------------------------------------|
| <b>Report Title</b>        | Verification Report for <i>Kamiranga</i> Ceramic Fuel Switching Project                                  |
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## Summary:

### The purpose and scope of verification

TÜV Rheinland has performed the 4<sup>th</sup> periodic verification of the project: “*Kamiranga* Ceramic Fuel Switching Project” according to the Verified Carbon Standard – VCS Version 3. This verification covers the period from 01 March 2011 to 30 April 2012.

The project was validated under VCS 2007.1 by Designated Operational Entity TÜV Nord Cert GmbH, which also verified the first period verification from January 01<sup>st</sup> 2008 to June 30<sup>th</sup> 2009. The second and

third period verification from July 1<sup>st</sup>, 2009 to January 31<sup>st</sup> 2010 and February 1<sup>st</sup> 2010 to February 28<sup>th</sup> 2011 were verified as per VCS 2007 and performed by Bureau Veritas Certification Holding SAS.

The verification includes confirming the implementation of the monitoring plan of the VCS PD and the application of the CDM small scale methodology “AMS-I.E.: Switch from Non-Renewable Biomass for Thermal Applications by the User”, version 01.

#### **A brief description of the verification and the project**

The project activity is the project of *Kamiranga* Ceramic which is a ceramic company located in São Miguel do Guamá municipality in the State of Pará, north of Brazil. The ceramic company produces structural ceramic pieces such as bricks mainly for the regional market in Belém and for the northeast region of the state.

The objective of the implementation of this project activity in the ceramic is to stop using the native wood, which is a non-renewable fuel, and completely substitute it with renewable biomasses to feed their kilns and fire their ceramic units, so that they can minimize environmental impacts related to the native wood deforestation and consumption.

This fuel switching project is reducing the greenhouse gas (GHG) emissions through the substitution of native wood for renewable biomasses to generate thermal energy.

#### **The method and criteria used for verification**

The verification team has reviewed the Monitoring Report against the criteria established in the VCS Version 3 Program Guide and the CDM Validation and Verification Standard. In line with the criteria included in the VCS Version 3 Program Guide, the verification is meant to ensure that the reported emission reductions are real, measurable, transparent and conservative.

The verification consisted of a desk review and an on-site visit (September 19<sup>th</sup>, 2012) where interviews with the key personnel from the project company *Kamiranga* Ceramic and the PD developer Sustainable Carbon – Projetos Ambientais Ltda were conducted. The verification team also confirmed that the monitoring procedures were correctly applied and the emission reductions were correctly calculated.

#### **Summary of the verification conclusion**

The Monitoring Report is considered to be in compliance with VCS Program Guide, the approved methodology AMS I.E (version 01) and the Monitoring Plan presented in the Project Description.

During the monitoring period from 01 March 2011 to 30 April 2012 the project generated the following GHG emission reductions: **35,270** tCO<sub>2</sub> equivalents.

TÜV Rheinland does not take any responsibility towards the issuance and utilization of the emission reductions hereby verified and certified. Request for issuance of VCU's shall be made by the project proponent to an approved VCS Program Registry based on the requirements set out under the most recent version of the VCS Program Guidelines clause on VCS Registration. The verification of reported emission reductions is based on the information made available to us and the engagement conditions detailed in this report. TÜV Rheinland cannot guarantee the accuracy or correctness of this information. Hence, TÜV Rheinland cannot be held liable by any party for decisions made or not made based on this report.

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## 1 INTRODUCTION

### 1.1 Objective

Sustainable Carbon – Projetos Ambientais LTDA has commissioned TÜV Rheinland to verify the 4th periodic verification of the emission reductions reported for the VCS “*Kamiranga* Ceramic Fuel Switching Project” with regard to the relevant requirements for VCS program as per the Verified Carbon Standard Version 3.

The objective of the the 4th periodic verification is to verify that the actual monitoring systems and procedures are in compliance with the monitoring system and procedures described in the Monitoring Plan that is presented in the PD as well as with the Monitoring Manual. In addition, the periodic verification evaluates the greenhouse gas (GHG) emissions data presented in the Monitoring Report and expresses a conclusion about whether the presented GHG emissions data is free off material misstatements and sufficiently supported by evidence.

### 1.2 Scope and Criteria

The verification comprises a review of the monitoring report over the monitoring period from 01 March 2011 to 30 April 2012, based on the registered Project Description (PD) in part of the project design, monitoring parameters, monitoring plan, emission reduction calculation, monitoring methodology and all related evidences provided by project participant. Those documents have been reviewed and verified against VCS Version 3 requirements, UNFCCC rules and associated interpretations. The verification is based on validated project design document including baseline calculations.

The main scopes of this verification are:

- Verify whether the emission reductions generated by the project are in line with the VCS Verification Protocol and the information provided by the project participants contains all the necessary information to evidence the project’s compliance with all criteria in the VCS.
- Verify that the project has been implemented as described in the Project Design (PD) during the verification period.
- Confirm that the monitoring plan was implemented and fully functional to generate voluntary emission reductions (VCU) without any double counting during the whole verification period.
- Give a conclusion whether reported data are accurate, complete, consistent, and transparent, with a high level of assurance and free of material error or misstatement.

In particular, the project baseline, monitoring plan and the project compliance with relevant applicable protocols and criteria (i.e. UNFCCC, VCS, host Party and others) are to be validated in order to confirm that the project design, as documented, is sound and reasonable and meets the applicable criteria.

The correct application of the CDM small scale methodology: “AMS-I.E.: Switch from Non-Renewable Biomass for Thermal Applications by the User” v.1 was already validated by TÜV Nord Cert GmbH, documented in its Validation Report of 06/11/2009.

An explicit review of the validation and its underlying assumptions made and conclusion of TÜV Nord Cert GmbH are not scope of this verification.

### 1.3 Level of assurance

As the VCS Version 3 recognizes verified emission reductions, TÜV Rheinland has focused on providing a reasonable level of assurance that the emission reduction calculation methodology is appropriate and correctly applied, and that emission reductions have been accurately monitored. The implementation can be considered sustainable and no indications were observed leading to the assumption of high risks beyond common project specific challenges in relation to the likelihood of continual removal of GHG emission reduction through the project. This judgment is based on the document review, on site checks and consistency checks.

In the case it is required, TÜV Rheinland may discount verified emission reductions or requests a discount of these by using conservative assumptions for uncertainties in emission reduction calculations that cannot be fully quantified or that cannot give a desired level of assurance. For verifying/certifying VCUs, the desired level of assurance was based on the combined quantitative assessment of the accuracy of monitoring project performance and the identification of material risks.

### 1.4 Summary Description of the Project

*Kamiranga Ceramic* which is a ceramic company located in *São Miguel do Guamá* municipality in the State of *Pará*, north of Brazil. The ceramic company produces structural ceramic pieces such as bricks mainly for the regional market in *Belém* and for the northeast region of the state.

During the onsite visit carried out on September 19th, 2012 it was possible to assess that the *Kamiranga Ceramic* produces ceramic devices in two *Paulista* kilns and one Hoffman kiln, which were described in the VCS PD, and also in two new *Paulista* kilns that were not mentioned in the VCS PD.. It was confirmed through interviews onsite.

The fuel switching project in *Kamiranga Ceramic* is reducing greenhouse gases by substituting the native firewood by renewable biomasses for thermal energy generation used on the ceramic firing process. The sawdust, originated in legal reforestation areas, is a renewable biomass that presents a shorter renewal cycle when compared to the native firewood cycle, which is a non-renewable biomass and is not being used in the project activity. The açaí pits are residues generated by local industries.

The fuel switch was only feasible when considering the income derived from the commercialization of the carbon credits, since it was unattractive due to the high investments for the adaptation of machineries to the new biomass, and other barriers. Due to the project activity, a set of adaptations were necessary, such as alterations in the furnaces and other machineries, so the ceramic can operate with the renewable biomasses properly. In addition, the climate conditions at the Amazonian biome such as high relative humidity constitute a huge problem for drying the biomasses.

## 2 VERIFICATION PROCESS

### 2.1 Method and Criteria

The verification is based on validated project description including baseline and monitoring report. These documents are reviewed against VCS Version 3 requirements. TÜV Rheinland has, based on the recommendations in the Validation and Verification Standard, employed a risk-based approach in the verification, focusing on the identification of significant risks and reliability of project monitoring and generation of emission reductions.

The verification includes the next steps: desk review of the project design documents and monitoring report; on-site visit and follow-up interviews and resolution of outstanding issues and the issuance of the final verification report and opinion.

### 2.2 Document Review

The following table outlines the documentation reviewed during the verification process:

|                                                                                                                                          |
|------------------------------------------------------------------------------------------------------------------------------------------|
| / 1/ UNFCCC, Clean Development Mechanism Validation and Verification Standard, Version 02.0                                              |
| / 2/ UNFCCC, CDM small scale methodology “AMS-I.E.: Switch from Non-Renewable Biomass for Thermal Applications by the User”, version 01. |
| / 3/ VCS PD registered, Version 2.3 – October 27th, 2009                                                                                 |
| / 4/ VCS Validation Report - TÜV NORD CERT GmbH - November 6 <sup>th</sup> , 2009                                                        |
| / 5/ VCS Verification Report - TÜV NORD CERT GmbH - November 6 <sup>th</sup> , 2009                                                      |
| / 6/ VCS Verification Report - Bureau Veritas Certification Holding SAS - June 4 <sup>th</sup> , 2010                                    |
| / 7/ VCS Verification Report - Bureau Veritas Certification Holding SAS - August 23 <sup>rd</sup> , 2011                                 |
| / 8/ VCS Monitoring Report - First Draft - Version 01 - August 31st, 2012                                                                |
| / 9/ VCS Monitoring Report - Last version - Version 02.0 - October 17 <sup>th</sup> , 2012                                               |
| / 10/ Emission Reductions Calculation - Spreadsheet “VCS MR Calculation Kamiranga_period 04_01 03 11_30 04 2012_v02.0.xlsx”              |

### 2.3 Interviews

The verification team has performed an on-site visit on September 19th, 2012 during which the operations of the ceramic were reviewed. During the visit the verification team conducted interviews with the following representatives of the project company *Kamiranga* Ceramic and the Sustainable Carbon – Projetos Ambientais Ltda who prepared the VCS PD and the VCS Monitoring Report:

- Mr. *Sigifério Alves de Oliveira*, Director and owner of *Kamiranga* Ceramic.

- Mr. *Gleydson Moura*. Administrative Auxiliary, monitoring data responsible of *Kamiranga Ceramic*.
- Mr. *Thiago de Avila Othero*, consultant of Sustainable Carbon – Projetos Ambientais Ltda.

The monitoring report was completed by *Marcelo Hector Sabbagh Haddad*, *Camila Vaccari*, *Mariana dos Santos Silva*, *Mariana Fier*, *Larissa Tega da Fonseca*, *Felipe Sanchez A. Silva*, and *Thiago de Avila Othero*, from *Sustainable Carbon – Projetos Ambientais LTDA*.

## 2.4 Site Inspections

An on-site inspection was conducted with the purpose to clarify whether the project had been carried out as described in the VCS PD, assessment of documents and interview people in order to verify the project conditions.

The on-site visit at the ceramic confirmed that the monitoring and reporting is carried out consistently and in line with established procedures and as per the requirements of the monitoring plan mentioned in the registered VCS PD.

## 2.5 Resolution of Any Material Discrepancy

This process is aimed at resolving any outstanding issues which need to be clarified prior to the TÜV Rheinland conclusion on the project design and monitoring results. In order to ensure transparency a verification protocol is customized for the project. The protocol shows in transparent manner criteria (requirements), means of verification and their results against the identified criteria.

Findings established during the verification can either be seen as a non-fulfillment of CDM criteria and VCS Version 3, or where a risk to the fulfillment of project objectives is identified. Corrective action requests (CAR) issued where mistakes have been made with a direct influence on project results. Moreover, clarifications (CL) were requested where additional information is needed to fully clarify an issue.

During the course of this Verification, the consistency check was performed using the internal daily records of the production of ceramic units (PR<sub>y</sub>) against the Calculation Spreadsheet used to calculate the ER, and revealed that the internal daily records did not represented the actual indicated on the Calculation Spreadsheet. This issue has been resolved as requested on CAR 1 (see on Table 2 of Verification Protocol). The PP revised all the data, provided the appropriate evidences and the verification team confirmed the accuracy of the revision.

## 3 VERIFICATION FINDINGS

The findings of the verification are stated in the following sections. The verification criteria (requirements), the means of verification and its results against the identified criteria are documented in more detail in the verification protocol in Appendix A.

### 3.1 Project Implementation Status

The project consists in fuel switching, substitution of native wood for renewable biomasses to generate thermal energy, feeding the kilns and fire the ceramic units from the *Kamiranga Ceramic*, according to the VCS PD.

During the on-site visit, it was physically observed by the verification team that renewable biomasses such as sawdust and açai pits have been employed on the kilns of the *Kamiranga Ceramic* for energy supply.

The project implementation status has follows:

|                                                       |                                                                                                                                                      |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| Start date:                                           | September 1 <sup>st</sup> , 2007                                                                                                                     |
| First crediting period<br>(10 years, twice renewable) | January 1 <sup>st</sup> , 2008 to December 31 <sup>st</sup> , 2017<br>Total Emission Reductions estimated for the period: 351,250 tCO <sub>2</sub> e |
| 1 <sup>st</sup> Periodic Verification                 | January 1 <sup>st</sup> , 2008 to June 30 <sup>th</sup> , 2009<br>Emission Reductions: 48,068 tCO <sub>2</sub> e                                     |
| 2 <sup>nd</sup> Periodic Verification                 | July 1 <sup>st</sup> , 2009 to January 31 <sup>st</sup> , 2010.<br>Emission Reductions: 21,063 tCO <sub>2</sub> e                                    |
| 3 <sup>rd</sup> Periodic Verification                 | February 1 <sup>st</sup> , 2010 to February 28 <sup>th</sup> , 2011<br>Emission Reductions: 34,045 tCO <sub>2</sub> e                                |

There are no remaining issues from previous validation and verifications. The CARs and CLs raised during this verification process were satisfactorily answered by the project proponent and are closed.

The monitored period for this verification process comprises from 01 March 2011 to 30 April 2012. The production of the monitored period was 34,803 tonnes of ceramic units. The verification team checked the internal control sheet that contains the number of ceramic pieces produced that comes into each of the kilns. Compared to estimates in the registered PD, the 10% decrease in the emission reductions, the estimated on VCS PD for 14 months and the amount for this monitoring period are: 38,920 and 34,803 tonnes of ceramic units respectively.

Since the last monitoring period, *Kamiranga Ceramic* has constructed two new *Paulista* kilns that were not mentioned in the VCS PD. One of the kilns was built during the last monitored period, which corresponds to the period from 01/02/2010 to 28/02/2011. Thus, the production of this new kiln was excluded from the last monitoring period since it was not possible to perform the additionality assessment due to the lack of data.

In the current monitoring period the construction of the second new *Paulista* Kiln was concluded. As the ceramic company always used exclusively renewable biomass in these new kilns, during the current monitoring period was performed the additionality assessment in order to include the production provided by these new kilns. The additionality assessment (for both new *Paulista* kilns) was validated based on assessing the comparison made between the cost of energy generated on the baseline scenario of *Kamiranga Ceramic* and at the current monitoring period, detailed in Table 01 of VCS MR. The verification team was able to verify that all assumptions have been used in a proper manner, thus it is consistent to affirm that the project is still additional.

According to the VCS PD, in order to the project is in accordance with local laws, it must run with licenses under valid time. During the on-site visit, the verification team checked the environmental license and clay extraction license and they were valid during this monitored period, confirming the project compliance with the local laws.

As stated on the VCS MR, a deviation from the monitoring plan regarding the measurement the amount of renewable biomasses used (parameter  $Q_{\text{renbiomass}}$ ) was done. The registered VCS PD version 2.3 establishes that the project proponent (meaning the ceramic owner) would measure the amount of renewable biomasses used (parameter  $Q_{\text{renbiomass}}$ ). However, during the entire monitored period this parameter was monitored through all the receipts and invoices of biomass received by the ceramic industry. This means the amount of renewable biomass is measured by each provider and controlled by the ceramic owners by storing receipts and invoices. The verification team checked the receipts and invoices of biomass and considered the deviation acceptable and reliable.

### 3.2 Accuracy of GHG Emission Reduction or Removal Calculations

The verification team has checked the emission reduction calculation and confirmed that the Baseline Emissions have been calculated according to the formulas in the PD and following the approved CDM baseline and monitoring methodology “AMS-I.E.: Switch from Non-Renewable Biomass for Thermal Applications by the User”, version 01.

The emission reduction is calculated as baseline emissions ( $BE_y$ ) minus project emissions ( $PE_y$ ) minus leakage emissions ( $LE_y$ ). Since no project and leakage emissions are identified according to the applied methodology, baseline emissions are equal to the amount of emission reduction.

$$ER_y = B_y \times f_{\text{NRB},y} \times NCV_{\text{biomass}} \times EF_{\text{projected\_fossilfuel}}$$

$$B_y = PR_y \times BF_y$$

Where:

|                        |                                                                                                                                                   |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| $ER_y$                 | = Emission reductions during the year y in tCO <sub>2e</sub>                                                                                      |
| $f_{\text{NRB},y}$     | = Fraction of biomass used in the absence of the project activity in year y that can be established as non renewable biomass using survey methods |
| $NCV_{\text{biomass}}$ | = Net calorific value of the non-renewable that is substituted (IPCC default for wood fuel, 0.015 TJ/tonne)                                       |
| $B_y$                  | = Quantity of biomass that is substituted or displaced in tonnes                                                                                  |
| $PR_y$                 | = Number of ceramic pieces produced per month                                                                                                     |
| $BF_y$                 | = Tonnes of wood per thousand of pieces produced                                                                                                  |

Emission reductions were correctly calculated through the quantity of biomass that is substituted or displaced in tonnes of ceramic units multiplied by fraction of non-renewable biomass (wood) used in the absence of the project activity in year y multiplied by net calorific value of non-renewable biomass multiplied by the emission factor for the projected fossil fuel consumption in the baseline.

### 3.3 Quality of Evidence to Determine GHG Emission Reductions or Removals

TÜV Rheinland was able to verify that *Kamiranga* Ceramic has adequate monitoring mechanisms where the required parameters have been monitored on a monthly basis. This was verified during the on-site visit when the plant records were verified to assess the correctness of the reported data.

The amount of renewable biomass employed was checked by accessing all the receipts and invoices of biomass received by the ceramic.

The production of ceramic units per month was checked by accessing the internal control sheets used by *Kamiranga Ceramic*, which are organized per month and daily filled according to data based on ceramic units burned in the kilns.

The Emission Reductions have been correctly calculated. A complete set of data for the specified monitoring period was available and verified while undertaking site visit plant records maintained at site. As no further uncertainties or quality restriction affect the calculations the verification team has reviewed the above-mentioned evidences and considered that calculations are in line with VCS v.3 requirements.

### 3.4 Management and Operational System

Through the on-site visit and interview, the verification team checked that the quality management for the project is in place. As confirmed by the project proponent, the monitoring plan has been implemented as per the registered VCS PD. The according responsibilities of the personnel mentioned in the Monitoring Report are consistent with the current monitoring plan, served as the basis of the monitoring activity.

During the on-site visit, the verification team interviewed Mr. *Gleydson Moura* who is in charge for monitoring data, information on inputs and outputs of the ceramic industry, detailed information on the acquisition of renewable biomasses and how this data is kept by the controller's office. Then, it was concluded that she is familiar with the project monitoring procedures.

## 4 VERIFICATION CONCLUSION

The verification team of TÜV Rheinland has performed a Verification for the *Kamiranga Ceramic Fuel Switching Project* in Brazil on the basis of VCS Version 3 and UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The verification team concluded that the project as described in the VCS Monitoring Report (Version 02.0 - October 17th, 2012), meets all relevant requirements of the above-defined criteria. TÜV Rheinland therefore issues a positive Verification opinion.

The verified Emission Reductions during the concerned monitoring period (01 March 2011 to 30 April 2012) are displayed as follows:

| Period                         | PR <sub>y</sub><br>(units) | By<br>(tonnes) | BE <sub>y</sub><br>(tCO <sub>2</sub> e) | PE <sub>y</sub><br>(tCO <sub>2</sub> e) | LE <sub>y</sub><br>(tCO <sub>2</sub> e) | ER <sub>y</sub><br>(tCO <sub>2</sub> e) |
|--------------------------------|----------------------------|----------------|-----------------------------------------|-----------------------------------------|-----------------------------------------|-----------------------------------------|
| Total 2011                     | 19,385                     | 15,702         | 19,733                                  | 0                                       | 0                                       | 19,733                                  |
| Total 2012                     | 15,261                     | 12,361         | 15,537                                  | 0                                       | 0                                       | 15,537                                  |
| <b>Total Monitoring Period</b> | <b>34,645</b>              | <b>28,063</b>  | <b>35,270</b>                           | <b>0</b>                                | <b>0</b>                                | <b>35,270</b>                           |

## 5 APPENDIX A- VERIFICATION PROTOCOL

| Table 1: Verification requirements                                                                                                                                                                                                                                                                      |      |                  |                                                                                                                                                      |                  |                  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|------------------|
| Checklist question                                                                                                                                                                                                                                                                                      | Ref. | MoV <sup>1</sup> | Findings, comments, references, data sources                                                                                                         | Draft conclusion | Final conclusion |
| <b>1. Implementation</b>                                                                                                                                                                                                                                                                                |      |                  |                                                                                                                                                      |                  |                  |
| 1.1 Have all physical features proposed in the registered PDD been implemented at the project site?<br>§ 184 of CDM Project Standard                                                                                                                                                                    | VVS  | DR               | Yes, during the on site visit performed on 19 <sup>th</sup> September 2012, the verification team verified that all physical features were in place. | OK               | OK               |
| 1.2 Has the project activity been operated in accordance with the project scenario described in the registered PDD and relevant guidance?<br>Reference:<br>< <a href="http://cdm.unfccc.int/EB/033/eb33rep.pdf">http://cdm.unfccc.int/EB/033/eb33rep.pdf</a> >,<br>§75<br>§ 185 of CDM Project Standard | VVS  | DR               | Yes, the project activity have been operated in accordance with the project scenario described in the registered VCS PD.                             | OK               | OK               |
| 1.3 If the project activity is implemented on a number of different locations, has the Monitoring report provided the verifiable starting dates for each site?<br>§ 188of CDM Project Standard                                                                                                          | VVS  | DR               | Not applicable. The project is implemented in one location only.                                                                                     | OK               | OK               |

<sup>1</sup> MoV = Means of Verification, DR = Document Review, I = Interview, www = internet search.

| <b>Table 1: Verification requirements</b>                                                                                                                                                                     |             |                        |                                                                                                                                                                                                                          |                         |                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-------------------------|
| <b>Checklist question</b>                                                                                                                                                                                     | <b>Ref.</b> | <b>MoV<sup>1</sup></b> | <b>Findings, comments, references, data sources</b>                                                                                                                                                                      | <b>Draft conclusion</b> | <b>Final conclusion</b> |
| 1.4 Is the start date of monitoring period consistent?                                                                                                                                                        | VVS         | DR                     | Yes, the start of this monitoring period is consistent, since it follows the monitoring period of the previous verification processes, which properly followed the start date of the crediting period stated in the VCS. | OK                      | OK                      |
| 1.5 Is the monitoring report consistently filled with respect to all sections as required by its guideline of filling the monitoring report?                                                                  | VVS         | DR                     | Yes, the monitoring report is in accordance with the last available template (v3.1) in the VCS website, and is properly filled.                                                                                          | OK                      | OK                      |
| 1.6 Does the CER's obtained for the monitoring period within the limit of estimate in the registered PDD? Is the claimed CER's justifiable?                                                                   | VVS         | DR                     | Yes, it is within the limit.                                                                                                                                                                                             | OK                      | OK                      |
| 1.7 Is the monitoring system provided in line diagrams showing all relevant monitoring points?                                                                                                                | VVS         | DR                     | Yes.                                                                                                                                                                                                                     | OK                      | OK                      |
| <b>2. Monitoring plan and methodology</b>                                                                                                                                                                     |             |                        |                                                                                                                                                                                                                          |                         |                         |
| 2.1 Is the monitoring plan established in accordance with the monitoring methodology? § 186 of CDM Project Standard                                                                                           | VVS         | DR                     | Yes, the monitoring plan established is in accordance with the monitoring methodology.                                                                                                                                   | OK                      | OK                      |
| 2.2 In case the implemented monitoring plan defers from the monitoring methodology, has any requests for revision to or deviation from the monitoring methodology been officially communicated to the CDM EB? | VVS         | DR                     | Not applicable. Please see item 2.1.                                                                                                                                                                                     | OK                      | OK                      |

**Table 1: Verification requirements**

| Checklist question                                                                                                                                                                           | Ref. | MoV <sup>1</sup> | Findings, comments, references, data sources                                                                                                                                                                                                                                                                                                                                                                     | Draft conclusion                      | Final conclusion                          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------------------------|
| Reference:<br>< <a href="http://cdm.unfccc.int/EB/033/eb33rep.pdf">http://cdm.unfccc.int/EB/033/eb33rep.pdf</a> >,<br>§84, §58<br>§ 193 of CDM Project Standard                              |      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                  |                                       |                                           |
| 2.2.1 Have the above changes to the monitoring plan been approved by the CDM EB?                                                                                                             | VVS  | DR               | Not applicable. Please see item 2.1.                                                                                                                                                                                                                                                                                                                                                                             | OK                                    | OK                                        |
| <b>3. Monitoring and the monitoring plan</b>                                                                                                                                                 |      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                  |                                       |                                           |
| 3.1 Is monitoring established in full compliance with the monitoring plan, contained in the registered PDD (or new monitoring plan approved by the CDM EB)?<br>§ 191 of CDM Project Standard | VVS  | DR               | <p>Yes, the monitoring established is in full compliance with the monitoring plan, contained in the registered VCS PD.</p> <p><b>CL 1:</b> Please revise links of all footnotes on page 8, some of them the link does not work.</p> <p><b>CL 2:</b> Clarify contradictory information regarding the two new Paulista kilns, on page 6 of MR and on Calculation Spreadsheet “4th period - VCUs Calculations”.</p> | <p><b>CL-1</b></p> <p><b>CL-2</b></p> | <p><b>CLOSED</b></p> <p><b>CLOSED</b></p> |
| 3.2 Are all baseline emission parameters monitored and updated in accordance with monitoring plan, monitoring methodology and relevant CDM EB decisions?                                     | VVS  | DR               | Yes, all baseline emission parameters are monitored and updated in accordance with monitoring plan.                                                                                                                                                                                                                                                                                                              | OK                                    | OK                                        |

| <b>Table 1: Verification requirements</b>                                                                                                                       |             |                        |                                                                                                                                                                                        |                         |                         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-------------------------|
| <b>Checklist question</b>                                                                                                                                       | <b>Ref.</b> | <b>MoV<sup>1</sup></b> | <b>Findings, comments, references, data sources</b>                                                                                                                                    | <b>Draft conclusion</b> | <b>Final conclusion</b> |
| 3.2.1 Was the monitoring equipment for baseline emission parameters controlled and monitoring results recorded as per approved frequency?                       | VVS         | DR                     | No monitoring equipment is used to determine the baseline emission parameters. The frequencies of the parameters are in accordance with the monitoring plan. Please see item 4.1.      | OK                      | OK                      |
| 3.2.2 Was the monitoring equipment for baseline emission parameters calibrated in accordance with QA&QC procedures described in the registered monitoring plan? | VVS         | DR                     | Not applicable. No monitoring equipment is used to determine the baseline emission parameters.                                                                                         | OK                      | OK                      |
| 3.3 Are all project emission parameters monitored and updated in accordance with monitoring plan, monitoring methodology and relevant CDM EB decisions?         | VVS         | DR                     | Not applicable. There are no project emissions in this project activity.                                                                                                               | OK                      | OK                      |
| 3.3.1 Was the monitoring equipment for project emission parameters controlled and monitoring results recorded as per approved frequency?                        | VVS         | DR                     | Not applicable. Please see item 3.3.                                                                                                                                                   | OK                      | OK                      |
| 3.3.2 Was the monitoring equipment for project emission parameters calibrated in accordance with QA&QC procedures described in the registered monitoring plan?  | VVS         | DR                     | Not applicable. Please see item 3.3.                                                                                                                                                   | OK                      | OK                      |
| 3.4 Are all leakage emission parameters monitored and updated in accordance with monitoring plan, monitoring methodology and relevant CDM EB decisions?         | VVS         | DR                     | There was no leakage in this monitoring period. It was verified through published literature and surveys that there is a surplus of the biomass in the region of the project activity. | OK                      | OK                      |

**Table 1: Verification requirements**

| Checklist question                                                                                                                                                                                                                                                                                                     | Ref. | MoV <sup>1</sup> | Findings, comments, references, data sources                                                              | Draft conclusion | Final conclusion |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------------|-----------------------------------------------------------------------------------------------------------|------------------|------------------|
| 3.4.1 Was the monitoring equipment for leakage emission parameters controlled and monitoring results recorded as per approved frequency?                                                                                                                                                                               | VVS  | DR               | Not applicable. Please see item 3.4.                                                                      | OK               | OK               |
| 3.4.2 Was the monitoring equipment for leakage emission parameters calibrated in accordance with QA&QC procedures described in the registered monitoring plan?                                                                                                                                                         | VVS  | DR               | Not applicable. Please see item 3.4.                                                                      | OK               | OK               |
| 3.5 Were all monitoring parameters available and verifiable through the whole monitoring period?                                                                                                                                                                                                                       | VVS  | DR               | Yes, all parameters were available and verifiable, which were checked during the onsite assessment.       | OK               | OK               |
| 3.5.1 In case, only partial monitoring data is available and PP(s) provide estimations or assumptions for the rest of data, was it possible to verify those estimations and assumptions?<br>Reference:<br>< <a href="http://cdm.unfccc.int/EB/026/eb26rep.pdf">http://cdm.unfccc.int/EB/026/eb26rep.pdf</a> >, §109(b) | VVS  | DR               | Not applicable. Please see item 3.5.                                                                      | OK               | OK               |
| 3.6 Was management and operation system established and operated in accordance with the monitoring plan?                                                                                                                                                                                                               | VVS  | DR               | Yes, management and operation system established and operated are in accordance with the monitoring plan. | OK               | OK               |

**Table 1: Verification requirements**

| Checklist question                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Ref.            | MoV <sup>1</sup> | Findings, comments, references, data sources                                                                                                                                                                                                                                 | Draft conclusion | Final conclusion |          |            |          |        |                     |          |          |     |    |                                                                                     |    |    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|------------------|----------|------------|----------|--------|---------------------|----------|----------|-----|----|-------------------------------------------------------------------------------------|----|----|
| 3.7 Was is it possible to verify that involved management and operation personal is fully aware of the responsibilities and perform all operations according to the registered monitoring plan and internally developed manuals?                                                                                                                                                                                                                                          | VVS             | DR               | Yes. The responsible for the monitoring plan are Mr. Gleydson Moura and Mr. Sigifério Alves de Oliveira, from Kamiranga ceramic. Sustainable Carbon technical team (including those members described on Section 1.3 of the MR) was also involved in the project monitoring. | OK               | OK               |          |            |          |        |                     |          |          |     |    |                                                                                     |    |    |
| 3.8 Does the monitoring system provide organizational structure, role and responsibilities, emergency procedures?                                                                                                                                                                                                                                                                                                                                                         | VVS             | DR               | Yes.                                                                                                                                                                                                                                                                         | OK               | OK               |          |            |          |        |                     |          |          |     |    |                                                                                     |    |    |
| 3.9 Does any uncertainties identified and addressed?                                                                                                                                                                                                                                                                                                                                                                                                                      | VVS             | DR               | NA                                                                                                                                                                                                                                                                           | OK               | OK               |          |            |          |        |                     |          |          |     |    |                                                                                     |    |    |
| 4. Parameters                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                 |                  |                                                                                                                                                                                                                                                                              |                  |                  |          |            |          |        |                     |          |          |     |    |                                                                                     |    |    |
| 4.1 <b>Monitored parameter</b><br>Title: Q <sub>renbiomass</sub><br>Indication: Amount of renewable biomass used<br><br>Units: tonnes per month<br>Measured value ( <i>ex-post</i> ): <table><tr><td>Period/ Biomass</td><td>Sawdust</td><td>Açaí Pits</td></tr><tr><td>Total 2011</td><td>4,683.56</td><td>1,283.33</td></tr><tr><td>Total 2012</td><td>1,818.20</td><td>759.15</td></tr><tr><td>Total in the period</td><td>6,501.76</td><td>2,042.48</td></tr></table> | Period/ Biomass | Sawdust          | Açaí Pits                                                                                                                                                                                                                                                                    | Total 2011       | 4,683.56         | 1,283.33 | Total 2012 | 1,818.20 | 759.15 | Total in the period | 6,501.76 | 2,042.48 | VVS | DR | The amount of renewable biomass used were checked through the receipts of purchase. | OK | OK |
| Period/ Biomass                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Sawdust         | Açaí Pits        |                                                                                                                                                                                                                                                                              |                  |                  |          |            |          |        |                     |          |          |     |    |                                                                                     |    |    |
| Total 2011                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 4,683.56        | 1,283.33         |                                                                                                                                                                                                                                                                              |                  |                  |          |            |          |        |                     |          |          |     |    |                                                                                     |    |    |
| Total 2012                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1,818.20        | 759.15           |                                                                                                                                                                                                                                                                              |                  |                  |          |            |          |        |                     |          |          |     |    |                                                                                     |    |    |
| Total in the period                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 6,501.76        | 2,042.48         |                                                                                                                                                                                                                                                                              |                  |                  |          |            |          |        |                     |          |          |     |    |                                                                                     |    |    |

**Table 1: Verification requirements**

| Checklist question                                                                                         | Ref. | MoV <sup>1</sup> | Findings, comments, references, data sources                                                                                                                                                                                                                                                                                                       | Draft conclusion                    | Final conclusion                   |
|------------------------------------------------------------------------------------------------------------|------|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|------------------------------------|
| Title: PRy<br>Indication: Production of ceramic units<br>Units: Tonnes of ceramic units fired per month    | VVS  | DR               | <b>CAR 1:</b> Revise data of the parameter PRy on the MR and Calculation Spreadsheet regarding the amount of bricks produced on months January to April 2012. And provide evidences of amount per month of the year 2011 (including Dropbox spreadsheet).<br><br><b>CL 3:</b> Please clarify the meaning of footnote number 6 on page 6 of the MR. | <b>CAR-4</b><br><br><del>CL-3</del> | <b>CLOSED</b><br><br><b>CLOSED</b> |
| Title: Origin of renewable biomass<br>Indication: Renewable origin of the biomass<br>Units: Not applicable | VVS  | DR               | It was confirmed that only the renewable biomass mentioned in the MR is applied. It was confirmed through the biomass receipts and invoices.                                                                                                                                                                                                       | OK                                  | OK                                 |

**Table 1: Verification requirements**

| Checklist question                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Ref. | MoV <sup>1</sup> | Findings, comments, references, data sources                                                                                    | Draft conclusion | Final conclusion |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------------|---------------------------------------------------------------------------------------------------------------------------------|------------------|------------------|
| <p><b>4.2 Default parameter</b></p> <p>Title: <math>EF_{\text{projected fossil fuel}}</math><br/> Indication: CO<sub>2</sub> Emission factor of residual fuel oil<br/> Units: tCO<sub>2</sub>/TJ<br/> Default/Used value: 77.40</p> <p>Title: <math>NCV_{\text{biomass}}</math><br/> Indication: Net Calorific Value<br/> Units: TJ/tonne of wood<br/> Default/Used value: 0.0182</p> <p>Title: <math>\rho_{\text{wood}}</math><br/> Indication: Specific gravity<br/> Units: tonne/m<sup>3</sup><br/> Default/Used value: 0.67</p> <p>Title: BF<sub>y</sub><br/> Indication: Baseline consumption of non-renewable biomass per thousand of ceramic units produced in year y.<br/> Units: tons of wood per tons of ceramic units fired<br/> Default/Used value: 0.81</p> | VVS  | DR               | The verification team cross-check the independent sources of data and confirmed that all the references were correctly applied. | OK               | OK               |

**Table 1: Verification requirements**

| Checklist question                                                                                                                                                                                        | Ref. | MoV <sup>1</sup> | Findings, comments, references, data sources                                                                                                                                       | Draft conclusion | Final conclusion |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|------------------|
| <b>5. Calculations</b>                                                                                                                                                                                    |      |                  |                                                                                                                                                                                    |                  |                  |
| 5.1 Have all the calculations related to the baseline emissions been carried according to the formulae and methods described in the registered PDD and applied methodology? § 194 of CDM Project Standard | VVS  | DR               | The formulae and methods for baseline emissions described in the MR are in accordance with the registered VCS PD. Also, they were properly applied in the spreadsheet calculation. | OK               | OK               |
| 5.2 Have all the calculations related to the project emissions been carried according to the formulae and methods described in the registered PDD and applied methodology?                                | VVS  | DR               | Not applicable. Please see item 3.3.                                                                                                                                               | OK               | OK               |
| 5.3 Have all the calculations related to the leakage emissions been carried according to the formulae and methods described in the registered PDD and applied methodology?                                | VVS  | DR               | Not applicable. Please see item 3.4.                                                                                                                                               | OK               | OK               |

| Table 2: List of Requests for Corrective Action (CAR) and Clarification (CL) |                 |                                                                                                                                                                                                                                                              |                     |                                                                                                                                                                                                                                                       |                                                                                                                                                                                                   |
|------------------------------------------------------------------------------|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| No.                                                                          | Type of request | Observation                                                                                                                                                                                                                                                  | Reference (Table 1) | Summary of project owner response                                                                                                                                                                                                                     | Verification team conclusion                                                                                                                                                                      |
| 1.                                                                           | CAR             | <b>CAR 1:</b> Revise data of the parameter $PR_y$ on the MR and Calculation Spreadsheet regarding the amount of bricks produced on months January to April 2012. And provide evidences of amount per month of the year 2011 (including Dropbox spreadsheet). | 4.1                 | All data regarding the parameter $PR_y$ was revised, as requested. Corrections were made in the VCS MR Calculation Spreadsheet and in the VCS MR v.02.0. Evidences of the amount of ceramic units produced will be sent to the audit team by Dropbox. | The PP provided evidences (daily control spreadsheets) and updated VCS MR and Calculation Spreadsheet. The verification team considered that all data were correctly revised. This CAR is CLOSED. |
| 2.                                                                           | CL              | <b>CL 1:</b> Please revise links of all footnotes on page 8, some of then the link does not work.                                                                                                                                                            | 3.1                 | All footnotes on page 8 were revised and updated, as requested.                                                                                                                                                                                       | The footnotes on page 8 of MR were correctly revised. This CL is CLOSED.                                                                                                                          |
| 3.                                                                           | CL              | <b>CL 2:</b> Clarify contradictory information regarding the two new Paulista kilns, on page 6 of MR and on Calculation Spreadsheet "4th period - VCUs Calculations".                                                                                        | 3.1                 | Information regarding the construction of the two new <i>Paulista</i> kilns was revised. Corrections were made on sections 1.1, 2.1 and parameter $PR_y$ of the VCS MR v.02. The VCS Calculation Spreadsheet v.02 was also corrected.                 | The information revised was accepted by the verification team. This CL is CLOSED.                                                                                                                 |
| 4.                                                                           | CL              | <b>CL 3:</b> Please clarify the meaning of footnote number 6 on page 6 of the MR.                                                                                                                                                                            | 4.1                 | The footnote number 6 on page 6 was uptaded to footnote number 8 and better clarified, as requested.                                                                                                                                                  | The correction made was accepted by the verification team. This CL is CLOSED.                                                                                                                     |