



CPA VALIDATION REPORT

Title of CPA:

**BRA SC - (ROMALDO BRUNO
PATZLAFF - 620440S02) 3SP**

Title of PoA to which CPA is to be included:

**“METHANE CAPTURE AND COMBUSTION
FROM ANIMAL WASTE MANAGEMENT
SYSTEM (AWMS) OF THE 3S PROGRAM
FARMS OF THE INSTITUTO SADIA DE
SUSTENTABILIDADE”
IN BRAZIL**

REPORT No. 2008-0447/_0830

REVISION No. 01



CPA VALIDATION REPORT

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|-------------------------------------|---|
| Date of first issue: 6 July 2010 | Project No.: PRJC-222026-2010-CCS-BRA |
| Approved by: Michael Lehmann | Organisational unit: Climate Change Services |
| Client: Sadia Institute | Client ref.: Ralf Piper |

Identification of CPA: BRA SC - (ROMALDO BRUNO PATZLAFF - 620440S02) 3SP
Location: Latitude -27.148 and Longitude -52.156 , Santa Catarina State
Env. Lic.: 0269/08 , no Protocol, issued 16/05/2008 valid until 16/05/2012
Issue date of CDM-SSC-CPA-DD: 10 June 2010 **Host Party:** Brazil
PoA: "Methane capture and combustion from Animal Waste Management System (AWMS) of the 3S Program farms of the Instituto Sadia de Sustentabilidade"
Methodology: AMS-III.D **Version:** 13 **CPA ER estimate:** 3,760 over 7 years
GHG reducing Measure/Technology: "Methane recovery in agricultural and agro industrial activities"
Size ☐ Large Scale ☒ Small Scale
Validation Phases:
☒ Desk Review
☒ Follow up interviews
☒ Resolution of outstanding issues
Validation Status
☐ Corrective Actions Requested
☐ Clarifications Requested
☒ Full Approval and request for inclusion
☐ Rejected
 In summary, it is DNV's opinion that the CPA "BRA SC - (ROMALDO BRUNO PATZLAFF - 620440S02) 3SP" as described in the CDM-SSC-CPA-DD of 10 June 2010 requesting to be included in the PoA "Methane capture and combustion from Animal Waste Management System (AWMS) of the 3S Program farms of the Instituto Sadia de Sustentabilidade" in Brazil, meets the eligibility and additionality criteria established in the PoA and all relevant UNFCCC requirements for including CPAs in a PoA and correctly applies the baseline and monitoring methodology AMS-III.D, version 13. DNV thus requests the inclusion of the CPA in the PoA, a CDM programme of activities.

| | | |
|---|-----------------------------|----------------|
| Report No.: 2008-0447/_0830 | Date of this 6 July 2010 | Rev. No. 01 |
| Report title: "Methane capture and combustion from Animal Waste Management System (AWMS) of the 3S Program farms of the Instituto Sadia de Sustentabilidade" in Brazil | | |
| Work carried out by: Luis Filipe Tavares, Fabiana Philipi and Gabriel Baines | | |
| Work verified by: Michael Lehmann | | |

Key words:

CDM

Kyoto Protocol

Programme of Activities

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☐ Limited distribution

☐ Unrestricted distribution



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Abbreviations

| | |
|-------------------|---|
| B ₀ | m ³ CH ₄ /kg VS (capacity of volatile solid transformed to methane) |
| CAR | Corrective Action Request |
| CDM | Clean Development Mechanism |
| CEF | Carbon Emission Factor |
| CER | Certified Emission Reduction |
| CH ₄ | Methane |
| CL | Clarification request |
| CO ₂ | Carbon dioxide |
| CO ₂ e | Carbon dioxide equivalent |
| CPA | CDM programme activity |
| CDM-CPA-DD | CDM programme activity design document |
| CDM-PoA-DD | CDM programme of activities design document |
| PoA | Programme of activities |
| DNV | Det Norske Veritas |
| DNA | Designated National Authority |
| FATMA | Fundação de Meio Ambiente de Santa Catarina (Santa Catarina State Environment Agency) |
| GHG | Greenhouse gas(es) |
| GWP | Global Warming Potential |
| IPCC | Intergovernmental Panel on Climate Change |
| MP | Monitoring Plan |
| MCF | Methane Conversion Factor (capacity of facility to produce methane) |
| NGO | Non-governmental Organisation |
| NPV | Net Present Value |
| ODA | Official Development Assistance |
| PDD | Project Design Document |
| UNFCCC | United Nations Framework Convention on Climate Change |
| VS | Volatile Solids produced daily per swine head |



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Appendix A: Protocol for Assessing Compliance of Specific CDM Programme Activities with the Programme of Activities



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1 INTRODUCTION

Sadia Institute has commissioned Det Norske Veritas Certification AS (DNV) to assess the information in the CDM-CPA-DD for the CPA titled “BRA SC - (ROMALDO BRUNO PATZLAFF - 620440S02) 3SP” (hereafter called “the CPA”) against the requirements for including CPAs to the PoA “Methane capture and combustion from Animal Waste Management System (AWMS) of the 3S Program farms of the Instituto Sadia de Sustentabilidade” and further documentation requirements for including CPAs to a PoA.

This report summarises the findings of the validation of the specific small-scale CDM Programme of Activities Design Document (CDM-SSC-CPA-DD).

1.1 Objective

The assessment of a CPA requesting to be included in a PoA shall ensure that all the requirements determined in the PoA are met.

The assessment was performed on the basis of the eligibility and additionality criteria established in the PoA and the UNFCCC criteria for including CPAs to programme of activities under the Clean Development Mechanism (CDM), as well as criteria given to provide for consistent project operations, monitoring and reporting according to AMS-III.D “Methane recovery in agricultural and agro industrial activities”, version 13.

1.2 Scope

The validation scope is defined as an independent and objective review by a Designated Operational Entity (DOE) of the specific CDM -SSC-CPA-DD to be included in the PoA. The DOE shall scrutinize the information in the CDM-CPA-DD to assess compliance with the eligibility criteria and criteria for demonstrating additionality established by the PoA, to check correctly application of AMS-III.D (Version 13) and to check compliance with documentation requirements for CPAs.

The validation is not meant to provide any consulting towards the programme participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the project design.



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2 METHODOLOGY

The validation consisted of the following three phases:

- I a desk review of the specific CDM-SSC-CPA-DD with relevant information to be included in the PoA;
- II site visit to the Sadia headquarter and to a representative sample of swine farms to follow-up interviews with project stakeholders according to a sampling and assessment plan established by DNV /15/;
- III the resolution of outstanding issues and the issuance of the final validation report and opinion.

The following sections outline each step in more detail.

2.1 Desk Review of the Project Design Documentation

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

- /1/ Sadia Institute: CDM-SSC-PoA-DD for the PoA “Methane capture and combustion from Animal Waste Management System (AWMS) of the 3S Program farms of the Instituto Sadia de Sustentabilidade”, Version 02 of 01 October 2008.
- /2/ Sadia Institute: Generic CDM-SSC-CPA-DD for PoA titled “Methane capture and combustion from Animal Waste Management System (AWMS) of the 3S Program farms of the Instituto Sadia de Sustentabilidade”, IS Template, Version 02 of 01 October 2008
- /3/ Sadia Institute: CDM-SSC-CPA-DD for CPA titled “BRA SC - (ROMALDO BRUNO PATZLAFF - 620440S02) 3SP – AWMS/SI”, version 01 of 10 June 2010.
- /4/ Sadia Institute: Emission reduction calculation spreadsheet (Planilha-simula-credito v02) for CPA titled BRA SC - (ROMALDO BRUNO PATZLAFF - 620440S02) 3SP
- /5/ Sadia Institute: Emission reduction calculation spreadsheet (Dados CPAs total)
- /6/ Ministério da Ciência e Tecnologia (MCT): Brazilian grid emission factor <http://www.mct.gov.br/index.php/content/view/74689.html>
- /7/ CDM Executive Board: Validation and Verification Manual. Version 01.1
- /8/ Brazilian Meteorological Institute. www.inmet.gov.br
- /9/ CDM Executive Board: “Procedure for registration of a Programme of Activities as a single CDM Project Activity and issuance of certified emission reductions for Programme of activities”. Version 03
- /10/ CDM Executive Board: ” Guidelines on assessment of de-bundling for SSC project activities”, version 02
- /11/ CDM Executive Board: Appendix B of the “Simplified modalities and procedures for small-scale CDM project activities” - Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activities - AMS-III.D–“Methane recovery in agricultural and agro industrial activities” Version 13.
- /12/ 2006 IPCC Guidelines for National Greenhouse Gas Inventories–Volume 4 Chapter 10
- /13/ Operation Environment License 0269/08 , no Protocol, issued by FATMA for farm of ROMALDO BRUNO PATZLAFF (Clifor number 620440S02/3SP)
- /14/ Santa Catarina State Environment Agency Normative Instruction 11 http://www.fatma.sc.gov.br/index.php?option=com_docman&task=doc_download&gid=94&Itemid=83



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- /15/ DNV Sampling plan for CPA-DD submission of Programme of Activities -PoA
 /16/ http://guidebook.dema.mil/226/tools_links_file/stat-sample.htm

2.2 Site visit and follow-up Interviews

The PoA of “Methane capture and combustion from Animal Waste Management System (AWMS) of the 3S Program farms of the Instituto Sadia de Sustentabilidade” is currently composed by 1200 farms/CPAs.

The PoA is under management of Sadia, and all farms are operated under strictly controlled conditions, which includes the supply of sows, boars and nursing to produce finishers. Sadia also provides the food, vaccines and all procedures for managing the operation of the farms. All farms regularly report data on swine population and weight to Sadia.

Given that all farms/CPAs are operated following the same procedures and processes and Sadia centrally collects information on the swine population and weight for all their farms/CPAs and has copies of the environmental licenses of all farms/CPAs, DNV decided to not visit all farms/CPAs, but only a sample thereof. For this purpose DNV has established a sampling and assessment plan which ensures that DNV with a reasonable level of assurance is able confirm a CPA's eligibility to be included to the PoA. As part of this plan, DNV visited the Sadia Headquarter at São Paulo from 24 to 28 March 2008 and 26 to 30 April 2010 to review the relevant documentation for all farms/CPAs and performed site visits from 29 March 2010 to 14 May 2010 to sample of 25% of all swine farms/CPAs /16/

According to the sampling criteria, CPA BRA SC - (ROMALDO BRUNO PATZLAFF - 620440S02) 3SP was not visited.

The below listed persons have been interviewed during the site visit to Sadia Headquarter at São Paulo City .

| Date | Name | Organization | Topic |
|---------------------------------|---------------------|-------------------------------------|--|
| /17/ | Pauline H. Bellaver | Instituto Sadia Sustentabilidade | <ul style="list-style-type: none"> • Identification of farms • Additionality of the PoA/CPA |
| /18/ 24 to 28 March 2008 | Guilherme Delmazo | | <ul style="list-style-type: none"> • Monitoring plan |
| /19/ and 26 to 30 April 2010 | Nayana Moreira | | <ul style="list-style-type: none"> • Baseline emission estimation • Project emission estimation of PoA/CPA |
| | | | <ul style="list-style-type: none"> • Historic average swine population • Environmental License/legal compliance. |
| | | | <ul style="list-style-type: none"> • Location of farms |
| /20/ 29 March | Flavia Cunha | | <ul style="list-style-type: none"> • Baseline scenario |
| /21/ 2010 to 14 May 2010 | Sandra Mara Bazi | | <ul style="list-style-type: none"> • Implementation status |
| /22/ | Vagner Gugel | | <ul style="list-style-type: none"> • Monitoring system |

2.3 Resolution of Outstanding Issues

The objective of this phase of the validation was to resolve any outstanding issues which needed be clarified prior to DNV's positive conclusion on the CPA. In order to ensure transparency a validation protocol was customised for assessing CPAs. The protocol shows in a transparent manner the criteria (requirements), means of verification and the results from validating the identified criteria. The validation protocol serves the following purposes:



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- It organises, details and clarifies the requirements a CPA requesting inclusion is expected to meet;
- It ensures a transparent validation process where the validator will document how a particular requirement has been validated and the result of the validation.

The completed validation protocol for the CDM-SSC-CPA-DD titled BRA SC - (ROMALDO BRUNO PATZLAFF - 620440S02) 3SP is enclosed in Appendix A to this report.

A corrective action request (CAR) is raised if one of the following occurs:

- The project participants have made mistakes that will influence the ability of the project activity to achieve real, measurable additional emission reductions;
- The CDM requirements have not been met;
- There is a risk that emission reductions cannot be monitored or calculated.

A clarification request (CL) is raised if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met..

2.4 Internal Quality Control

The CPA validation report underwent a technical review before requesting inclusion of the CPA. The technical reviews were performed by a technical reviewer qualified in accordance with DNV's qualification scheme for CDM validation and verification.

2.5 Validation Team

| <i>Role/Qualification</i> | <i>Last Name</i> | <i>First Name</i> | <i>Country</i> | <i>Type of involvement</i> | | | | | |
|---------------------------------------|-------------------------|--------------------------|-----------------------|-----------------------------------|------------|-----------|---------------------|------------------|--------------|
| | | | | Desk review | Site visit | Reporting | Supervision of work | Technical review | Expert input |
| CDM validator / technical team leader | Tavares | Luis Filipe | Brazil | ✓ | ✓ | ✓ | ✓ | | ✓ |
| sector expert | | | | | | | | | |
| GHG auditor | Philipi | Fabiana | Brazil | | ✓ | | | | |
| GHG auditor | Baines | Gabriel | Brazil | | ✓ | | | | |
| Technical reviewer | Lehmann | Michael | Norway | | | | | ✓ | |



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3 VALIDATION FINDINGS

The CPA titled “BRA SC - (ROMALDO BRUNO PATZLAFF - 620440S02) 3SP”, as described in the CDM-SSC-CPA-DD of 10 June 2010, meets the requirements to be included in the PoA “Methane capture and combustion from Animal Waste Management System (AWMS) of the 3S Program farms of the Instituto Sadia de Sustentabilidade” in Brazil and correctly applies the baseline and monitoring methodology AMS-III.D, version 13.

DNV thus requests the inclusion of the CPA titled “BRA SC - (ROMALDO BRUNO PATZLAFF - 620440S02) 3SP” in the PoA “Methane capture and combustion from Animal Waste Management System (AWMS) of the 3S Program farms of the Instituto Sadia de Sustentabilidade”.

APPENDIX A

PROTOCOL FOR ASSESSING COMPLIANCE OF SPECIFIC CDM PROGRAMME ACTIVITIES WITH THE PROGRAMME OF ACTIVITIES

| CHECKLIST QUESTION | | Ref. | MoV* | COMMENTS | Draft Concl. | Final Concl. |
|--------------------------------------|---|-------------|------|--|-----------------|-----------------|
| A. General description of CPA | | | | | | |
| A.1. Project boundaries | | | | | | |
| A.1.1 | Are the CPA's spatial boundaries (geographical) clearly defined, allowing the unique identification of the CPA? | /1/ | DR | In order to have an unique identification and avoid double counting, Sadia Institute designates each CPA of the PoA with Sadia's CLIFOR number, which is linked with geographic coordinates -27.148 (latitude) and -52.156 (longitude), CLIFOR number 620440S02/3SP. | | OK |
| A.1.2 | Has it been demonstrated that the CPA is within the PoA? | /1/ /15/ | DR | The CPA titled "BRA SC - (ROMALDO BRUNO PATZLAFF - 620440S02) 3SP" requesting inclusion in the PoA "Methane capture and combustion from Animal Waste Management System (AWMS) of the 3S Program farms of the Instituto Sadia de Sustentabilidade" is located in the Santa Catarina State, Brazil and consists of the implementation of biodigesters in aggregated market farm for 640 Market swine. The farm had used anaerobic lagoons for treating manure as verified by reviewing the environmental licence of the farm/CPA in question and as verified during the site visit of a sample of farms/CPAs according the sampling and assessment plan /15/. The environmental licence establishes the permission to treat the swine effluent in an open lagoon (esterqueira). The renewed environment licence was updated with the | | OK |

| CHECKLIST QUESTION | Ref. | MoV* | COMMENTS | Draft Concl. | Final Concl. |
|---|------|------|--|-----------------|-----------------|
| | | | inclusion of biodigester and flaring facilities. The installation of biodigesters aims to treat the manure under controlled conditions as well as capture and burn the methane generated by the decay of swine manure from the swine farm. The facility drains the overflow, with lower organic matter content, to the existent open lagoon, which stores the effluents. Effluents are normally used for crop irrigation. | | |
| A.2. Duration of the CDM programme activity, Crediting Period | | | | | |
| A.2.1 Are the CPA's starting date and operational lifetime clearly defined and evidenced? | /1/ | DR | The starting date of the CPA BRA SC - (ROMALDO BRUNO PATZLAFF - 620440S02) 3SP is the date of the purchase of the flare, i.e. 14/12/2007. This starting date was assessed through checking of purchase receipts. The project start date is after 22 February 2008 and thus the date the PoA-DD of the PoA was published and the validation of the PoA commenced. The expected operational lifetime of this CPA is minimum of 21 years | | OK |
| A.2.2 Has the crediting period been clearly defined and is the start of the crediting period deemed to be reasonable? | /1/ | DR | The starting date of the crediting period is the date of inclusion of the mentioned CPA: 20 August 2010. | | OK |
| A.2.3 Has it been confirmed that the length of the CPA crediting period does not exceed the end of PoA? | /1/ | DR | The crediting period of the CPA does not exceed the total crediting period of the PoA. | | OK |
| A.3. Entity responsible for the CPA | | | | | |

| CHECKLIST QUESTION | | Ref. | MoV* | COMMENTS | Draft Concl. | Final Concl. |
|--|---|------|------|--|-----------------|-----------------|
| A.3.1 | Is the entity responsible for the CPA identified and a project participant of the PoA? | /1/ | DR | Section A.3 of the CPA-DD lists the project participant, as the entity that is responsible for the implementation of the CPA. This entity is a project participant of the PoA. | | OK |
| B. Eligibility of CPA and Estimation of Emission Reductions | | | | | | |
| B.1. Eligibility criteria for CDM Programme Activities <i>It is assessed whether the CPA complies with the criteria for inclusion in the registered programme of activities.</i> | | | | | | |
| B.1.1 | Has it been sufficiently justified that the CPA complies with the PoA eligibility criteria "Swine farms with livestock populations managed under confined conditions" | /1/ | DR | This criterion applies to all CPAs, since all farms under the 3S Program of Sadia Institute apply the Sadia swine production procedures which entail management of swine livestock under confined conditions. | | OK |
| B.1.2 | Has it been sufficiently justified that the CPA complies with the PoA eligibility criteria "Swine farms where manure is not discharged into natural water resources (e.g. rivers or estuaries)" | /1/ | DR | This criterion applies to all CPA, considering that all farms are under the 3S Program of Sadia Institute and all apply the Sadia swine production procedures. Sadia complies with all legal requirements, including the environment regulation which establishes the prohibition to drain the swine effluent to river, lake or other water streams. Hence, there was no discharge into natural water resources. | | OK |
| B.1.3 | Has it been sufficiently justified that the CPA complies with the PoA eligibility criteria "the depth of the lagoons used for manure management in the baseline scenario is at least 1m" | /1/ | DR | This criterion applies to all CPA, considering that all farms are under the 3S Program of Sadia Institute and all apply the Sadia swine production procedures and the environmental regulation to use the open lagoons to treat the | | OK |

| CHECKLIST QUESTION | | Ref. | MoV* | COMMENTS | Draft Concl. | Final Concl. |
|--------------------|--|------------|------|--|-----------------|-----------------|
| | | | | swine effluent. In addition, the farm owners do typically not want use excessive area to implement new lagoons, and they have thus the objective to improve the effectiveness of anaerobic treatment instead of implementing new lagoons. Due to this, the lagoons have more than one meter depth as verified through reviewing design drawings of lagoons at the Sadia headquarters and by checking the lagoon depths during the site visit at a sample of farms/CPAs. | | |
| B.1.4 | Has it been sufficiently justified that the CPA complies with the PoA eligibility criteria “the annual average temperature on the site is higher than 5°C” | /1/ /8/ | DR | This criterion applies to all CPAs, considering that all farms are located in an area of temperate or tropical climate. DNV was able verify this by reviewing information with meteorological information for Brazil and the states where the farms are located /8/. | | OK |
| B.1.5 | Has it been sufficiently justified that the CPA complies with the PoA eligibility criteria “the AWMS process in the project case ensures that no leakage of manure waste into ground water takes place, all the lagoons have a non-permeable layer at the lagoon bottom” | /1/ | DR | This criterion applies to all CPA, considering that all farms are under the 3S Program of Sadia Institute and all apply the Sadia swine production procedures. The design of biodigester ensures the implementation of the bottom layer and top layer, as a condition “ <i>sine qua non</i> ” to well operation and effective swine effluent treatment. | | OK |
| B.1.6 | Has it been sufficiently justified that the CPA complies with the PoA eligibility criteria “the mineralized sludge is handled aerobically, and the final application is made in the open-air lagoon in | /1/ | DR | This criterion applies to all CPA, considering that all farms are under the 3S Program of Sadia Institute and all apply the Sadia swine production procedures. In addition according | | OK |

| CHECKLIST QUESTION | | Ref. | MoV* | COMMENTS | Draft Concl. | Final Concl. |
|--|--|------|------|---|-----------------|-----------------|
| the proper conditions” | | | | environment regulation, the farms has the permission only to host 640 Market swine due to the irrigation limit around 50m ³ /ha/year according environment regulation Normative Instruction 11 of FATMA - Fundação de Meio Ambiente de Santa Catarina (Santa Catarina State Environment Agency) | | |
| B.1.7 | Has it been sufficiently justified that the CPA complies with the PoA eligibility criteria “technical measures are used (e.g. flared, combusted) to ensure that all biogas produced by the digester is used or flared” | /1/ | DR | This criterion applies to all CPAs, considering that all farms are under the 3S Program of Sadia Institute and all apply the Sadia swine production procedures and apply the same bio digester design. The measurement and flaring facilities are installed around 4 meters distance from the bio digester and the flow meter is a thermal mass type, with low counter pressure. Hence, no biogas leakage is expected to occur. | | OK |
| B.2. Additionality <i>It is assessed whether the CPA complies with the eligibility criteria for demonstrating additionality of a CPA under the registered programme of activities.</i> | | | | | | |
| B.2.1 | Has it been sufficiently justified that the CPA complies with the criteria that the farmers has signed a contract with the 3S Programme which determines the technology? | /1/ | DR | According to the contract of CPA BRA SC - (ROMALDO BRUNO PATZLAFF - 620440S02) 3SP signed between Sadia and ROMALDO BRUNO PATZLAFF, the integrated farms receive from Sadia pigs to gestation, pigs to grow, swine food and all recommendation of animal sanity, vaccines, visits from veterinary professionals and other | | OK |

| CHECKLIST QUESTION | | Ref. | MoV* | COMMENTS | Draft Concl. | Final Concl. |
|--------------------|---|------|------|--|-----------------|-----------------|
| | | | | kinds of assistance. The contract of 3S Programme is based on evidence that the farm has a valid environmental license (0269/08 issued on 16/05/2008 valid until 16/05/2012) which assures the condition that the farmer uses the Sadia biodigester and respective equipment. This was also checked when assessing the flare implementation by reviewing the purchase receipt, | | |
| B.2.2 | Has it been sufficiently justified that the CPA complies with the criteria that the baseline scenario is the same for all farms, so the investment in equipment will differ only according to the size of each farm | /1/ | DR | The swine farm CPA BRA SC - (ROMALDO BRUNO PATZLAFF - 620440S02) 3SP was implemented for a population of 640 Market swine - with open lagoon according the state environment regulation and considered as baseline. The project had included the biodigester and complementary equipment proportional the swine population. | | OK |
| B.2.3 | Has it been sufficiently justified that the CPA complies with the criteria that same technology of biodigester and enclosed flare system is used? | /1/ | DR | The 3S Programme has the same design for biodigester and measure and flaring facilities. | | OK |
| B.2.4 | Has it been sufficiently justified that the CPA complies with the criteria that legislation applicable to the CPA is in conformance with the Brazilian Legislation and there is no additional legislation involved? | /1/ | DR | DNV verified that the farm has a valid environmental license 0269/08 , no Protocol,(Section C2 of CPA) | | OK |
| B.2.5 | Has it been sufficiently justified that the CPA complies with the criteria that an economic comparison between the baseline scenario and the | /1/ | DR | A NPV analysis for 10 years results in a negative NPV of US\$ -26,171.45 considering the investment for the biodigester, biogas | | OK |

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|--|--|------|------|--|-----------------|-----------------|
| proposed project activity, including or not the electric generation or the heat generation, demonstrates that by implementing the project activity by an economic point of view it is not feasible to implement the system without the generation of the CERs? | | | | capture equipment and flare equipment of US\$ 19,929.30 and operational, maintenance and monitoring cost of US\$ 1,250.00/year. There is no revenue because the biogas is flared and not used or sold (Section B3 of CPA). However, if the farmer chooses to invest to use the biogas to generate electricity the NPV reach US\$ -65,745.73 . As the farm has only Market swine and therefore there would not be heat use, the NPV analysis for heating was not considered. | | |
| B.2.6 | Has it been sufficiently justified that the CPA complies with the criteria that the technology of production and the genetics of the Sadia Company are similar to the pattern found in the Western Europe and the same values for Bo e VS apply? | /1/ | DR | As verified during the site visit at the Sadia Headquarter, the swine population of BRA SC - (ROMALDO BRUNO PATZLAFF - 620440S02) 3SP has the same genetic (low fat, maximum meat) from the species “Large White”, “Landrace” and “Duroc” and it is appropriate that the variables B ₀ and VS consider swine of European genetics. The swine population is followed and controlled through the Sadia Control System SAP. The swine population, the weight of each age class, the genetic and the parents of each swine are recorded in order to achieve the maximum productivity, the maximum rate of food conversion, and the maximum birth rate. | | OK |
| B.3. Calculation of GHG Emission Reductions – Project emissions <i>It is assessed whether the project emissions are stated according</i> | | | | | | |

| CHECKLIST QUESTION | | Ref. | MoV* | COMMENTS | Draft Concl. | Final Concl. |
|--|--|------------|------|--|-----------------|-----------------|
| <i>to the methodology and the PoA-DD and whether the argumentation for the choice of default factors and values - where applicable – is justified.</i> | | | | | | |
| B.3.1 | Is the calculation of project emissions of the CPA in accordance with the procedure described in the PoA-DD? | /1/ | DR | <p>The project emission was considered as the electricity consumption from the biogas capture and measurement system, which capacity of 0.000056 MWh per hour by 24 hours a day and by 365 days per year more 20% of TDL.</p> <p>The project emission is calculated by the total electricity consumption multiplied by the grid factor determined by the DNA of Brazil for the year 2008 (0.3119 t CO₂e/MWh) calculated according the “<i>Tool to calculate the emission factor for an electricity system</i>”, resulting in 0,18 tons CO₂e./year.</p> | | OK |
| B.3.2 | Are CPA-specific conservative assumptions used when calculating the project emissions? | /1/ | DR | See B.3.1 | | OK |
| B.3.3 | Are CPA-specific uncertainties in the project emission estimates properly addressed? | /1/ | DR | See B.3.1 | | OK |
| B.4. Calculation of GHG Emission Reductions – Baseline emissions <i>It is assessed whether the baseline emissions are stated according to the methodology and the PoA-DD and whether the argumentation for the choice of default factors and values – where applicable – is justified.</i> | | | | | | |
| B.4.1 | Is the calculation of baseline emissions of the CPA in accordance with the procedure described | /1/ /4/ | DR | Baseline emissions estimations are documented in the spreadsheet “Planilha- | | OK |

| CHECKLIST QUESTION | Ref. | MoV* | COMMENTS | Draft Concl. | Final Concl. |
|--|------------|------|---|-----------------|-----------------|
| in the PoA-DD? | | | <p>simula-credito" version 02 /4/ according to the PoA-DD. The emission reductions are calculated considering the IPCC2006 Tier 2 and in accordance with AMS-III.D (Version 13), and was calculated ex-ante for the CPA considering the European genetics and following parameters:</p> <ul style="list-style-type: none"> -B₀ (0,45 m³CH₄/kg VS) -VS (0,30 for market swine and 0,46 for breed swine) consider swine of European genetics used by Sadia. -MCF as 77% (18°C RS/SC; 19°C PR) 78% (20°C SP; 21°C MG/) and 79% (22°C GO; 26°C MT). | | |
| B.4.2 Are CPA-specific conservative assumptions used when calculating the baseline emissions? | /1/ /4/ | DR | <p>Baseline emission estimations are documented in the spreadsheet "Planilha-simula-credito" version 02 /4/. The emission reductions are calculated considering the IPCC2006 Tier 2.</p> <p>The emission reduction will be compared with the yearly measured methane generation and the lower value will be applied for determining the baseline emissions..</p> | | OK |
| B.4.3 Are CPA-specific uncertainties in the baseline emission estimates properly addressed? | /1/ | DR | See B.3.1 | | OK |
| B.5. Calculation of GHG Emission Reductions – Leakage <i>It is assessed whether leakage emissions are stated according to the methodology and the PoA-DD and whether the</i> | | | | | |

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| <i>argumentation for the choice of default factors and values – where applicable – is justified.</i> | | | | | | |
| B.5.1 | Is the calculation of leakage emissions of the CPA in accordance with the procedure described in the PoA-DD? | /1/ | DR | No sources of leakage emission were identified according to AMS-III.D (Version 13). | | OK |
| B.5.2 | Are CPA-specific conservative assumptions used when calculating the leakage emissions? | /1/ | DR | See B.5.1 | | OK |
| B.5.3 | Are CPA-specific uncertainties in the leakage emission estimates properly addressed? | /1/ | DR | See B.5.1 | | OK |
| B.6. Emission Reductions <i>The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.</i> | | | | | | |
| B.6.1 | Has it been demonstrated that the total emission reductions of the CPA of activities will be real, measurable and give long-term benefits related to the mitigation of climate change? | /1/ | DR | CPA ER estimate: 3,760 tCO ₂ e over 7 years | | OK |
| B.7. Monitoring Methodology <i>It is assessed whether the CPA applies an appropriate monitoring methodology.</i> | | | | | | |
| B.7.1 | Is the monitoring plan for the CPA documented according to the approved methodology, in accordance with the programme of activities and in a complete and transparent manner? | /1/ | DR | The CPA apply the approved monitoring methodology AMS-III.D “Methane recovery in agricultural and agro industrial activities” (Version 13) and the monitoring consists of direct measurement of the amount of methane captured and flared or utilised for electricity generation. | | OK |
| B.8. Data and Parameters Available at Validation <i>It is established whether appropriate values were selected for parameters determined ex-ante.</i> | | | | | | |

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| B.8.1 | Does the applied methodology allow determining the selected values ex-ante? | /1/ | DR | See B.2.6 | | OK |
| B.9. Ex-Post Monitoring <i>It is established whether the monitoring plan provides for reliable and complete emission data over time.</i> | | | | | | |
| B.9.1 | Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas emissions within the CPA boundary during the crediting period? | /1/ | DR | <p>The emission reduction calculations are documented in accordance with AMS-III.D (Version 13), and was calculated for CPA considering the following parameters:</p> <ul style="list-style-type: none"> • The flow of biogas captured will be continuously monitored through thermal mass flow meters and the volume is expressed as the volume at 20°C and 1 023 mbar. • The content of methane in biogas will be measured periodically through methane analyser at a 95% confidence level. • The flare efficiency will be monitored according to the procedures outlined in the “<i>Tool to determine project emissions from flaring gases containing methane</i>”, considering the temperature and flow rate of the flare, in order to assure the default value of 90% efficiency, and will be recorded in a data log and handled through portable computer. | | OK |
| B.9.2 | Is the measurement accuracy addressed and | /1/ | DR | See B.9.4 | | OK |

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| | deemed appropriate? Are procedures in place on how to deal with erroneous measurements? | | | | | |
| B.9.3 | Is the measurement <i>interval</i> identified and deemed appropriate? | /1/ | DR | See B.9.4 | | OK |
| B.9.4 | Is the <i>registration, monitoring, measurement and reporting</i> procedure defined? | /1/ | DR | All measurements will be stored on memory of PLC and extracted/handled by portable computer/drive. | | OK |
| B.9.5 | Are procedures identified for <i>maintenance</i> of monitoring equipment and installations? Are the calibration intervals being observed? | /1/ | DR | See B.9.4 | | OK |
| B.10. CPA Management Planning <i>It is checked that programme implementation is properly prepared for and that critical arrangements are addressed.</i> | | | | | | |
| B.10.1 | Is the authority and responsibility of overall CPA management clearly described? | /1/ | DR | Responsibilities and authorities for project management, monitoring and reporting activities, measurement, training and reporting techniques and QA/QC procedures are defined in PoA. In addition was verified that Sadia have enough resources and skills to assure adequate operation and monitoring of bio digesters and the biogas capture and flaring system. | | OK |

Resolution of Corrective Action and Clarification Requests

| Corrective action or clarification request | Summary of project owner response | Validation team conclusion |
|---|--|-----------------------------------|
| <i>No corrective action or clarification requests were raised</i> | | |

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