POA VALIDATION REPORT

"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

REVISION NO. 01B

DET NORSKE VERITAS

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POA VALIDATION REPORT

DET NORSKE VERITAS
CERTIFICATION AS

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Client: Instituto Sadia de Sustentabilidade	Client ref.: Adriano Lima Ferreira

Title of PoA: "Methane capture and combustion from Animal Waste Management System (AWMS) of the 3S Program farms of the "Instituto Sadia de Sustentabilidade"
Host Country: Brazil
Methodology: AMS-III.D **Version:**13
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 submission for registration
☐ Rejected

In summary, it is DNV's opinion that the programme of activities "Methane capture and combustion from Animal Waste Management System (AWMS) of the 3S Program farms of the "Instituto Sadia de Sustentabilidade" in Brazil, as described in the PoA-DD/CPA-DD of 01 October 2008 meets all relevant UNFCCC requirements for the CDM and all relevant host Party criteria and correctly applies the baseline and monitoring methodology AMS-III.D, version 13. DNV thus requests the registration of the project as a CDM programme of activities.

The only changes made to this version of the validation report compared to the validation report rev. 01 dated 16 October 2008 referred to in the letter of approval of the DNA of Brazil are linked to the status of issuance of the letter of approval by the DNAs of Brazil and the United Kingdom and the replacement of the first CPA that is submitted together with the request for registration of the PoA.

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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

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Key words:

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Abbreviations

B_0	m^3CH_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_2e	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 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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POA VALIDATION REPORT

1 EXECUTIVE SUMMARY – VALIDATION OPINION

Det Norske Veritas Certification AS (DNV) has performed a validation of the programme of activity (PoA) titled "Methane capture and combustion from Animal Waste Management System (AWMS) of the 3S Program farms of the "Instituto Sadia de Sustentabilidade" in Brazil and the PoA specific CDM-SSC-CPA-DD with generic information relevant to all CDM programme activities (CPAs) to be included in this PoA.

The validation was performed on the basis of UNFCCC criteria for programme of activities under the Clean Development Mechanism (CDM) and host Party criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The review of the project design documentation and the subsequent follow-up interviews have provided DNV with sufficient evidence to determine the fulfilment of stated criteria.

The host Party is Brazil and the Annex I Party is the United Kingdom. Both Parties fulfil the participation requirements and have provided written approval of voluntary participation in the PoA. The DNA of Brazil has confirmed that the PoA will assist Brazil in achieving sustainable development.

The project activities to be included into the PoA will apply AMS-III.D "Methane recovery in agricultural and agro industrial activities", version 13.

By burning biogas instead of passively venting it; the project results in reductions of CH_4/CO_2 emissions that are real, measurable and give long-term benefits to the mitigation of climate change. It is demonstrated that the PoA as a whole is not a likely baseline scenario. Emission reductions attributable to a project included to the PoA are hence expected to be additional to any that would occur in the absence of the project activity given that a PoA meets the requirements for demonstrating additionality established in the CDM-SSC-PoA-DD.

Adequate training and monitoring procedures have been described.

In summary, it is DNV's opinion that the PoA titled "Methane capture and combustion from Animal Waste Management System (AWMS) of the 3S Program farms of the "Instituto Sadia de Sustentabilidade" in Brazil, as described in the CDM-SSC-PoA-DD of 01 October 2008, meets all relevant UNFCCC requirements for a PoA under the CDM and all relevant host Party criteria and correctly applies the baseline and monitoring methodology AMS-III.D, version 13. DNV thus requests the registration of the PoA titled "Methane capture and combustion from Animal Waste Management System (AWMS) of the 3S Program farms of the "Instituto Sadia de Sustentabilidade" as a PoA under the CDM.

2 INTRODUCTION

Instituto Sadia de Sustentabilidade had commissioned Det Norske Veritas Certification AS (DNV) to perform a validation of the proposed CDM Programme of Activities (PoA) with the title "Methane capture and combustion from Animal Waste Management System (AWMS) of the 3S Program farms of the "Instituto Sadia de Sustentabilidade", located in the Rio Grande do Sul (RS), Santa Catarina (SC), Paraná (PR), Minas Gerais (MG) and Mato Grosso (MT) States, Brazil (hereafter called "the PoA"). This report summarises the findings of the validation of the PoA and the PoA specific small-scale CDM programme of activities Design Document (CDM-SSC-CPA-DD) with generic information relevant to all CDM Program Activities (CPAs) to be included in this PoA. The validation was performed on the basis of UNFCCC criteria for the PoAs under the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures, the simplified modalities and procedures for small-scale CDM project activities, the procedures for registration of a programme of activities and the subsequent decisions by the CDM Executive Board.

The only changes made to this version of the validation report compared to the validation report rev. 01 dated 16 October 2008 referred to in the letter of approval of the DNA of Brazil are linked to the status of issuance of the letter of approval by the DNAs of Brazil and the United Kingdom and the replacement of the first CPA that is submitted together with the request for registration of the PoA.

2.1 Objective

The purpose of a validation is to have an independent third party assess the small scale PoA design document (CDM-SSC-PoA-DD) and the PoA specific CDM-SSC-CPA-DD with generic information relevant to all CPAs to be included in this PoA. In particular, the eligibility criteria for inclusion and demonstration of additionality of CPAs, the programme's baseline determination, monitoring plan, and the programme's compliance with relevant UNFCCC and host Party criteria are validated in order to confirm that the programme design, as documented, is sound and reasonable and meets the identified criteria. Validation is a requirement for all CDM PoAs and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of certified emission reductions (CERs).

2.2 Scope

The validation scope is defined as an independent and objective review of the CDM-SSC-PoA-DD and the PoA specific CDM -SSC-CPA-DD with generic information relevant to all CPAs to be included in this PoA. The CDM-SSC-PoA-DD and CDM-SSC-CPA-DD were reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords, the simplified modalities and procedures for small-scale CDM project activities, the procedures for procedures for registration of a programme of activities as a single CDM project activity and the relevant decisions by the CDM Executive Board, including the approved baseline and monitoring methodology AMS-III.D (Version 13).

The validation of the programme has also considered the completed CDM-SSC-CPA-DD for the CPA with the title "BRA/SC – 678228 S02 / 3SP" submitted together with the CDM-SSC-CPA-DD. Since the CPA "BRA/SC – 678228 S02 / 3SP" started prior to the registration of the PoA and is thus no eligible under the PoA according to the current definition of the start date of CPAs in the glossary of CDM terms, the CPA "BRA/SC – 678228 S02 / 3SP" was replaced with the CPA"BRA/SC – 8150354S01/ 3SP".

The validation team has, based on the recommendations in the Validation and Verification Manual /10/ employed a risk-based approach, focusing on the identification of significant risks for programme implementation and the generation of CERs.

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.

3 METHODOLOGY

The validation consisted of the following three phases:

I a desk review of the CDM-SSC-PoA-DD and PoA specific CDM-SSC-CPA-DD with generic information relevant to all CPAs to be included in this PoA;

II follow-up interviews with project stakeholder's

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.

3.1 Desk Review of the Project Design Documentation

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

/1/ Instituto Sadia de Sustentabilidade: CDM-SSC-PoA-DD for the PoA titled "Methane capture and combustion from Animal Waste Management System (AWMS) of the 3S Program farms of the "Instituto Sadia de Sustentabilidade", Version 01 of 20 Feb 2008 and version 02 of 01 October 2008.

/2/ Instituto Sadia de Sustentabilidade: 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 01 of 20 Feb 2008 and version 02 of 01 October 2008.

/3/ Instituto Sadia de Sustentabilidade: CDM-SSC-CPA-DD for CPA titled "BRA/SC – 678228 S02 / 3SP", Version 01 of 20 Feb 2008, version 02 of 01 October 2008.

/4/ Instituto Sadia de Sustentabilidade: CDM-SSC-CPA-DD for CPA titled "BRA/SC – 8150354S01/ 3SP", version 02 of 01 October 2008.

/5/ Emission reduction calculation: spreadsheets Planilha-simula-credito v02 for CPA titled BRA/SC – 678228 S02 / 3SP IS 678228S02 and CPA titled BRA/SC – 8150354S01/ 3SP

/6/ Emission reduction calculation: spreadsheets Dados CPAs total

/7/ Brazilian grid emission factor http://www.mct.gov.br/index.php/content/view/74691.html

/8/ Brazilian Water Environment Legislation

http://www.mma.gov.br/port/conama/res/res05/res35705.pdf

/9/ Common practice foreseen by environment state agency for license issuance. http://www.fatma.sc.gov.br/download/IN_0312/htm/In_11(Suinocultura).htm

/10/ CDM Executive Board: Validation and Verification Manual. Version 01

/11/ *Brazilian Meteorological Institute. http://www.inmet.gov.br*

/12/ 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" V02

/13/ CDM Executive Board: "Guidance for determining the occurrence of de-bundling under a Programme of Activities (PoA)" EB33 Annex 21

/14/ 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.

/15/ CDM Executive Board: Attachment A to the 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. Version 06 of 30 September 2005.

/16/ 2006 IPCC Guidelines for National Greenhouse Gas Inventories–Volume 4 Chapter 10

/17/ Calibration Certificate EN10204-2.1 for T-Trend ATT12 Thermal Mass Flow Meters 9700103 to 9700353(412A) issued on 24.07.2007 by Endress+Hauser http://www.br.endress.com/

/18/ Operation Environment License 441/2008 issued by FATMA for farm of Aldelar Dal Mago (Clifor # IS 8150354S01)

/19/ Letters from "Instituto Sadia de Sustentabilidade" for comments and meeting invitation issued to City Halls and Municipality Assemblies, District Attorneys, the environmental states and local agencies, the Brazilian forum of NGOs and local communities associations and others.

/20/ Meeting records of "Instituto Sadia de Sustentabilidade" presentation for locals stakeholders on several municipalities where the PoA has participating farms.

/21/ Thermal Mass Flow Measuring System http://www.products4engineers.nl/resources/upload/a20071226242223.PDF

/22/ Brazilian Swine Producers Association http://www.abcs.org.br/portal//mun_sui/producao/genetica/principais.jsp

/23/ Comissão Interministerial de Mudança Global do Clima (DNA of Brazil): *Letter of Approval*. 11 November 2008.

/24/ Department for Environment, Food and Rural Affairs (DNA of United Kingdom): *Written Approval of Voluntary Participation of UK DNA*. 13 November 2007

3.2 Follow-up Interviews with Project Stakeholders

The below listed persons have been interviewed and/or provided additional information to the presented documentation.

Date	Name	Organization	Topic

/25/	24-04-08	Pauline H. Bellaver	Instituto Sadia Sustentabilidade	• Identification of farms • Additionality of the PoA/CPA • Monitoring plan • Baseline emission estimation • Project emission estimation of PoA/CPA • Historic average swine population • Environmental Licenses/legal compliance • Stakeholders consultation process
/26/		Guilherme Delmazo		
/27/		Nayana Moreira		

3.3 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 PoA. In order to ensure transparency a validation protocol was customised for the programme. 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:

- It organises, details and clarifies the requirements a CDM PoA 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 validation protocol consists of three tables. The different columns in these tables are described in the figure below. The completed validation protocol for the PoA “Methane capture and combustion from Animal Waste Management System (AWMS) of the 3S Program farms of the “Instituto Sadia de Sustentabilidade” is enclosed in Appendix A to this report.

Findings established during the validation can either be seen as a non-fulfilment of CDM criteria or where a risk to the fulfilment of project objectives is identified. Corrective action requests (CAR) are issued, where:

i) mistakes have been made with a direct influence on project results;
ii) CDM and/or methodology specific requirements have not been met; or
iii) there is a risk that the project would not be accepted as a CDM project or that emission reductions will not be certified.

A request for clarification (CL) may be used where additional information is needed to fully clarify an issue.

Validation Protocol Table 1: Mandatory Requirements for CDM Programme of Activities		
Requirement	***Reference***	***Conclusion***
The requirements the project must meet.	*Gives reference to the legislation or agreement where the requirement is found.*	This is either acceptable based on evidence provided (**OK**), a **Corrective Action Request (CAR)** of risk or non-compliance with stated requirements or a request for **Clarification (CL)** where further clarifications are needed.

Validation Protocol Table 2: Requirement checklist				
Checklist Question	***Reference***	***Means of verification (MoV)***	***Comment***	***Draft and/or Final Conclusion***
The various requirements in Table 2 are linked to checklist questions the project should meet. The checklist is organised in different sections, following the logic of the small-scale PoA-DD/ CPA-DD template, version 01. Each section is then further sub-divided.	*Gives reference to documents where the answer to the checklist question or item is found.*	*Explains how conformance with the checklist question is investigated. Examples of means of verification are document review (DR) or interview (I). N/A means not applicable.*	*The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is further used to explain the conclusions reached.*	*This is either acceptable based on evidence provided (**OK**), or a c**orrective action request (CAR)** due to non-compliance with the checklist question (See below). A request for clarification (CL) is used when the validation team has identified a need for further clarification.*

Validation Protocol Table 3: Resolution of Corrective Action and Clarification Requests			
Draft report clarifications and corrective action requests	***Ref. to checklist question in table 2***	***Summary of project owner response***	***Validation conclusion***
If the conclusions from the draft Validation are either a CAR or a CL, these should be listed in this section.	*Reference to the checklist question number in Table 2 where the CAR or CL is explained.*	*The responses given by the project participants during the communications with the validation team should be summarised in this section.*	*This section should summarise the validation team's responses and final conclusions. The conclusions should also be included in Table 2, under "Final Conclusion".*

Figure 1: Validation protocol tables

3.4 Internal Quality Control

The validation report including the initial validation findings underwent a technical review before being submitted to the project participants. The final validation report underwent another technical review before requesting registration of the project activity. The technical reviews were performed by a technical reviewer qualified in accordance with DNV's qualification scheme for CDM validation and verification.

3.5 Validation Team

				Type of involvement					
Role/Qualification	***Last Name***	***First Name***	***Country***	Desk review	Site visit	Reporting	Supervision of work	Technical review	Expert input
CDM validator / technical team leader sector expert	Tavares	Luis Filipe	Brazil	✓	✓	✓	✓		✓
Technical reviewer	Lehmann	Michael	Norway					✓	

4 VALIDATION FINDINGS

The findings of the validation are stated in the following sections. The validation criteria (requirements), the means of verification and the results from validating the identified criteria are documented in more detail in the validation protocol in Appendix A.
The final validation findings relate to the programme design as documented and described in the PoA design documentation dated 01 October 2008.

4.1 Participation Requirements

The PoA participants are Instituto Sadia de Sustentabilidade of Brazil, which is designated as coordinating/managing entity, and the European Carbon Fund of France but seeking authorization to participate in the PoA by the DNA of the United Kingdom. All Parties involved, i.e., Brazil and the United Kingdom, meet the requirements to participate in the CDM, and have provided written approval of voluntary participation in the project /23//24/.

No public funding is involved, and the validation did not reveal any information that indicates that the project can be seen as a diversion of ODA funding towards Brazil.

4.2 Programme Design

The "Methane capture and combustion from Animal Waste Management System (AWMS) of the 3S Program farms of the "Instituto Sadia de Sustentabilidade" PoA consists of the implementation of biodigesters in aggregated Market Farms (Swine termination) and Breeding Farms (swine reproduction) included in the 3S Sadia Programme. These original farms are constituted by barns for a swine population, and complementary anaerobic lagoons.

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 Sadia swine's farms. 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.

Biogas will primarily be flared, but in some CPAs biogas may be utilised for electricity production (e.g. barn lighting or barn-heating systems). However, if biogas is utilised, no CERs will be claimed for potentially displacing fossil fuels or grid electricity.

The project is expected to bring environmental benefits (reduction of GHG emissions, reduced risk of ground and water bodies contamination, etc), thus contributing to sustainable development objectives of the Brazilian Government. The DNA of Brazil has confirmed that the project assists in achieving sustainable development /23/.

The PoA started with the development of the CDM project activity 0047 "GHG capture and combustion from swine manure management systems at Faxinal dos Guedes and Toledo" registered in 30 Jan 2006. The development of this project with AWMS at three of Sadia's swine farms (Faxinal dos Guedes, Toledo Luz Marina and Toledo São Sebastião) led to the establishment of the "Instituto Sadia de Sustentabilidade" and establishment of this PoA to implement the same technology at an estimated total of 1017 CPAs to be included in this PoA.

The PoA has an expected operational lifetime 28 years and each CPA will a renewable crediting period of 7 years.

4.3 Criteria for Inclusion of CDM Programme Activities

The PoA-DD established clear eligibility criteria for inclusion of each CPA under the PoA, requiring for each CPA that:

- The swine farms are with livestock population managed under confined conditions;
- The swine farms do not discharge effluent to water resources;
- The open lagoons used are more depth than 1 m;
- The annual average temperature at the each project site is higher than 5ºC;
- The open lagoons used are with non permeable layer at the bottom;
- The produced sludge is handled under aerobic conditions (the site visits carried out by DNV confirmed that the normal practise is to apply the produced sludge to the fields).
- All biogas produced will be flared or utilized for electricity generation.

4.4 Operational, Management and Verification Plan

The programme consists of the implementation of biodigesters in aggregated Market Farms (Swine termination) and Breeding Farms (swine reproduction) included on 3S Sadia Programme.

The programme considers 1070 biodigesters at 1017 farms/CPAs. In order to have a unique identification and to avoid double counting, each farm included in a CPA will receive Sadia's CLIFOR number, which is linked with geographic coordinates, and is currently used by Sadia in the system for assuring sanity conditions of the specific swine populations.

The PoA will not include any CPA as a de-bundled component of a larger project activity. The CDM project activity (0047) of Instituto Sadia de Sustentabilidade is not part of the PoA.

As verified during the site visit, and as show in the "Planilha-simula-credito" spreadsheet /5/, all swine population of Sadia has the same genetic (low fat, maximum meat) from the species "Large White", "Landrace" and "Duroc". The swine breeding procedure of Sadia has the same schedule for all finisher farms (120 days) and for all breeding farms (nursing of 20 days and boar and sow with 220 kg and gilt with 180 kg) and market farms (finishers with 82 kg), and as a consequence the weighted averages of swine population for these kind of farms are the same. In addition, the design of biodigesters is common for all farms, including the monitoring system and flaring. The system design allows the owner of the swine farms to utilise biogas for electricity or heat generation. However, even the farm owner decides to implement biogas utilization, no CERs will be claimed for potentially displacing fossil fuels or grid electricity.

According to the "Procedure for registration of PoA" /12/, the programme proposes a sampling method/procedure to be used by DOEs for verification of the amount of reductions of anthropogenic emissions. The sampling method proposed is that the sample consists of 25% of all CPAs in each verification round. Considering the uniformity of the main parameters, and the clear identification and tractability of population and biogas measurement and monitoring, and that Sadia has the "Cliffor" tracking system that avoid double -counting and assure identification of the verification status of each CPA at anytime, a sample size of 25% of all CPAs in each verification round is considered statistically sound. This sample was determined by the method of random sampling for discrete data according to the Bayesian's statistics for equal or more than 1100 CPA's with an error level of 5% and confidence level of

95% for Simple Random Sampling (for population under 10.000 elements), and DNV could deemed it appropriate.

4.5 Baseline Determination

The PoA and consequently each CPA applies the simplified baseline methodology for selected small-scale CDM project activity AMS-III.D (Version 13) – ”Methane recovery in agricultural and agro industrial activities” /14/.

The programme meets the applicability criteria of AMS-III.D (Version 13) as it is demonstrated that:

- The PoA/CPA recovers methane generated from the treatment of swine manure by installing methane recovery and combustion systems. The environment legislation of Brazil requires no discharge of swine manure effluent on water bodies. The usual practice is to use the anaerobic open lagoon (“esterqueira”) with methane emissions escaping to the atmosphere;
- The PoA/CPA involves the use of effluent and stabilized sludge on crops irrigation in farms, without any anaerobic conditions;
- The PoA/CPA involves facilities to burn (flaring) or utilise (electric generators) all biogas generated by the digester;
- The emissions reductions of each CPA are expected to be lower than 60 000 tCO_2e per year, the ceiling for category III small scale projects.

Thus, this methodology is applicable to the programme in accordance with the existing criteria.

In the absence of the PoA, the swine farms included in the PoA would continue to emit methane to the atmosphere at historical average levels, considering that in the Brazilian swine farming sector there is only a restriction to discharge the manure into the water body according to environment legislation, and the common practice is use anaerobic open lagoon.

The baseline is the emissions of methane from anaerobic decay of swine manure, calculated in accordance with the most recent IPCC tier 2 approach (IPCC 2006 Guidelines) and applying IPCC default values for the parameters B_0 and VS for European genetic and management used by Sadia.

The project boundary is defined as the methane recovery and destroying/combustion facility, in accordance with AMS-III.D (Version 13).

The system boundaries can be presented in tabular format:

	GHGs involved	*Description*
Baseline emissions	*CH_4*	*Methane produced from the swine manure decay emitted to the atmosphere*
Project emissions	*CO_2*	*Electricity consumed by the project activities*
Leakage	*None*	*None*

4.6 Additionality

4.6.1 Additionality of the Programme

The additionality of the programme could be demonstrated considering that there are no mandatory rules to collect and burn the methane produced by the decay of swine manure in Brazil. The environmental regulations establish only a restriction to discharge swine manure effluents into the water bodies. The common practice in swine farms in Brazil is used the anaerobic lagoon in order to decay the manure and subsequent use as soil fertilizer.

The investment necessary to implement a collection and combustion system for methane produced from swine manure decay is quite significant, while the possible return by generating electricity or heat, if applicable, is rather small. As the implementation costs of the project at a farm almost reaches the same costs as the costs of the implementation of one 3 000 swine warehouse, the farmers prefer to invest into increasing their production capacity which will provide them with increased revenue. This condition could be replicated for electricity generation, where the investment of a generator is almost the same of a biodigester, and the electricity saved need more than 10 years to be covered. The production of heat, saving LPG need lower investment but the return is still low and not enough to revert the focus of swine farmer to invest on swine warehouse.

In addition, the implementation of biogas collection and combustion system needs the action of voluntary coordination of Sadia Institute in order to be implemented, and the likely baseline scenario for swine farmers is to continue to discharge the swine manure into the anaerobic lagoon. The PoA is thus implementing a voluntary coordinated action not required by legislation and that would not be implemented in the absence of the PoA

4.6.2 Additionality of Typical CPA

The additionality of the typical SSC-CPA of the PoA is demonstrated by applying the Attachment A to the Appendix B of the simplified modalities and procedures for CDM small-scale project activities.

The additionality claims of a typical project are based on the following barriers:

- *Investment barrier*: A simple cost analysis will be carried out for each CPA to demonstrate that the project is less financially attractive than the baseline. There are currently no direct subsides or promotional support for the implementation of AWMS with the capture and destruction of biogas, each CPA is expected to have high costs required to install biodigesters and a flare and/or an electricity generator or a boiler for heat generation, while potential revenues from generating electricity or savings due to displacing fossil fuels in heat generation, if applicable, are rather limited. Hence, the CPAs are expected to face investment barriers compared to the usual practice of open anaerobic lagoons. For the CPA with the title “BRA/SC – 8150354S01/ 3SP”, a NPV analysis for 10 years results in a negative NPV of US$7 953 considering the investment for the biodigester, biogas capture equipment and flare equipment of US$25 503 and operational, maintenance and monitoring cost of US$1 250/year. There is no revenue because the biogas is flared and not used or sold. Considering the investment costs for installing the necessary equipment for biogas utilization also make biogas utilization for electricity or heat generation not a financially attractive option compared to operating an anaerobic lagoons despite some savings in energy costs for the farm. The figures provided

for the CPA with the title "BRA/SC – 8150354S01/ 3SP" were confirmed by DNV and are comparable with costs reported for similar swine manure biogas capture and destruction projects. Hence, the CPAs included in the PoA are likely to face investment barriers if the biogas is only flared.

- *Technological barrier*: The implementation of biodigesters instead of open anaerobic lagoons requires special expertise with respect to design of the facility, operation and maintenance of the flare and operation control (pressure, temperature, flow etc). This expertise is not commonly available to swine farm managers, thus requiring support of external technicians. Hence, the project would not be implemented without external support to overcome the technical difficulties.
- *Legal Barrier and Common Practice*: As verified on Environment Legislation /8/ and a common practice for swine manure management /9/ , the project go beyond the established legislation with the use the anaerobic lagoon to treat swine manure and biogas. Hence the project is in line with sustainability police of host country.

Given the first two barriers, it is sufficiently demonstrated that the typical CPA of the PoA is not a likely baseline scenario and that emission reductions of a typical CPA thus are additional to what would otherwise have occurred. The additionality of each CAP will be assessed with respect to the compliance of the CPA with the eligibility criteria and the demonstration that the CPA faces an investment barrier (see below).

4.6.3 Approach for Demonstrating Additionality of CPAs

Considering that the Sadia swine population has the same genetic, the design of biodigesters has the same pattern and technology and the environment legislation on states where the project is located are equivalent and based on Federal environment legislation, the criteria to demonstrate the additionality of each SSC-CPA will be restricted to:

a) Evidence that the farm has a valid environment license (Section C2 of CPA) and;

b) Economic comparison demonstrating the investment barrier (Section B3 of CPA).

4.7 Monitoring

The Programme of Activities (PoA) and each Programme Activity applies the approved monitoring methodology AMS-III.D (Version 13) "Methane recovery in agricultural and agro industrial activities", according to the 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.

According to AMS-III.D (Version 13), the monitoring consists of direct measurement of the amount of methane captured and flared or utilised for electricity generation.

Concerning leakage, no sources of emission were identified according to AMS-III.D (Version 13).

4.7.1 Methodological Choices and Equations to Be Used for Calculation of Emission Reductions of a CPA

Emission reduction calculations are transparently documented by Sadia spreadsheets /5/ /6/.

The estimated amount of GHG emission reductions from the Programme of Activities is 591,418 tCO_2e/y during the first 7 years. As requested by AMS-III.D (Version 13) the

emissions reductions will be compared with the yearly methane generation potential calculated in the CDM-CPA-DD of each CPA.

4.7.2 Parameters Determined Ex-Ante

Baseline emission estimations are documented in the spreadsheet "Planilha-simula-credito" version 03 /5/. The emission reductions are calculated considering the IPCC2006 Tier 2.

As verified during the site visit, all swine population of Sadia has the same genetic (low fat, maximum meat) from the species "Large White", "Landrace" and "Duroc" /22/ and it is appropriate that the variables B_0 and VS consider swine of European genetics.

Each CPA will use thermal flow meters which avoid the use of blowers, and the consumption of electricity by the biodigester and flaring system will be only the electricity consumption of the PLC and flow meters, as verified by DNV during the site visit of the proposed CPA with the title "BRA/SC – 678228 S02 / 3SP - Aldelar Dal Mago farm". Nonetheless, project emissions associated to the consumption of electricity will be determined considering the electricity consumed by this monitoring system multiplied by the Brazilian grid emission of 0.1842 tCO_2/MWh /7/.

4.7.3 Parameters Monitored Ex-Post

The emission reduction calculations are documented in accordance with AMS-III.D (Version 13), and will be calculated ex-post for each CPA considering the following parameters:

- The flow of biogas captured will be continuously monitored through thermal mass flow meters calibrated to 20ºC 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 **"***Tool to determine project emissions from flaring gases containing methane*", 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. As verified by DNV during the site visit of the proposed CPA with the title "BRA/SC – 678228 S02 / 3SP - Aldelar Dal Mago farm" the data log is a PLC (programmable logic controller), which open the control valve of biogas from the biodigester to flare when the internal pressure reach 12 mm H_2O, monitor the flame temperature of flare and wait 5 minutes until it reach over 500ºC, when it starts to integrate the flow/volume of biogas measured by the thermal mass flow. If the temperature does not reach 500ºC before 5 minutes, the PLC closes the valve and starts the process again. When the internal pressure is down to 8 mm H_2O (0.8 mbar) overpressure, the PLC closes the valve, in order to avoid deflate the biodigester.

  All measurements and alarms will be stored on memory of PLC and extracted/handled by portable computer/drive.

The sludge disposition will be registered in operational book and electronic spreadsheet.

The monitoring plan described in the CDM-PoA-DD will be applied for each CPA.

4.7.4 Management System and Quality Assurance for Monitoring and Reporting

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, it was verified that Sadia have enough resources and skills to assure adequate operation and monitoring of biodigesters and the biogas capture and flaring system.

4.8 Environmental Impacts

As stated in the PoA-DD, the project will reduce the environment impacts of the swine farms, like organic load of wastewater, odour and others. All farms received environment operation licenses issued by respective state environment agency. The PoA on section C.1 define that the Environmental Analysis is done at the CPA level.

4.9 Comments by Local Stakeholders

The local stakeholder consultation was carried out at the PoA level. As stated in the CDM-PoA-DD, local stakeholders, such as the City Hall and Municipal Assembly, District Attorney, the environmental state and local agencies, the Brazilian forum of NGOs and local communities associations, were invited to comment on the project, in accordance with the requirements of Resolution 1 of the Brazilian DNA. The letters sent to the local stakeholders, the comments received and how due account was taken were evidenced by DNV during the site visit.

4.10 Comments by Parties, Stakeholders and NGOs

The CDM-SSC-PoA-DD dated 01 October 2008, the specific CDM-SSC-CPA-DD with generic information relevant to all CPAs to be included in this PoA and the CDM-SSC-CPA-DD for the CPA with the title “BRA/SC – 678228 S02 / 3SP – AWMS/SI” were made publicly available on UNFCCC’s website[1] and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 22 February 2008 to 22 March 2008. No comments were received during this period.

[1] http://cdm.unfccc.int/ProgrammeOfActivities/Validation/index.html

APPENDIX A

CDM PoA VALIDATION PROTOCOL

Table 1 Mandatory Requirements for Clean Development Mechanism (CDM) Programme of Activities (PoA)

Requirement	Reference	Conclusion
About Parties		
1. The programme shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art.	Kyoto Protocol Art.12.2	Table 2, Section A.2/A4 The Annex I Party involved is the United Kingdom
2. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC.	Kyoto Protocol Art.12.2.	Table 2, Section A.2.
3. The project shall have the written approval of voluntary participation from the designated national authority of each Party involved.	Kyoto Protocol Art. 12.5a, CDM Modalities and Procedures §40a	OK
4. The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof.	Kyoto Protocol Art. 12.2, CDM Modalities and Procedures §40a	Table 2, Section A.4
5. In case public funding from Parties included in Annex I is used for the project activity, these Parties shall provide an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of these Parties.	Decision 17/CP.7, CDM Modalities and Procedures Appendix B, § 2	The validation did not reveal any information that indicates that the project can be seen as a diversion of ODA funding towards Brazil.
6. Parties participating in the CDM shall designate a national authority for the CDM.	CDM Modalities and Procedures §29	The Brazilian designated national authority for the CDM is the Comissão Interministerial de Mudança Global do Clima. The DNA of the United Kingdom is the Department for Environment, Food and Rural Affairs.
7. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol.	CDM Modalities §30/31a	Brazil has ratified the Kyoto Protocol on 23 August 2002.

Requirement	Reference	Conclusion
		The UK ratified the Kyoto Protocol on 31 May 2002.
8. The participating Annex I Party's assigned amount shall have been calculated and recorded.	CDM Modalities and Procedures §31b	The UK's assigned amount is 92% of its 1990 emissions
9. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7.	CDM Modalities and Procedures §31b	The UK has in place a national registry and reported on 15 April 2004 its national GHG inventory for the years 1990-2002.
About Design of Programme		
10. The CDM-POA-DD sets a framework for the implementation of the PoA and defines unambiguously a CPA under the PoA.	PoA Procedures § 2	The project will consider 1103 biodigesters at 1073 farms; however it is not clear on PoA the information about the number of CPAs. ~~**CL 1**~~
11. The coordinating/managing entity shall be identified.	PoA Procedures § 2 (a)	The Coordinating/managing entity is not clear about Sadia Institute or Sadia SA ~~**CL 2**~~
12. The boundary for the PoA in terms of a geographical area (e.g., municipality, region within a country, country or several countries) within which all CPAs included in the PoA will be implemented is defined.	PoA Procedures § 2 (b)	The boundary is biodigesters in aggregated Market Farms (Swine termination) and Breeding Farms (swine reproduction) included on 3S Sadia Programme located in the Rio Grande do Sul (RS), Santa Catarina (SC), Paraná (PR), Minas Gerais (MG) and Mato Grosso (MT) States, Brazil
13. Eligibility criteria are defined for inclusion of a project activity as a CPA under the PoA, which shall include criteria for demonstration of additionality, and the type and/or extent of information (e.g. criteria, indicators, variables, parameters or measurements) that shall be provided by	PoA Procedures § 2 (g)	7 criteria were established.

Requirement	Reference	Conclusion
each CPA in order to ensure its eligibility.		
14. The length of the PoA is not exceeding 28 years.	PoA Procedures § 2 (h)	The PoA has an expected operational lifetime of 28 years and the expected operational lifetime should be at least the end of PoA, however the PoA/CPA don't evidence clearly this. DNV request more information about that. ~~CL 12~~
15. The operational and management arrangements established by the coordinating/managing entity for the implementation of the PoA is described, including a description of a record keeping system for each CPA under the PoA, a system/procedure to avoid double accounting e.g. to avoid the case of including a new CPA that has been already registered either as CDM project activity or as a CPA of another PoA, the provisions to ensure that those operating the CPA are aware and have agreed that their activity is being subscribed to the PoA.	PoA Procedures § 2 (i)	The Sadia's CLIFOR system identifies all aggregated swine farms into the 3S Sadia Programme.
16. The proposed statistically sound sampling method/procedure to be used by DOEs for verification of the amount of emission reductions achieved by CPAs under the PoA is described. In case the coordinating/managing entity opts for a verification method that does not use sampling but verifies each CPA there is a transparent system defined and described that ensures that no double accounting occurs and that the status of verification can be determined anytime for each CPA.	PoA Procedures § 2 (k)	Not established yet. ~~CL 8~~
About small-scale programmes of activities (if applicable)		
17. The CPAs shall meet the eligibility criteria for small scale CDM project activities set out in § 6 (c) of the Marrakech Accords.	Simplified Modalities and Procedures for Small Scale CDM Project Activities §12a,c	All CPAs consist on swine farms with lower that 60 ktonCO$_2$/year of emission reduction.
About additionality		

Requirement	Reference	Conclusion
18. Additionality of the programme as a whole is demonstrated because in the absence of the CDM (i) the proposed voluntary measure would not be implemented, or (ii) the mandatory policy/regulation would be systematically not enforced and that non-compliance with those requirements is widespread in the country/region, or (iii) that the PoA will lead to a greater level of enforcement of the existing mandatory policy /regulation.	Kyoto Protocol Art. 12.5c, CDM Modalities and Procedures §43 PoA Procedures § 2 (e)	Table 2, Section E.3
19. Additionality of a typical CPA is demonstrated by using the procedure provided in the baseline and monitoring methodology applied.	PoA Procedures § 2 (f)	Table 2, Section E.4
About application of baseline and monitoring methodology		
20. The baseline and monitoring methodology shall be previously approved by the CDM Executive Board.	CDM Modalities and Procedures §37e	Table 2, Section E.1.1
21. A baseline shall be established on a project-specific basis, in a transparent manner and taking into account relevant national and/or sectoral policies and circumstances.	CDM Modalities and Procedures §45c,d	Table 2, Section E.1
22. The baseline methodology shall exclude to earn CERs for decreases in activity levels outside the project activity or due to force majeure.	CDM Modalities and Procedures §47	The baseline consists only on Methane recovery in agricultural and agro industrial activities.
23. The monitoring plan for a typical CPA is developed in accordance with the approved monitoring methodology, and identification of the monitoring provisions and data parameters a CPA has is to apply/monitor	PoA Procedures § 2 (j)	The monitoring is according AMS-III.D (Version 13
24. Provisions for monitoring, verification and reporting shall be in accordance with the modalities described in the Marrakech Accords and relevant decisions of the COP/MOP.	CDM Modalities and Procedures §37f	Table 2, Section E.9
About forecast emission reductions		
25. The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.	Kyoto Protocol Art. 12.5b	Table 2, Section B.4 to B.7
About environmental impacts		

Requirement	Reference	Conclusion
26. Documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts, shall be submitted, and, if those impacts are considered significant by the project participants or the Host Party, an environmental impact assessment in accordance with procedures as required by the Host Party shall be carried out.	CDM Modalities and Procedures §37c	☒ Analysis at PoA level ☒ Analysis at CPA level Each CPA will present the environment licence.
About stakeholder comments		
27. Comments by local stakeholders shall be invited, a summary of these provided and how due account was taken of any comments received.	CDM Modalities and Procedures §37b	☒ Analysis at PoA level ☐ Analysis at CPA level
28. Parties, stakeholders and UNFCCC accredited NGOs shall have been invited to comment on the validation requirements for minimum 30 days, and the project design document and comments have been made publicly available.	CDM Modalities and Procedures §40	The PoA-DD and CPA-DD of 01 October 2008 were made publicly available on DNV's climate change website (www.dnv.com/certification/climatechange) and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 22 February 2008 to 22 March 2008. No comment was received during this period.
Other		
29. The project design document shall be in conformance with the UNFCCC CDM-PDD format.	CDM Modalities and Procedures Appendix B, EB Decision	The Programme of Activities and Programme Activity design documents conforms to version 01 of the CDM-SSC-PoA-DD and CDM-SSC-CPA-DD.

Table 2 Requirements Checklist

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl
A. General Description of Programme Activity *The project design is assessed.*				**Final Concl**	
A.1. Programme Boundaries *Project/Programme Boundaries are the limits and borders defining the GHG emission reduction project.*					
A.1.1. Are the programme's spatial boundaries (geographical) clearly defined?	/1/	DR	The "Methane capture and combustion from Animal Waste Management System (AWMS) of the 3S Program farms of the "Instituto Sadia **de Sustentabilidade"** includes farms located in the Rio Grande do Sul (RS), Santa Catarina (SC), Paraná (PR), Minas Gerais (MG) and Mato Grosso (MT) States, Brazil, however the PoA don't identify the number of CPAs foreseen to be included	~~CL 1~~	OK
A.1.2. Are the programme's system boundaries (components and facilities used to mitigate GHGs) clearly defined?	/1/	DR	The programme activity's boundary is defined as the physical, geographical site of the swine farms. In accordance with AMS-III.D, the project boundary includes the methane recovery and destruction/ combustion from swine manure treatment.		OK
A.1.3. Can each CPA under the PoA be clearly identified individually including spatial boundaries (geographical) clearly defined?	/1/	DR	The CPA will be identified trough name of farmer and by the Sadias's CLIFOR number, including geographic location (latitude and longitude) to assure single counting on PoA		OK
A.2. Participation Requirements *Referring to Part A, Annex 1 and 2 of the PDD as well*					

* MoV = Means of Verification, DR= Document Review, I= Interview

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl
as the CDM glossary with respect to the terms Party, Letter of Approval, Authorization and Project Participant.					
A.2.1. Which Parties and programme participants are participating in the project?	/1/	DR	The Project participant is Instituto Sadia de Sustentabilidade of Brazil. The host Party Brazil meets all relevant participation requirements. No participating Annex I Party is yet identified.		OK
A.2.2. Has the coordinating/managing entity of the programme been identified?	/1/	DR	It is not clearly nominated.	~~CL 2~~	OK
A.2.3. Have all involved Parties provided a valid and complete letter of approval and have all private/public project participants been authorized by an involved Party?	/1/	DR	The DNA of Brazil confirmed that the project assists in achieving sustainable development.		OK
A.2.4. Do all participating Parties fulfil the participation requirements as follows: - Ratification of the Kyoto Protocol - Voluntary participation - Designated a National Authority	/1/	DR	Yes, Brazil fulfils all requirements.		OK
A.2.5. Has it been checked that if there is public funding for the programme from Parties in Annex I, this funding shall not be a diversion of official development assistance.	/1/	DR	The validation did not reveal any information that indicates that the project can be seen as a diversion of ODA funding towards Brazil.		OK
A.3. Technology to be employed *Validation of project technology focuses on the programme engineering, choice of technology and competence/ maintenance needs. The validator should ensure that environmentally safe and sound technology and know-how is*					

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl
used.					
A.3.1. Does the programme design engineering reflect current good practices?	/1/	DR	Yes. The technology reflects current good practices.		OK
A.3.2. Does the programme use state of the art technology or would the technology result in a significantly better performance than any commonly used technologies in the host country?	/1/	DR	The implementation of biodigester instead of open lagoon needs special skills with respect to design of the facility and operation and maintenance of flare and operation control (pressure, temperature, flow etc). The monitoring and supervisor will be carrying on through an electronic system (SCA/PLC/SCS Data Controller system). These skills are not common for swine farm managers and need support of external technicians.		OK
A.3.3. Does the programme make provisions for meeting training and maintenance needs?	/1/	DR	Responsibilities and authorities for management on each CPA are defined to the own farmers, the monitoring , measurement will carrying on through electronic equipments, and reporting activities by Instituto Sadia de Sustentabilidade technicians, including support of training and QA/QC procedures.		OK
A.4. Contribution to Sustainable Development *The programme's contribution to sustainable development is assessed.*					
A.4.1. Has the host country confirmed that the programme assists it in achieving sustainable development?	/1/	DR	The DNA of Brazil confirmed that the project assists in achieving sustainable development.		OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl
A.4.2. Will the programme create other environmental or social benefits than GHG emission reductions?	/1/	DR	The Programme is expected to bring environmental benefits (reduction of the GHG emissions, risk of ground and water bodies contamination, etc), thus contributing to sustainable development objectives of the Brazilian Government. However, the DNA of Brazil has not yet confirmed the PoA's contribution to sustainable development.		OK
A.5. Small scale programme activity *Is this assessed whether the project qualifies as small-scale CDM project activity*					
A.5.1. Do CPAs under the programme qualify as a small scale CDM project activity as defined in paragraph 6 (c) of decision 17/CP.7 on the modalities and procedures for the CDM?	/1/	DR	The project applies the simplified baseline methodology for selected small-scale CDM project activity AMS-III.D (Version 13) – "Methane recovery in agricultural and agro industrial activities"		OK
A.5.2. Is the small scale project activity not a de-bundled component of a larger project activity?	/1/	DR	The PoA-DD do not evidence that the Programme of Activities and any CPA are not a de-bundled component of a larger PoA or has the same coordinating or managing entity as Instituto Sadia de Sustentabilidade, and assure that are no projects in the same project whose project boundary is within 1 km of the project boundary.	~~CL 3~~	OK
A.6. Operational, management and monitoring plan for the programme					
A.6.1. Do the operational and management arrangements established by the coordinating entity include a	/1/	DR	In order to unique identification and avoid double accounting, Instituto Sadia de	~~CL 1~~	OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl
record keeping system for each CPA under the programme?			Sustentabilidade establishes designate the each CPA of PoA by the Sadia's CLIFOR number, which is linked with geographic coordinates and assure sanity conditions of specific swine populations.		
A.6.2. Do the operational and management arrangements established by the coordinating entity include a system/procedure to avoid including CPAs that have already been registered either as CDM project activity or as a CPA of another PoA?	/1/	DR	See A.6.1		OK
A.6.3. Do the operational and management arrangements established by the coordinating entity include provisions to ensure that CPA implementers are aware and have agreed that their activity is being subscribed to the PoA?	/1/	DR	The programme consists of the implementation of biodigesters in aggregated Market Farms (Swine termination) and Breeding Farms (swine reproduction) included on 3S Sadia Programme.		OK
A.6.4. Does the monitoring plan include a description of a proposed statistically sound sampling method and procedure to be used by designated operational entities for verification of GHG emission reductions by CPAs under the programme? OR If the programme does not use verification method that applies a statistical method for sampling, has a system been defined to avoid double counting of CERs, and is the system transparent?	/1/	DR	Although the PoA identify the way to avoid double accounting of each CPA, it is not defined which verification sampling method will be used by the DOE as established on "Procedures for Registration of a Programme of Activities.	~~CL 8~~	OK
B. Duration of the Programme of Activities, Crediting Period					

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl
B.1.1. Is the programme starting date and length of the programme clearly defined and evidenced?	/1/	DR	The PoA starting date will be on 08 August 2008. The PoA apply as starting date of programme the implementation of registered CDM Project: "*GHG capture and combustion from swine manure management systems at Faxinal dos Guedes and Toledo*" (0047), however the PoA consider the starting date of the programme, which should be considered as the earliest of implementation, construction and real action and proof of consideration of PoA before the decision to go ahead with the project the date of 08 August 2008. DNV request clarify it.	~~CL 5~~	OK
B.1.2. Does the PoA design documentation confirm that the length of the PoA does not exceed 28 years?	/1/	DR	A fix 10 years crediting period was selected, starting on 08 August 2008, however is not clear if it could be start at the project activity's registration date The CPA will start at insertion on PoA with renewable 07 years credit period, the same length of PoA, even they will inserted before the start of PoA	~~CL 5~~ ~~CL 12~~	OK
C. Environmental Impacts *Documentation on the analysis of the environmental impacts will be assessed, and if deemed significant, an EIA should be provided to the validator.*			☒ Analysis at PoA level ☒ Analysis at CPA level This section must only be completed if the analysis of environmental impacts is at PoA level.		
C.1.1. Has an analysis of the environmental impacts of	/1/	DR	As stated only in the PoA-DD, the project		OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl
the programme been sufficiently described?			will reduce the environment impacts, like organic load of wastewater, odor and others All farms had receive environment operation licenses issued by respective state environment agency.		
C.1.2. Are there any Host Party requirements for an Environmental Impact Assessment (EIA)?	/1/	DR	See C.1.1.		OK
C.1.3. Will the programme create any adverse environmental effects?	/1/	DR	See C.1.1.		OK
C.1.4. Are transboundary environmental impacts considered in the analysis?	/1/	DR	See C.1.1.		OK
C.1.5. Have identified environmental impacts been addressed in the programme design?	/1/	DR	See C.1.1.		OK
C.1.6. Does the programme comply with environmental legislation in the host country?	/1/	DR	The PoA analyses the environment impacts and demonstrate that will be all positive impacts, evidenced by the environmental licence issued for each CPA, The PoA on section C.1 define that the Environmental Analysis is done at PoA level; however the identification of Environment Licenses should be done at on CPD-DD level. DNV requests documented evidences of the Environmental Licenses.	~~CL 14~~	OK
D. Stakeholder Comments *The validator should ensure that stakeholder comments have been invited with appropriate media and that due account has been taken of any comments received.*			☒ Consultation at PoA level ☐ Consultation at CPA level This section must only be completed if the analysis of environmental impacts is at PoA		

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl
			level.		
D.1.1. Have relevant stakeholders been consulted?	/1/	DR	As stated only in the PoA-DD, local stakeholders, such as the City Hall and Municipal Assembly, District Attorney, the environmental state and local agencies, the Brazilian forum of NGOs and local communities associations, were invited to comment on the project, in accordance with the requirements of Resolution 1 of the Brazilian DNA. The letters sent to the local stakeholders, the comments received and how due account was taken were not evidenced. DNV requests a copy of these.	~~CL 15~~	OK
D.1.2. Have appropriate media been used to invite comments by local stakeholders?	/1/	DR	See D.1.1		OK
D.1.3. If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	/1/	DR	See D.1.1		OK
D.1.4. Is a summary of the stakeholder comments received provided?	/1/	DR	See D.1.1		OK
D.1.5. Has due account been taken of any stakeholder comments received?	/1/	DR	See D.1.1		OK
E. Programme Baseline *The validation of the project/programme baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.*					

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl
E.1. Baseline Methodology *It is assessed whether the project/programme applies an appropriate baseline methodology.*					
E.1.1. Does the project/programme apply an approved methodology and the correct version thereof?	/1/	DR	The PoA/CPA applies the simplified baseline methodology for selected small-scale CDM project activity AMS-III.D (Version 13) – ”Methane recovery in agricultural and agro industrial activities” as outlined in the 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 /14/, however the PoA and CPA’s applied the calculation for N2O not included on AMS-III.D (Version 13). DNV request adjust it. The PoA/CPA will not use blowers to exhaust biogas, Hence the project emissions consider in all CPAs the electricity consumption of the monitoring system which is multiplied by the Brazilian grid emission of 0.1842 ton CO_2/MWh /7/ results in 0.09 tons CO_2/year. Although the project emissions are very small, for each CPA the equipment consuming electricity should be listed to confirm that the electricity consumption is 0.056 kWh/y only and no equipment consuming more electricity was necessary to	~~CAR 1~~ ~~CAR 3~~	OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl
			be installed (e.g. blowers).		
E.1.2. Are the applicability criteria in the baseline methodology all fulfilled?	/1/	DR	The Programme meets the applicability criteria of AMS-III.D (Version 13) as it is demonstrated that: • The PoA/CPA recovers methane generated from the treatment of swine manure by installing methane recovery and combustion systems. The environment legislation of Brazil requires no discharge of swine manure effluent on water bodies. The usual practice is to use the anaerobic open lagoon ("esterqueira") with methane emissions escaping to the atmosphere; • The PoA/CPA involves the use of effluent and stabilized sludge on crops irrigation in farms, without any anaerobic conditions; • The PoA/CPA involves facilities to burn (flaring) or fuel (electric generators) all biogas generated by the digester; • The emissions reductions of each CPA are lower than 60 kt CO_2 equiv/year, the ceiling for category III small scale projects. Thus, this methodology is applicable to the project in accordance with the existing criteria		OK
E.2. Baseline Scenario Determination *The choice of the baseline scenario will be validated with focus on whether the baseline is a likely scenario, and whether the methodology to define the baseline scenario*					

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl
has been followed in a complete and transparent manner.					
E.2.1. What is the baseline scenario?	/1/	DR	The baseline is the emissions of methane from anaerobic decay of swine manure. The N_2O emissions reductions applied by the first version of PoA/CPA is not applicable to the methodology	~~CAR 1~~	OK
E.2.2. What other alternative scenarios have been considered and why is the selected scenario the most likely one?	/1/	DR	No.		OK
E.2.3. Has the baseline scenario been determined according to the methodology?	/1/	DR	In the absence of the PoA/CPA, the existing facility would continue to emit methane to the atmosphere at historical average levels, considering that in Brazilian swine activity, only the restriction of discharge the manure into the water body is established on environment legislation, and the common practice is use anaerobic open lagoon.		OK
E.2.4. Has the baseline scenario been determined using conservative assumptions where possible?	/1/	DR	See B.2.1		OK
E.2.5. Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	/1/	DR	Yes.		OK
E.2.6. Is the baseline scenario determination compatible with the available data and are all literature and sources clearly referenced?	/1/	DR	The baseline is the emissions of methane from anaerobic decay of swine manure, calculated in accordance with the most recent		OK

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			IPCC tier 2 approach (IPCC 2006 Guidelines) and applying IPCC default values for the parameters B_0 and VS for European genetic and management used by Sadia, however, the VS adjusted to the weight of Sadia livestock don't consider the Vs default for specific market and breeding swine as established by Tables 10A- 7 and 8 of 2006 IPCC. In addition, the MCF for anaerobic open lagoons is not according the same Tables and local specific ambient temperature. DNV requests adjustment on this.	~~CL 4~~	
E.2.7. Have the major risks to the baseline been identified?	/1/	DR	See E.2.6.		OK
E.3. Additionality of the Programme of Activities *The assessment of additionality will be validated with focus on whether the programme itself is not a likely baseline scenario.*					
E.3.1. Has it been demonstrated that the programme is a voluntary coordinated action that would not be implemented in the absence of CDM?	/1/	DR	The programme consists of the implementation of biodigesters in aggregated Market Farms (Swine termination) and Breeding Farms (swine reproduction) included on 3S Sadia Programme.		OK
E.3.2. If the programme is implementing a mandatory policy/regulation, has it been demonstrated whether the policy/regulation is being enforced? If it is enforced, has it been demonstrated that the programme will lead to a	/1/	DR	The additionality of programme could be demonstrated considering that there are no mandatory rules for collect and burn the methane produced by the decay of swine		OK

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higher level of enforcement?			manure in Brazil. The environment regulations establish only the restriction to discharge swine manure effluents into the water bodies. The common practice in swine farms in Brazil is used the anaerobic lagoon in order to decay the manure and subsequent use as soil fertilizer.		
E.3.3. Are all assumptions stated in a transparent and conservative manner?	/1/	DR	Yes		OK
E.3.4. Is sufficient evidence provided to support the relevance of the arguments made?	/1/	DR	The additionality claims of the project are based on the following barriers: • Investment barrier: Since there are currently no direct subsides or promotional support for the implementation of manure management or capture and destroying biogas and there are higher costs required to install biodigesters and flare than what would be represented by the baseline scenario, the project faces investment barriers compared with the usual practice of open anaerobic lagoons. For the CPA with the title "BRA/SC – 8150354S01/ 3SP", a NPV analysis for 10 years results in a negative NPV of US$7 953 considering the investment for the biodigester, biogas capture equipment and flare equipment of US$25 503 and operational, maintenance and monitoring		OK

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			cost of US$1 250/year. There is no revenue because the biogas is flared and not used or sold.. These figures are comparable with similar swine manure biogas capture and destroy project. Hence, the project faces an investment barrier. • Technological barrier: The implementation of biodigesters instead of open anaerobic lagoons requires special expertise with respect to design of facility, operation and maintenance of flare and operation control (pressure, temperature, flow etc). This expertise is not commonly developed for swine farm managers, thus requiring support of external technicians. Hence, the project would not be implemented without external support to overcome the technical difficulties. • Legal Barrier: As verified on Environment Legislation /8/ and a common practice for swine manure management /9/ , the project go beyond the established legislation with the use the anaerobic lagoon to treat swine manure and biogas. Hence the project is in line with sustainability police of host country. Given the first two barriers, it is sufficiently demonstrated that the Program of Activities is not a likely baseline scenario.		
E.3.5. If the starting date of the project/programme	/1/	DR	The PoA apply as starting date of programme	~~CL 5~~	OK

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activities is before the date of validation, has sufficient evidence been provided that the incentive from the CDM was seriously considered in the decision to proceed with the programme?			the implementation of registered CDM Project: "*GHG capture and combustion from swine manure management systems at Faxinal dos Guedes and Toledo*" (0047), however the PoA consider the starting date of the programme, which should be considered as the earliest of implementation, construction and real action and proof of consideration of PoA before the decision to go ahead with the project the date of 08 August 2008. DNV requests a clarification of it.		
E.4. Additionality of CPAs					
E.4.1. Is the approach described for demonstrating additionality of a CPA in accordance with the using the procedure provided in the baseline and monitoring methodology applied?	/1/	DR	The additionality of the typical SSC-CPA of the PoA is demonstrated by applying the Attachment A to the Appendix B of the simplified modalities and procedures for CDM small-scale project activities.		OK
E.4.2. Are specific criteria for demonstrating the additionality of a specific CPA included to the PoA?	/1/	DR	The criteria to demonstrate the additionality of each SSC-CPA will be the use of same technology and demonstrating the investment barrier still valid, with only variation according the size of swine population. According to the PoA-DD, in section E.5.2 "PP shall provide the key criteria for assessing additionality" and "it shall be demonstrated how these criteria would be applied to assess the additionality of a typical CPA at the time of inclusion". However,	CAR 4	

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			section E.5.2 of the PoA-DD rather describes the additionality of the programme, but not the criteria. Moreover, the CPA-DD in section B.3 includes an investment comparison (digester vs lagoon) and if such an investment comparison shall be carried out for each CPA, this as a criteria has to be included in section E.5.2 of the PoA-DD. Finally, the criteria for assessing additionality in section E.5.2 must be revised to also include criteria for CPAs that will utilize biogas.		
E.4.3. Is the additionality of a typical CPA demonstrated?	/1/	DR	As the investment necessary to implement a collect and burn system for methane produced from swine manure decay reach almost the same of the implementation cost of one 3 000 swine warehouse, the farmers prefer infest into the proper activity.		OK
E.5. Calculation of GHG Emission Reductions – Project emissions *It is assessed whether the project emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.*					
E.5.1. Has the procedure to calculate project emissions of an individual CPA been documented according to the approved methodology and in a complete and transparent manner?	/1/	DR	Emission reduction calculations are transparently documented by Sadia spreadsheets /5/, however it is not in line with AMS-III.D (Version 13) as follow: E.1. The PoA and CPA's applied the	~~CAR 1~~	OK

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			calculation for N_2O; E.2. They apply as project emissions the residual methane emissions of biodigester and flare which is not according applied methodology. E.3. They apply the power consumption wrongly as leakage and argue that if presumed insignificant in CO2e emissions, but don't evidence justifications for that. DNV requests adjustments.		
E.5.2. Have conservative assumptions been used when calculating the project emissions?	/1/	DR	See E.5.1.		OK
E.5.3. Are uncertainties in the project emission estimates properly addressed?	/1/	DR	See E.5.1.		OK
E.6. Calculation of GHG Emission Reductions – Baseline emissions *It is assessed whether the procedure for calculating baseline emissions is according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.*					
E.6.1. Has the procedure to calculate baseline emissions of an individual CPA been documented according to the approved methodology and in a complete and transparent manner?	/1/	DR	Baseline emission estimations are documented in the spreadsheet "Planilha-simula-credito" version 02 /5/. The emission reductions are calculated considering the IPCC2006 Tier 2. The variables B_0 and VS consider for		OK

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			European genetic and management used by Sadia, however, the VS adjusted to the weight of Sadia livestock do not consider the Vs default for specific market and breeding swine as established by Tables 10A- 7 and 8 of 2006 IPCC. In addition, the MCF for anaerobic open lagoons is not according the same Tables and local specific ambient temperature. DNV requests adjustment on this.	~~CL 6~~	
			Project will use thermal flow meters which avoid the use of blowers, and the consumption of electricity by biodigesters will be only the necessary to supply the PLC and flow meters. The electricity consumption for a typical CPA is estimated to be 0.000056MWh which multiplied with the Brazilian grid emission of 0.1842 ton CO_2/MWh /7/ results in 0.09 tons CO_2/year.		
			The parameters mentioned above is clearly identified on PoA according the template of CDM-SSC-PoA-DD version 01, however on CPAs this parameters were included only as a table. DNV recommend fulfill the CPA-DD with the same format mentioned on guidelines for completing CDM-PDD.	~~CL 16~~	
			The CDM-SSC-CPA-DD of IS 678228S02 applies the figure MCF1 as 0.46 which is not considered on none of the tables 10A- 7 and		

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			8 of 2006 IPCC. In addition, the section B.5.1 includes a table with the parameters that should be considered on monitoring ex-post. DNV request correct it.	~~CAR 2~~	
E.6.2. Have conservative assumptions been used when calculating the baseline emissions?	/1/	DR	See E.6.1.		OK
E.6.3. Are uncertainties in the baseline emission estimates properly addressed?	/1/	DR	See E.6.1.		OK
E.7. Calculation of GHG Emission Reductions – Leakage *It is assessed whether the procedure for calculating leakage is according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.*					
E.7.1. Has the procedure to calculate leakage emissions of an individual CPA been documented according to the approved methodology and in a complete and transparent manner?	/1/	DR	Although AMS-III.D (Version 13) don't require leakage calculations the PoA apply the power consumption wrongly as leakage and argue that if presumed insignificant in CO2e emissions, but do not evidence justifications for that.	~~CAR 1~~	OK
E.7.2. Have conservative assumptions been used when determining the procedure to be used to calculate the leakage emissions?	/1/	DR	See E.7.1.		OK
E.7.3. Are uncertainties in the leakage emission estimates properly addressed?	/1/	DR	See E.7.1.		OK

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E.8. Emission Reductions *The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.*					
E.8.1. Does the PoA-DD provide a clear and correct way of calculating the emission reductions from each CPA?	/1/	DR	Emission reduction calculations are transparently documented by Sadia spreadsheets /5/, however it is not in line with AMS-III.D (Version 13) as follow: • The PoA and CPA's applied the calculation for N2O; • They apply wrongly as project emissions the residual methane emissions of biodigester and flare, and don't consider the consumption of electricity or fuel used on operation of facilities. The project will consider 1 103 biodigesters at 1 073 farms; however it is not clear on PoA the information about the number of CPAs and the emissions reduction average. DNV request more information.	~~CAR 1~~ ~~CL 1~~	OK
E.9. Monitoring Methodology *It is assessed whether the project applies an appropriate monitoring methodology.*					
E.9.1. Is the monitoring plan documented according to the approved methodology and in a complete and transparent manner?	/1/	DR	The Programme of Activities (PoA) and each Programme Activity applies the approved monitoring methodology AMS-III.D (Version 13) "Methane recovery in agricultural and agro industrial activities",		OK

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			according to the 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. According to AMS-III.D (Version 13), the monitoring consists of direct measurement of the amount of methane fueled or flared. The PoA and CPA's applied the calculation for N_2O not included on AMS-III.D (Version 13). DNV request adjust it.	~~CAR 1~~	
E.9.2. Will all monitored data required for verification and issuance be kept for two years after the end of the crediting period or the last issuance of CERs, for this project activity, whichever occurs later?	/1/	DR	The record keeping time is not established	~~CL 7~~	OK
E.10. Monitoring of Plan *It is established whether the monitoring plan provides for reliable and complete project emission data over time.*					
E.10.1. 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 programme boundary during the crediting period?	/1/	DR	Emission reduction calculations are documented in accordance with AMS-III.D (Version 13), and will be calculated ex-post considering the parameters: • The flow of biogas captured will be continuously monitored through thermal mass flow meters calibrated to 20ºC and 1 023 mbar, however the correction of density of methane by temperature and	~~CL 9~~	OK

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			pressure of biogas was not included. • The monitoring plan foresees monitoring the CO_2 concentration of the biogas and calculate the metane concentration. However, this approach does not comply with AMS-III.D which requires direct measurements of the methane content. • The flare efficiency will be monitored according to the procedures outlined in the "Tool to determine project emissions from flaring gases containing methane", 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. However the PoA section E.7.1 mention monitoring the parameter "fvi,h", Volumetric fraction of components in residual gas of flare, which is considered only when the project request fare efficiency above 90%. • The monitoring of electricity of fuel consumed by facility is not included on monitoring plan. The sludge disposition will be registered in operational book and electronic spreadsheet. The monitoring plan of PoA is applied as the same for each CPA.	~~CAR 5~~ ~~CL 11~~	
E.10.2. Are the choices of project GHG indicators	/1/	DR	See E.10.1		OK

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reasonable and conservative?					
E.10.3. Is the measurement method clearly stated for each GHG value to be monitored and deemed appropriate?	/1/	DR	See E.10.1		OK
E.10.4. Is the measurement equipment described and deemed appropriate?	/1/	DR	The flow meters, sampling devices and gas analyzers are considered appropriate, including the monitoring and supervisor electronic system (SCA/PLC/SCS Data Controller system).		OK
E.10.5. Is the measurement accuracy addressed and deemed appropriate? Are procedures in place on how to deal with erroneous measurements?	/1/	DR	See E.10.1		OK
E.10.6. Is the measurement *interval* identified and deemed appropriate?	/1/	DR	See E.10.1		OK
E.10.7. Is the *registration, monitoring, measurement* and *reporting* procedure defined?	/1/	DR	Responsibilities and authorities for project management, monitoring and reporting activities, measurement and reporting techniques and QA/QC procedures are defined.		OK
E.10.8. Are procedures identified for *maintenance* of monitoring equipment and installations? Are the calibration intervals being observed?	/1/	DR	The flow meters, sampling devices and gas analyzers shall be subjected to regular maintenance, testing and calibration to ensure accuracy according to manufacturer specifications.		OK

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E.10.9. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	/1/	DR	See E.10.1		OK
E.11. Monitoring of Sustainable Development Indicators/ Environmental Impacts *It is assessed whether choices of indicators are reasonable and complete to monitor sustainable performance over time.*					
E.11.1. Is the monitoring of sustainable development indicators/ environmental impacts warranted by legislation in the host country	/1/	DR	The simplified monitoring methodology AMS-III.D and the Brazilian DNA do not require the monitoring of social and environmental indicators.		OK
E.11.2. Does the monitoring plan provide for the collection and archiving of relevant data concerning environmental, social and economic impacts?	/1/	DR	No environment, social or economic impacts are requested to monitor.		OK
E.11.3. Are the sustainable development indicators in line with stated national priorities in the Host Country?	/1/	DR	No sustainable development indicators are requested to monitor.		OK
E.12. Management System and Quality Assurance for Monitoring and Reporting *It is checked that programme implementation is properly prepared for and that critical arrangements are addressed.*					
E.12.1 Is the authority and responsibility of overall project management clearly described?	/1/	DR	Responsibilities and authorities for project management, monitoring and reporting	~~CL 7~~	OK

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				activities, measurement, training and reporting techniques and QA/QC procedures are defined, however there are not procedures identified for project performance reviews and corrective actions or procedures for emergency preparedness for cases where emergencies can cause unintended emissions.		
E.12.2	Are procedures identified for training of monitoring personnel?	/1/	DR	See E.12.1		OK
E.12.3	Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/	DR	See E.12.1		OK
E.12.4	Are procedures identified for review of reported results/data?	/1/	DR	See E.12.1		OK
E.12.5	Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting?	/1/	DR	See E.12.1		OK

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Table 3: Resolution of Corrective Action and Clarification Requests

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
CAR 1 • The PoA and CPA's applied the calculation for N2O not included on AMS-III.D; • Apply wrongly as project emissions the residual methane emissions of biodigester and flare. • Apply the power consumption wrongly as leakage and argue that if presumed insignificant in CO2e emissions, but do not give sufficient justification.	E.1.1 E.2.1 E.5.1 E.8.1	• The calculation for N2O of the PoA and CPA were excluded and the methodology AMS III.D was applied severely regarding only the methane emissions. • The project emissions were corrected and recalculated according to the methodology AMS III.D. • The power consumption was identified calculated and applied in the PoA and the CPA, however it is not considered in the project estimative. It is considered insignificant.	The version 2 of CDM-SSC-PoA-DD and CDM-SSC-CPA-DD and the spreadsheet "Planilha simula credito v021" evidence the correct approach and calculation according AMS-III.D Version 13. Therefore this CAR is Closed.
CAR 2 The CDM-SSC-CPA-DD of IS 678228S02 apply the figure MCF1 as 0.46 which is not considered on none of the tables 10A- 7 and 8 of 2006 IPCC. In addition, the section B.5.1 includes a table with the parameters that should be considered on monitoring ex-post.	E.6.1	The document CDM-SSC-CPA-DD of IS 678228 S02 was corrected by the application of the correct values of MCF from the IPCC 2006 Guidelines tables 10A and 8. The section B.5.1 eliminated the parameters that should be considered ex-post.	The version 2 of CDM-SSC-CPA-DD evidences the application of correct IPCC 2006 default values. Therefore this CAR is closed.
CAR 3 Although the project emissions are very small, for each CPA the equipment consuming electricity should be listed to confirm that the electricity consumption is	E.1.1	The version 02 of the PoA in section E.6.2 describes the method used to determine the energy consumption in the implemented system. In the document CDM-SSC-CPA-DD of IS	The revised CDM-SSC-CPA-DD describes that electricity consumption of each CPA will be determined based on the actual equipment installed. Therefore this CAR is closed.

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
0.056 kWh/y only and no equipment consuming more electricity was necessary to be installed (e.g. blowers).		678228 S02 the description of the consumption is determined in the section E.5.2.	
CAR 4 According to the PoA-DD, in section E.5.2 "PP shall provide the key criteria for assessing additionality" and "it shall be demonstrated how these criteria would be applied to assess the additionality of a typical CPA at the time of inclusion". However, section E.5.2 of the PoA-DD rather describes the additionality of the programme, but not the criteria. Moreover, the CPA-DD in section B.3 includes an investment comparison (digester vs lagoon) and if such an investment comparison shall be carried out for each CPA, this as criteria has to be included in section E.5.2 of the PoA-DD. Finally, the criteria for assessing additionality in section E.5.2 must be revised to also include criteria for CPAs that will utilize biogas.	E.4.2	In the version 02 of the PoA in the section E.5.2 is demonstrated the key criteria for accessing additionality and demonstrating also to access additionality for the CPA's.	Version 2 of CDM-SSC-PoA-DD includes criteria for assessing the additionality for each CPA. The criteria to demonstrate the additionality of each SSC-CPA will be restricted to: a) Evidence that the farm has a valid environment license (Section C2 of CPA) and; b) Economic comparison demonstrating the investment barrier (Section B3 of CPA). Therefore this CAR is closed.
CAR 5 The monitoring plan foresees monitoring of the CO_2 concentration of the biogas and calculation of the methane concentration. However, this approach does not comply with AMS-III.D which requires direct	E,10.1	The monitoring plan was revised and the equipment used will be a methane analyser. The sampling will be accomplished in 100% of the CPA's with periodical measurements at a 95% confidence level. After this period a	The content of methane in biogas will be measured periodically through methane analyser. The frequency of the measurements will be selected to ensure a 95% confidence level. Therefore this CAR is closed.

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
measurements of the methane content.		statistical analyses will be completed to determine the frequency of analyses for the next accreditation period.	
CAR 6 The CPA "BRA/SC – 678228 S02 / 3SP" started prior to the registration of the PoA and is thus no eligible under the PoA according to the current definition of the start date of CPAs in the glossary of CDM terms.	-	The CPA "BRA/SC – 678228 S02 / 3SP" was replaced with the CPA"BRA/SC – 8150354S01/ 3SP".	OK CAR is closed.
CL 1 The project will consider 1 103 biodigesters at 1 073 farms; however it is not clear from the PoA the number of CPAs and the emissions reduction average. DNV request more information.	A.1.1 A.6.1 E.8.1 E.9.1	The information of the number of CPA's and the emission reduction average was included in the document PoA of the Sadia Institute in the section A.2.	The version 2 of CDM-SSC-PoA-DD and the spreadsheet "Dados CPAs total" evidence the evidence the 1017 farms/CPAs with total baseline estimation of 591 418 ton CO_2/year considering the actual swine population. Therefore this CL is closed.
CL 2 The PoA/CPA coordinating/managing entity is not clearly identified or nominated.	A.2.2	The coordinating entity of the PoA and related CPA's of the 3S Program is the Sadia Institute. The nomination is determined in the documents of the PoA and CPA version 02 of the section A.3.	The designation of coordinating/ managing entity is clear. Therefore this CL is closed.
CL 3 The PoA-DD do not evidence that the Programme of Activities and any CPA are not a de-bundled component of a larger PoA or has the same coordinating or managing entity as Instituto Sadia de Sustentabilidade, and assure that are no projects in the same project	A.5.2	The PoA of the Sadia Institute is not part of the PDD of the Sadia Company. All CPA's have a distance of more than 1Km of the Sadia's own farms and do not participate of the PDD of Sadia. The geographical reference evidence the distances of the farms.	As verified on spreadsheet "Dados CPAs total" the Sadia aggregated farms considered into the programme are distinct of farms of Sadia CDM registered project (0047). Therefore this CL is closed.

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
whose project boundary is within 1 km of the project boundary.			
CL 4 The VS adjusted to the weight of Sadia livestock do not consider the Vs default for specific market and breeding swine as established by Tables 10A- 7 and 8 of 2006 IPCC. In addition, the MCF for anaerobic open lagoons is not according to the same Tables and local specific ambient temperature. DNV requests adjustment on this.	E.2.6	The VS and Bo values for the Sadia Institute were clarified and readjusted to the two types of farming system, for breeding and market farms the values applied were taken from the IPCC Guidelines 2006 tables 10A – 7 and 8. The value for MCF for anaerobic open air lagoons were readjusted according to the tables of the IPCC and average temperature for each state where the CPA is installed.	The version 2 of CDM-SSC-PoA-DD and CDM-SSC-CPA-DD and the spreadsheet "Planilha simula credito v021" could evidence the correct IPCC 2006 default values appliance. The VS for breading and market swine population were caped at default values. Therefore this CL is closed.
CL 5 The PoA apply as starting date of programme the implementation of registered CDM Project: "*GHG capture and combustion from swine manure management systems at Faxinal dos Guedes and Toledo*" (0047), however the PoA consider the starting date of the programme, which should be considered as the earliest of implementation, construction and real action and proof of consideration of PoA before the decision to go ahead with the project the date of 08 August 2008. DNV request clarify it.	B.1.1 E.3.5	The starting date of the project of the Sadia Institute involving carbon credits was in the year 2005 with the creation of the Sadia Institute and the 3S Program.	The starting date of PoA was evidenced and justified the consideration of CDM as decision of PoA as established by EB 41. In addition, the timeline included in version 2 of CDM-SSC-PoA-DD could evidence the impact of decision for consider the Sadia programme as a Programme of Activities instead aggregated CDM-PDD. Therefore this CL is closed.
CL 6 The variables B_0 and VS consider for	E.6.1	The version 02 of the PoA and CPA of the Sadia Institute readjusted all the	The version 2 of CDM-SSC-PoA-DD and CDM-SSC-CPA-DD and the spreadsheet

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
European genetic and management used by Sadia, however, the VS adjusted to the weight of Sadia livestock do not consider the Vs default for specific market and breeding swine as established by Tables 10A- 7 and 8 of 2006 IPCC. In addition, the MCF for anaerobic open lagoons is not according the same Tables and local specific ambient temperature. DNV requests adjustment on this.	E.9.2	values for VS and Bo considering market farms and breeding farms according to the IPCC 2006 Guidelines tables 10A – 7 and 8. The values for MCF local temperature were readjusted according to the IPCC 2006 Guidelines.	"Planilha simula credito v021" could evidence the correct IPCC 2006 default values appliance. The VS for breading and market swine population were caped at default values. The MCF will be considering 77% (18ºC SC / 19ºC PR) 78% (20ºC SP/ 21 ºC MG/ 22ºC) and 79% (GO/ 26ºC MT) which are the correct MCF taking into consideration the average ambient temperature in these states as sourced from http://www.inmet.gov.br/html/clima.php# (normais climatológicas) Therefore this CL is closed.
CL 7 The record keeping time and procedures identified for project performance reviews and corrective actions or procedures for emergency preparedness for cases where emergencies can cause unintended emissions were not established	E.9.2 E.12.1	The record keeping time and procedures for the reviews and correction actions, or emergencies procedures are determined in the monitoring plan of the 02 version of the PoA/CPA for the Sadia Institute. Training material and procedures to operate and manage the biodigester and enclosed flare system were developed to be used in the training of the Sadia's team.	The version 2 of CDM-SSC-PoA-DD and CDM-SSC-CPA-DD could evidence the applicable procedures. In addition, as verified during the site visit, Sadia has the Quality and Environment Management Systems which will be applicable over the Programme. Therefore this CL is closed.
CL 8 Although the PoA identify the way to avoid double accounting of each CPA, it is not defined which verification sampling method	A.6.4	The sampling random method to be applied in verification by the DOE's is estimated as 25% in each round for each verification. These samplings estimate	As verified during the site visit, all swine population of Sadia has the same genetic (low fat, maximum meat) from the species "Large White", "Landrace"

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
will be used by the DOE as established on "Procedures for Registration of a Programme of Activities".		that every 4 rounds or every 4 verifications the amount to be verified is 100% of the farms.	and "Duroc". The swine breeding procedure of Sadia has the same schedule for all finisher farms (120 day) and for all breeding farms (nursing of 20 days and boar and sow with 220 kg and gilt with 180 kg), and as consequence the weigh averages of swine population for these kind of farms are the same. In addition, the design of the biodigesters is common for all farms, including the monitoring system and flaring. Considering that the Sadia swine population has the same genetic, the design of biodigesters has the same pattern and technology and the environment legislation on states where the project is located are equivalent and based on Federal environment legislation, the criteria to demonstrate the additionality of each SSC-CPA will be restricted to: a) Evidence that the farm has a valid environment licensing (Section C2 of CPA) and; b) Economic Comparison demonstrating the investment barrier (Section B3 of CPA).

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
			Therefore this CL is closed.
CL 9 The flow of biogas captured will be continuously monitored through thermal mass flow meters calibrated to 25ºC and 1 023 mbar. however the correction of density of methane by temperature and pressure of biogas was not included	E.10.1	The chosen thermal flow meter presents in the manufacturer manual the determination that this flow meter corrects the density of the biogas by the temperature and pressure of the passing biogas. Therefore the correction of the density is accomplished automatically.	As verified during the site visit of BRA/SC – 678228 S02 / 3SP - farm, the flow meter # 9700343 (412A) used is thermal mass, which is capable adjust the temperature and pressure automatically /21/. Therefore this CL is closed.
CL 10 The flare efficiency will be monitored according to the procedures outlined in the "Tool to determine project emissions from flaring gases containing methane", 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. However the PoA section E.7.1 mention monitoring the parameter "fvi,h", Volumetric fraction of components in residual gas of flare, which is considered only when the project request fare efficiency above 90%.		The project of the Sadia Institute considers the methodology for flaring methane the efficiency of 90%, therefore the parameter "fvi,h" will be readjusted and will not be included in the monitoring plan of the PoA of the Sadia Institute.	As verified during the site visit of BRA/SC – 678228 S02 / 3SP - farm, the Programmable Logic Control used to monitoring and control of measuring and flaring, assure only operate the flare with temperature above 500ºC. If any circumstance of the flare temperature falls below this limit, the drain gas valve from the biodigester to flow meter /flare is closed automatically. Therefore this CL is closed.
CL 11 The monitoring of electricity of fuel consumed by facility is not included on monitoring plan	E.10.1	The factor used to calculate the parameter is the ef-grid$_{south}$ that is based in the generation of national electricity calculated by the National Operator System (ONS). The monitoring of the consumption of	As verified during the site visit of BRA/SC – 678228 S02 / 3SP - farm, the design of collect and flare system operate without boiler, once the thermo mass flow meter has very low resistance

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		the electricity will not be accomplished because of the value of the consumption that is inferior of 2W. The electricity consumption multiplied by the grid factor determined by the ONS of Brazil results in 0,14 tons CO2e./year. The value is not considered in the equations of the project emission system.	for drain. As consequence, only the instrument needs electricity. Therefore this CL is closed.
CL 12 The CPA will start at insertion on PoA with 7 years credit period, the same length of PoA, even they will inserted before the start of PoA.	B.1.2	The version 02 of the PoA determines that the length of the CPA crediting period is of renewable 7 years and the length of the CPA's will not trespass the length of the PoA of the Sadia Institute.	The version 2 of CDM-SSC-PoA-DD and CDM-SSC-CPA-DD could clarify the starting of programme and the length of CPA credit period. Therefore this CL is closed.
CL 13 As requested by the AMS-III.D (Version 13) the emissions reductions should be compared with the yearly methane generation potential calculated in the project design document for that year. DNV request include it on monitoring plan		The information about the validating limits are informed in the section E.7.2 of the PoA	The version 2 of CDM-SSC-PoA-DD clarifies the issue. Therefore this CL is closed.
CL 14 The PoA on section C.1 define that the Environmental Analysis is done at PoA level; however the identification of Environment Licenses should be done at on CPD-DD level. DNV requests documented evidences of the Environmental Licenses.	C.1.6	The version 02 of the PoA and the related CPA's present the necessary identification to evidence the validated environmental license of each CPA.	The version 2 of CDM-SSC-PoA-DD clarifies the issue. In addition, during the site visit, the environment license of BRA/SC – 678228 S02 / 3SP - farm was verified. Therefore this Cl is closed.

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
CL 15 Local stakeholders, such as the City Hall and Municipal Assembly, District Attorney, the environmental state and local agencies, the Brazilian forum of NGOs and local communities associations, were invited to comment on the project, in accordance with the requirements of Resolution 1 of the Brazilian DNA. The letters sent to the local stakeholders, the comments received and how due account was taken were not evidenced. DNV requests a copy of these.	D.1.1	The copies of the requested documents by DNV were sent to DNV validator in the date of 29 of April of 2008.	During the site visit, the letters sent to local stakeholders were verified. In addition, the record meetings promoted by Sadia Institute with local stakeholders, were verified, and could be evidence the clarification for the answers issued during these meetings. All were with respect clarification what is Carbon Credit or supporting the Programme. Therefore this CL is closed.
CL 16 The parameters mentioned is clearly identified on PoA according the template of CDM-SSC-PoA-DD version 01, however on CPAs the parameters were included only as a table. DNV recommend fulfill the CPA-DD with the same format mentioned on guidelines for completing CDM-PDD	E.6.1	The format suggested by DNV was accomplished. It can be evidenced in the version 02 of the CPA of the Sadia Institute.	The version 2 of CDM-SSC-CPA-DD is according template. Therefore this CL is closed.

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APPENDIX B

CERTIFICATES OF COMPETENCE

CERTIFICATE OF COMPETENCE

Luis Filipe Tavares

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJI-i1

GHG Auditor:	Yes		
CDM Validator:	Yes	***JI Validator:***	--
CDM Verifier:	Yes	***JI Verifier:***	--
Industry Sector Expert for Sectoral Scope(s):	Sectoral scope 9, 13 & 15 (manure management)		

Høvik, 1 September 2008

Michael Lehmann
Techncal Director, Climate Change Services

CERTIFICATE OF COMPETENCE

Michael Lehmann

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJI-i1

GHG Auditor:	Yes		
CDM Validator:	Yes	***JI Validator:***	Yes
CDM Verifier:	Yes	***JI Verifier:***	Yes
Industry Sector Expert for Sectoral Scope(s):	Sectoral scope 1, 2, 3		
Technical Reviewer for (group of) methodologies:			
ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G	Yes	*AM0027*	Yes
ACM002, AMS-I.A-D, AM0019, AM0026, AM0029, AM0045	Yes	*AM0030*	Yes
ACM003, ACM0005, AM0033, AM0040	Yes	*AM0031*	Yes
ACM0004, ACM0012	Yes	*AM0032*	Yes
ACM0006, AM0007, AM0015, AM0036, AM0042	Yes	*AM0035*	Yes
ACM0007	Yes	*AM0038*	Yes
ACM0008	Yes	*AM0041*	Yes
ACM0009, AM0008, AMS-III.B	Yes	*AM0034*	Yes
AM0006, AM0016, AMS-III.D, ACM0010	Yes	*AM0043*	
AM0009, AM0037	Yes	*AM0046*	
AM0013, AM0022, AM0025, AM0039, AMS-III.H, AMS-III.I	Yes	*AM0047*	
AM0014	Yes	*AMS-II.A-F, AM0044*	Yes
AM0017	Yes	*AMS-III.A*	Yes
AM0018	Yes	*AMS-III.E, AMS-III.F*	Yes
AM0020	Yes		
AM0021, AM0028, AM0034, AM0051	Yes		
AM0023	Yes		
AM0024	Yes		

Høvik, 5 February 2007

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director