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Verification Report

1ST VERIFICATION OF THE CDM-PROJECT:

AGRICOLA SUPER LIMITADA, ADVANCED SWINE MANURE TREATMENT IN MAITENLAHUE AND LA MANGA, CHILE

REPORT NO. 1008942

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Version 1

TÜV SÜD Industrie Service GmbH
Carbon Management Service
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First Verification of the CDM Project:
"Advanced swine manure treatment in Maitenlahue and La Manga" in Chile

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Subject:	First Periodic Verification of a CDM Project
Executing Operational Unit:	TÜV SÜD Industrie Service GmbH Carbon Management Service Westendstr. 199 - 80686 Munich, Federal Republic of Germany
Client:	Agrícola Super Limitada Camino La Estrella No. 401 Rancagua, 6th Región, Chile
Contract approved by:	Werner Betzenbichler
Report Title:	Initial and First Periodic Verification of the CDM Project: "Advanced swine manure treatment in Maitenlahue and La Manga".
Number of pages	21 (excluding cover page and annexes)

Summary:

TÜV SÜD Industrie Service GmbH has performed a verification of the registered CDM project: "Advanced swine manure treatment in Maitenlahue and La Manga" in Chile. The verification is based on requirements of the UN Framework Convention on Climate Change (UNFCCC). In this context, the relevant documents are the "Marrakech Accords".

The management of Agricola Super Limitada is responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions on the basis set out within the project Monitoring and Verification Plan indicated in the final PDD version dated November 2005. The development and maintenance of records and reporting procedures in accordance with that plan, including the calculation and determination of GHG emission reductions from the project is the responsibility of the management of the project.

The verifier confirms that the project is implemented as planned and described in validated and registered project design documents. Installed equipment being essential for generating emission reduction runs reliably and is calibrated appropriately. The monitoring system is in place and the project is ready to generate GHG emission reductions.

The verifier can confirm that the GHG emission reduction for the whole monitoring period is calculated without material misstatements. Our opinion relates to the project's GHG emissions and resulting GHG emissions reductions reported and related to the valid and registered project baseline and monitoring, and its associated documents. Based on the information we have seen and evaluated we confirm the following statement:

Reporting period: From 01-02-2005 – 31-10-2006.

Verified emission in the above reporting period:

Base Line Emissions : 244,024 t CO_2 eq

Project Emissions (incl. lekage) : 15,376 t CO_2 eq

Emission reductions: 228,648 t CO_2 eq

Work carried out by:	Internal Quality Control by:
• Javier Castro, Assesment Team Leader, Environmental Management Systems (ISO 14001) • Víctor Abarca, Local expert, GHG auditor • Iván Bugueño, GHG auditor Trainee	Werner Betzenbichler

Abbreviations

AE	Applicant Operational Entity
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
DNA	Designated National Authority
DOE	Designated Operational Entity
EB	Executive Board
ER	Emission reduction
FAR	Forward Action Request
GHG	Greenhouse gas(es)
KP	Kyoto Protocol
MP	Monitoring Plan
MR	Monitoring Report
PDD	Project Design Document
TÜV SÜD	TÜV SÜD Industrie Service GmbH
UNFCCC	United Nations Framework Convention on Climate Change
VVM	Validation and Verification Manual

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1 INTRODUCTION

1.1 Objective

Agricola Super Limitada (Agrosuper) has commissioned an independent verification by TÜV SÜD Industrie Service GmbH (TÜV SÜD) of its three registered CDM projects among which the project: "Advanced swine manure treatment in Maitenlahue and La Manga", has been selected to start with. Verification is the periodic independent review and ex post determination by the Designated Operational Entity / Independent Entity of the monitored reductions in GHG emissions during the defined verification period.

The objective of verification can be divided in Initial Verification and Periodic Verification:

- Initial Verification:
  The objective of an initial verification is to verify that the project is implemented as planned, to confirm that the monitoring system is in place and fully functional, and to assure that the project will generate verifiable emission reductions. A separate initial verification prior to the project entering into regular operations is not a mandatory requirement.
- Periodic Verification:
  The objective of the periodic verification is to verify that actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan; further more the periodic verification evaluates the GHG emission reduction data and express a conclusion with a high, but not absolute, level of assurance about whether the reported GHG emission reduction data is "free" of material misstatements; and verifies that the reported GHG emission data is sufficiently supported by evidence, i.e. monitoring records. If no prior initial verification has been carried out, the objective of the first periodic verification also includes the objectives of the initial verification.

The verification shall consider both quantitative and qualitative information on emission reductions. Quantitative data comprises the monitoring reports submitted to the verifier by the project entity. Qualitative data comprises information on internal management controls, calculation procedures, and procedures for transfer, frequency of emissions reports, review and internal audit of calculations/data transfers.

The verification follows UNFCCC criteria refer to the Kyoto Protocol criteria and the CDM rules and modalities as agreed in the Bonn Agreement and the Marrakech Accords.

1.2 Scope

Verification scope is defined as an independent and objective review and ex post determination by the Designated Operational Entity of the monitored reductions in GHG emissions. The verification is based on the submitted monitoring report and the validated project design documents including its monitoring plan. These documents are reviewed against Kyoto Protocol requirements, UNFCCC rules and associated interpretations. TÜV SÜD has, based on the recommendations in the Validation and Verification Manual employed a risk-based approach in the verification, focusing on the identification of significant risks and reliability of project monitoring and generation of CERs.

The verification is not meant to provide any consulting towards the client. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the monitoring activities.

The audit team has been provided with a Monitoring Report and underlying data records in November 21, 2005, covering the period February 01, 2005 to October 31, 2006. This document serves as the basis for the assessment presented herewith.

Studying the existing documentation belonging to this project, it was obvious that the competence and capability of the audit team performing the verification has to cover at least the following aspects:

- Knowledge of Kyoto Protocol and the Marrakech Accords
- Environmental and Social Impact Assessment
- Skills in environmental auditing (ISO 14000, EMAS)
- Quality assurance
- Agro-industrial activities
- Technical aspects of waste manure management systems
- Monitoring technologies
- Monitoring concepts
- Laboratory analysis
- Political, economical and technical random conditions in host country

According to these requirements TÜV SÜD has composed a project team in accordance with the appointment rules of the TÜV certification body "climate and energy":

Javier Castro is the Assessment Team leader, and auditor for environmental management systems at the department "Carbon Management Service" in the head office of TÜV Industrie Service GmbH, TÜV Süd Group in Munich. He is specialised in environmental issues.

Víctor Abarca is a local GHG Auditor, heading the department "Environmental Services" of ccaQualitas in Santiago de Chile, a local company being member of the TÜV SÜD Group. Having an academic education as constructor Engineer and is specialized during their work in waste management is well familiar with the assessment of anaerobic and aerobic treatment of effluents. He is an auditor for environmental management systems (according to ISO 14001) and quality management systems (ISO 9001). He has received extensive training in the CDM validation process, is an appointed auditor for CDM projects and participated already in several CDM project assessments all over Latin America.

Iván Bugueño is a Fishery Engineer and is an auditor for quality management systems (ISO 9001). He has received extensive training in the CDM validation process and now is working as trainee GHG auditor.

The audit team covers the above mentioned requirements as follows:

- Knowledge of Kyoto Protocol and the Marrakech Accords (ALL)
- Environmental and Social Impact Assessment (ALL)
- Skills in environmental auditing (Castro, Abarca)
- Quality assurance (ALL)
- Agro-industrial activities (ALL)
- Technical aspects of waste manure management systems (ALL)
- Monitoring technologies (ALL)
- Monitoring concepts (ALL)
- Laboratory analysis (ALL)
- Political, economical and technical random conditions in host country (ALL)

In order to have an internal quality control of the project, a team of the following persons has been composed by the certification body "climate and energy":

- **Werner Betzenbichler** (Certification Body "climate and energy")

1.3 GHG Project Description

The project consists of an advanced improvement to the common practice of swine waste treatment in the country, reducing an important volume of greenhouse gases. The technology implementation is based on the use of an activated sludge treatment plant and a storage lagoon from where treated residues are finally employed for irrigation purposes.

Project participants are Agricola Super Limitada (Agrosuper) owner of the project and located in Chile.

The starting date of the project was on March 26th, 2004 and its first crediting period began on February 1st, 2005.

The project has been registered as CDM activity on September 09th, 2006 having the reference number 0458 (see: http://cdm.unfccc.int/Projects/DB/DNV-CUK1149757857.32/view.html)

2 METHODOLOGY

The project assessment aims at being a risk based approach and is based on the methodology developed in the Validation and Verification Manual (for further information see www.vvmanual.info), an initiative of all Applicant Entities and Designated Operational Entities, which aims to harmonize the approach and quality of all such assessments.

In order to ensure transparency, a verification protocol was customized for the project, according to the Validation and Verification Manual. The protocol shows, in a transparent manner, criteria (requirements), means of verification and the results. The verification protocol serves the following purposes:

- It organizes, details and clarifies the requirements a CDM/JI project is expected to meet;
- It ensures a transparent verification process where the verifier will document how a particular requirement has been proved and the result of the verification.

The verification protocol consists of four tables. The different columns in these tables are described in Figure 1.

The completed protocol is enclosed in Annex 1 to this report.

Initial Verification Checklist – table 1			
OBJECTIVE	Ref.	COMMENTS	Concl.(incl FARs/CARs)
The requirements the project must meet.	*Gives reference to the legislation or agreement where the requirement is found.*	*Description of circumstances and further commendation to the conclusion.*	*This is either acceptable based on evidence provided (OK), or a Corrective Action Request (CAR) of risk or non-compliance with stated requirements. The corrective action requests are numbered and presented to the client in the Verification report. The Initial Verification has additional Forward Action Requests (FAR). FAR indicates essential risks for further periodic verifications*

Periodic Verification Checklist Table 1: Data Management System/Controls		
Expectations for GHG data management system/controls	Score	Verifiers Comments (including *Forward Action Requests*)
The project operator's data management system/controls are assessed to identify reporting risks and to assess the data management system's/control's ability to mitigate reporting risks. The GHG data management system/controls are assessed against the expectations detailed in the table.	A score is assigned as follows: Full all best-practice expectations are implemented. Partial a proportion of the best practice expectations is implemented Limited this should be given if little or none of the system component is in place.	*Description of circumstances and further commendation to the conclusion. This is either acceptable based on evidence provided (OK), or a Corrective Action Request (CAR) of risk or non-compliance with stated requirements. The corrective action requests are numbered and presented to the client in the Verification report. The Initial Verification has additional Forward Action Requests (FAR). FAR indicates essential risks for further periodic verifications*

Periodic Verification Checklist Table 2: GHG calculation procedures and management control testing		
Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks
Identification of potential reporting risks based on an assessment of the emission estimation procedures. Identification of key source data. Focus on those risks that impact the accuracy, completeness and consistency of the reported data.	Identification of the key controls for each area with potential reporting risks. Assessment of adequacy of the key controls and eventually test that the key controls are actually in operation. Internal controls include, Understanding of responsibilities and roles, Reporting, reviewing and formal management approval of data; Procedures for ensuring data completeness, conformance with reporting guidelines, maintenance of data trails etc.	*Identification of areas of residual risks, i.e. areas of potential reporting risks where there are no adequate management controls to mitigate potential reporting risks* *Areas where data accuracy, completeness and consistency could be improved are highlighted.*

Periodic Verification Checklist Table 3: Detailed audit testing of residual risk areas and random testing		
Areas of residual risks	**Additional verification testing performed**	**Conclusions and Areas Requiring Improvement (including *FARs*)**
List of residual areas of risks of Periodic Verification Checklist Table 2 where detailed audit testing is necessary. *In addition, other material areas may be selected for detailed audit testing.*	*The additional verification testing performed is described. Testing may include:* ▪ *Sample cross checking of manual transfers of data* ▪ *Recalculation* ▪ *Spreadsheet 'walk throughs' to check links and equations* ▪ *Inspection of calibration and maintenance records for key equipment* ▪ *Check sampling analysis results* *Discussions with process engineers who have detailed knowledge of process uncertainty/error bands.*	*Having investigated the residual risks, the conclusions are noted here. Errors and uncertainties are highlighted.*

Figure 1 Verification Protocol Tables

2.1 Review of Documents

The monitoring report submitted by the client and additional background documents related to the project performance were reviewed. A complete list of all documents reviewed is attached as annex 2 to this report.

2.2 Follow-up Interviews

On March 16, 2007, TÜV SÜD performed interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. Representatives of all management units having influence on data used to determine the emission reductions were interviewed. The main topics of the interviews are summarized in Table 1.

Table 1 Interview topics

Interviewed organization	Interview topics
Agrosuper (incl. consultants)	➢ Project implementation ➢ Reporting procedures ➢ Technical equipment and operation ➢ Monitoring plan ➢ Quality Assurance and Quality Control ➢ Agro-industrial activities ➢ Monitored data ➢ GHG calculation ➢ Data archiving ➢ Data transfer ➢ Compliance with national laws and regulations ➢ Upcoming changes to stages of manure treatment
Aguas y Riles	➢ Performance of maintenance work ➢ Reporting procedures ➢ Quality Management ➢ Sample taking procedures

2.3 Resolution of Corrective and Forward Action Requests

The objective of this phase of the verification was to resolve the requests for corrective actions and any other outstanding issues which needed to be clarified for TÜV SÜD`s positive conclusion on the GHG emission reduction calculation. Forward Action Requests are indicated issues which do not effect the generation of emission reduction in the verified period, but shall be improved in order to ensure the reliability of future data. To guarantee the transparency of the verification process, the concerns raised and responses that have been given are summarized in chapter 3 below and documented in more detail in the verification protocol in annex 1.

3 VERIFICATION FINDINGS

In the following sections the findings of the verification are stated. The verification findings for each verification subject are presented as follows:

The findings from the desk review of the final monitoring report and the findings from interviews during the follow up visit are summarized. A more detailed record of these findings can be found in the Verification Protocol in annex 1.

1) Where TÜV SÜD had identified issues that needed clarification or that represented a risk to the fulfillment of the project objectives, a Corrective or Forward Action Request, respectively, have been issued. The Corrective and Forward Action Requests are stated, where applicable, in the following sections and are further documented in the Verification Protocol in annex 1. The verification of the project resulted in one Forward Action Requests.
2) Where Corrective Action Requests, Open Issues, or Forward Action Request have been issued, the exchanges between the Client and TÜV SÜD to resolve these Corrective Action Requests, Open Issues, or Forward Action Request are summarized.
3) In the context of Forward Action Requests, risks have been identified, which may endanger the delivery of high quality CERs in the future, i.e. by deviations from standard procedures as defined by the MP. As a consequence, such aspects should receive a special focus during the next consecutive verification. A FAR may originate from lack of data sustaining claimed emission reductions. Forward Action Requests are understood as recommendation for future project monitoring; they are stated, where applicable, in the following sections and are further documented in the Verification Protocol in annex 1.
4) The final conclusions for verification subject are presented.

The verification findings relate to the project implementation as documented and described in the final monitoring report.

Initial Verification Findings

3.1 Remaining issues, CARs, FARs from previous validation

3.1.1 Discussion

The Corrective Action Requests (CAR) and Clarification Requests (CR) raised by DNV presented to the project participants in DNV's draft validation report of 09 September 2005 (rev. 0) were resolved during communications between the project participants and DNV and through the submission of the revised PDD of 21 November 2005

3.1.2 Findings

None

3.1.3 Conclusion

The project complies with the requirements.

3.2 Project Implementation

3.2.1 Discussion

The project has been implemented as defined in the PDD and there is no change in the major equipments. Equipment is delivered from several countries including a high share of technology transfer, while no document is available summarizing all equipment installed for that purpose.

The project is based on aerobic digestion in a activate sludge treatment system (dissolved air flotation solid-separation units with aerobic treatment. Following this treatment stage, the sludge runs into an aerobic and controlled storage lagoon for irrigation purposes and for composting. The activated-sludge process is an aerobic treatment system with a continuous flow that uses complex populations of aerobic micro-organisms to break down organic matter in wastewater. The project design and engineering reflects good practice and is significantly better than the common practice of swine management in Chile. The raw effluent is pumped into a balance tank and then through a primary solids separation unit (presses) where an initial volume of manure is removed. The remaining effluent is transported to a dissolved air flotation unit (DAF) and then into the anoxic tank of the aerobic system, where it is mixed with an active mass of micro-organisms (referred to as activated sludge) capable of aerobically degrading organic. Mechanical aeration maintains the aerobic environment in the basin and keeps reactor contents (referred to as mixed liquor) completely mixed. After a specific treatment time, water is pumped into the secondary DAF unit, where the sludge settles under quiescent conditions and a clarified effluent is obtained. The process recycles a portion of settled sludge back to the aeration basin to maintain the required sludge concentration (within the aerobic basin). The process also intentionally wastes a portion of the separated sludge to maintain the required solid retention time for effective organic (BOD) removal. This aerobic component of the advanced waste management system considers the capability to receive raw manure directly from the barns.

Treatment System was shown to the audit team, and is consistent with the information of the PDD.

The additional electric consumption can be considered as being negligible and therefore not requiring any adjustment of emission reductions. This aspect has already been indicated by the PDD and the validation report and now has been proved by inspecting the type and operating mode of additional consumers.

Both Treatment Systems (Maitenlahue and La Manga) have already gone into operation in March 26th, 2004. This has already been stated by the PDD as consequence of its retrospective registration. The starting date has already been referenced by the validation process, too.

The MR provides a list of all parameter to be monitored either by accounting input data or by using technical metering by equipment. This list is in line with the monitoring plan provided by the PDD of the registered project and already evaluated during the validation process. All required equipment and procedures are implemented in an appropriate manner using state of the art technology or reference to standardized analysis procedures.

Data on livestock indicators are maintained by the production units independently from any CDM activity. Paper records are checked by several persons and are transferred manually to a database used for management of agro-industrial activities. As this data is again used in daily operations by the same staff members in several departments filling input tables, there is high certainty that any inconsistent data would be identified. The CDM project team is only able to download such data for later processing in own files, but has no permit (electronically prohibited) to make any inputs or changes in that database.

Operation data and records of laboratory analyses are kept in electronic and paper format by Agroforestal Corneche (member of the same company group).

The CDM project team is responsible to consolidate all data required for emission reduction calculations. Calculations are done by the use of Excel spreadsheets. Only two persons have access to original spreadsheets, whereas more staff members have the right to read such data and copy it for own purposes. All corrective changes by data within monthly files are explained by comments inserted to the cell of the spreadsheet concerned. Data corrections are only made in form of setting a full day valid for emissions reductions or not. In the later case no reductions will be claimed.

On basis of monthly consolidated data the CDM team is responsible to provide emissions reduction reports to the management level and the other two project participants after the end of each quarter.

The submitted monitoring report forming the base of this verification was mainly done by the same routine frfom other project from AGROSUPER, summarizing consolidated monthly data over the whole monitoring period.

The Monitoring report comes with a legally binding signature by the manager of Agrosuper (serving as focal point for all communication of this CDM project), person authorized to sign such reports. As the certifier takes over liability for all verified emission reductions it is required to have an indication of a person to be contacted in case of any disputes.

EB request for Review Issue 1:

The project participant and the DOE are required to provide:

1. The monitoring report states that the flow rate of the manure after aerobic treatment and the five-day Biological Oxygen Demand (BOD) of the treated manure were calculated, while the monitoring plan and the approved methodology require the measurement of these parameters. In addition the temperature in the treated manure flow has not been monitored as per the monitoring plan. However the approved methodology requires the measurement of this parameter to confirm there was no leakage emissions. The verification report has not appropriately addressed these deviations.

Response by the project participants:

The monitoring plan from the PDD states in page 28 that "the flow rate after aerobic treatment is calculated with total inlet flow minus sludge volume. Total inlet flow is monitored from a flow meter installed before the activated sludge". The sludge volume is also monitored every month. In addition, the validation report states in page 7 that "the manure flow leaving the aerobic treatment stage will not be directly measured, but calculated as the difference between measured flow into the aerobic treatment stage and the flow of sludge from the aerobic treatment stage". Consequently, the project was registered considering this approach. The monitoring report states in page 5 that the flow rate after aerobic treatment is "calculated with total inlet flow minus sludge volume". Then, the monitoring report is consistent with the registered PDD and the validation report.

The monitoring of the inlet flow of the plant is an operational parameter of the AWMS. This parameter controls the hydraulic rate and load rate of the AWMS equipment. The purpose is to determine if the flow rate and the parameters load are according to design. If the flow rate differs from design, procedures are taken at the plant to adjust operation. The philosophy of control of the activated sludge plant does not consider or require the monitoring of the outlet flow. Due to it is not necessary as a control parameter for the proper operation of the AWMS, the flow

rate at the outlet of the activated sludge plant was not considered as a monitored parameter in the CDM Monitoring Plan.

Nonetheless, Agrosuper continuously improving the Environmental Management System has implemented at Maitenlahue and La Manga pilot projects regarding the measurement of the flow rate at the outlet of the plant. These are the only AWMS of Agrosuper were flow meters have been installed. The objective of the installation of the flow meters at the outlet of the plant is to reuse treated manure at the barns for the flushing of the manure. Attached are the registries regarding the outlet flow monitoring for Maitenlahue and La Manga, "Totalizer effluent Maitenlahue 2006.xls" and "Totalizer effluent La Manga 2006.xls".

Agrosuper wants to emphasize that the BOD_5 of liquid effluent has been monitored as per the monitoring plan during the complete period covered in this verification process and these registries are attached in the spreadsheets "Registries of the monitoring plan for Maitenlahue May_Dec 2005.xls", "Registries of the monitoring plan for Maitenlahue Jan_Oct 2006.xls", "Registries of the monitoring plan for La Manga Sep_Dec 2005.xls" and "Registries of the monitoring plan for La Manga Jan_Oct 2006.xls". The final monitoring report is making reference to the BOD_5 of liquid effluent not to the BOD_5 of the sludge.

During part of the present verification period there was a contingency and the sludge from Maitenlahue was disposed anaerobically since 25/08/2006 from and La Manga since 26/08/2006. Due to this contingency the leakages related to the anaerobic management of the sludge have to be accounted. Then, a value of the BOD_5 of the sludge is needed in order to estimate this leakage. The BOD_5 of the sludge was calculated based in the measured BOD_5 of the influent and the measured BOD_5 of the liquid effluent, according to the procedure detailed in the monitoring report. Agrosuper has been monitoring periodically the influent BOD_5 and the effluent BOD_5 for operational purposes and the registries of this monitoring is attached in the spreadsheets "BOD monitoring Maitenlahue 2006.xls" and "BOD monitoring La Manga 2006.xls". In order to calculate de BOD of the sludge, a monthly average of the influent BOD measurements and the effluent BOD measurements has been considered.

It is not feasible technically to measure in the laboratory the BOD_5 of a dehydrated sludge because the analysis has a high level of uncertainty and it has to be done with large dilutions in order to have a right lecture in the spectrophotometer, generating an important error in the measurement. Furthermore, in Chile there is not any standard and no laboratory has accreditation to measure the BOD_5 of a dehydrated sludge. For this reason, in order to get a valid and reliable estimation to calculate the leakages related to anaerobic management of the sludge, it was proposed to the DOE to calculate the BOD_5 by means of a mass balance, using the procedure detailed in the page 10 of the final monitoring report. Thus, Agrosuper has monitored BOD_5 at the inlet and outlet of the plant, and with both monitored data, has calculated the BOD_5 of the sludge.

The temperature has been measured for Maitenlahue and La Manga according the monitoring plan during the complete period covered in this verification process. Agrosuper presented to de DOE the registries of the temperature for both projects in the verification audit.

The registries of the BOD_5 and the temperature are attached in the spreadsheets "Registries of the monitoring plan for Maitenlahue May_Dec 2005.xls", "Registries of the monitoring plan for Maitenlahue Jan_Oct 2006.xls", "Registries of the monitoring plan for La Manga Sep_Dec 2005.xls" and "Registries of the monitoring plan for La Manga Jan_Oct 2006.xls".

Response by TÜV SÜD:

The flow at the outlet of the plant has been monitored as confirmed on-site. The BOD is measure for the liquid phases as the measurement of BOD of sludge is not accurate. Therefore it is TÜV SÜDs opinion that the procedure used by the project developer gives the best certainty to calculate the leakages related to anaerobic management of the sludge.
Additionally the measurement of the temperature has been also confirmed on-site. The data showing all this measurements is attached.

3.2.2 Findings

None

3.2.3 Conclusion

The project complies with the requirements.

3.3 Internal and External data

3.3.1 Discussion

The following internal parameters need to be obtained according to the monitoring plan of the registered final PDD:

Animal Population

Average Weight of Pigs

Manure flow to the aerobic post treatment

5 days Biochemical Oxygen Demand (BOD) in storage lagoon after aerobic treatment

Total Nitrogen content in second phase plant effluent

Temperature of manure in second phase plant effluent.

The implemented monitoring system is completely covering all these parameter. But the methodology is open for changes in the category of livestock population. As Agrosuper is only working with the same category of livestock (finishers) within their CDM activities, as already indicated by the PDD, it was assumed that there is no necessity to further indicate the category(-ies) of livestock population within the monitoring report.

The following methods for data acquisition are applied:

Animal Population: Determination of inlet and outlet of all barns which are operated in batch mode, i.e. filling of empty barns of one "farm" in approx. one week, feeding of finishers over several months and dispatch to slaughterhouses within few days. Detailed counting is done during every rotation by two parties (delivering farm and receiving farm or slaughterhouse). Daily stock is corrected every day by discounting dead animals in order to evaluate the as operation factor. All data are manually written in forms having several copies. A routine procedure allows copies of manually written data to be transported from all farms associated to Maitenlahue and La Manga to Longovilo Food Plant, where data are transferred to the computer system.

Average Weight of Pigs: Average weight of fixed sets of pigs (and therefore the whole population of a "farm") is determined at inlet and outlet using calibrated weighing installations of

Agrosuper. A growing tendency curve is correcting differences to a linear weight increase. As long as mortality shows no significant variation in time this is acceptable to be used for determining the average weight. All data is maintained and processed by the same system as mentioned above.

Manure flow to the aerobic post treatment: Total inlet flow is monitored from a flow meter installed before the activated sludge.

5 days Biochemical Oxygen Demand (BOD) in storage lagoon after aerobic treatment: Between each treatment stage of the manure waste management system, the biochemical oxygen demand BOD is measured during monitoring activities.

Total Nitrogen content in second phase plant effluent: Between each treatment stage of the manure waste management system, the nitrogen content N is measured during monitoring activities.

Temperature of manure in second phase plant effluent: Between each treatment stage of the manure waste management system, the temperature T is measured during monitoring activities.

According to the monitoring plan the following data is taken from external literature sources (IPCC; see baseline section of PDD):

Global Warming Potential of Methane

Global Warming Potential of Nitrous Oxide

Methane density at 20°C and 1 atm pressure

Methane Conversion Factor for Manure Treatment Activities

Maximum Methane Production Capacity B_0 for a defined livestock population

Volatile Solid Excretion of a defined livestock population

Default Average Swine Weight (uncorrected) of a defined livestock population

Default N_2O Emission Factor for the first treatment stage

Conversion Factor for Nitrous Oxide to Nitrogen

Default Nitrogen Excretion per Head of a defined livestock population

Default Average Nitrogen Excretion (NEX) of a defined livestock population

There is no requirement to include data from other Third Parties into the monitoring procedures.

3.3.2 Findings

None

3.3.3 Conclusion

The project complies with the requirements.

3.4 Environmental and Social Indicators

3.4.1 Discussion

No environmental and social indicators are defined in the monitoring plan.

3.4.2 Findings

None

3.4.3 Conclusion

The project complies with the requirements.

3.5 Management and Operational System

3.5.1 Discussion

Agrosuper has developed a documented procedure entitled: "Procedemiento para sistema de registros MDL; rev. 5", which is an integral part of the certified management system (ISO9001, ISO14001). The certified management system covers all agro-industrial activities of Agrosuper and hence also acquisition and documentation of all information on the livestock population. QMS documentation is available at all offices and sites addressed by the procedures and manuals.

Responsibilities are clearly referred to by the documented procedure indicated above. This can also be confirmed for the agro-industrial activities delivering relevant data input.

The subcontracted maintenance provider, "Aguas y Riles" is intending to have an own certified ISO9001 system available in 2006. Nonetheless they are using, as required by the service contracts, the quality assurance documents as provided by Agrosuper since the project's starting date.

The "Procedemiento para sistema de registros MDL; rev. 5" provides for the generation of consolidated data on monthly basis delivering results on emissions reductions and since the beginning served as mean of communication between the three project participation. But it does not yet include the process of finalizing and submitting a final monitoring report for verification.

EB Request for Review Issue 2:

The project participant and the DOE are required to provide:

2. Please address the discrepancies of emission reductions between in the form of request for issuance of the Verification Report and in the spreadsheet of the final monitoring report.

Response by the project participants:

The final emission reductions presented in the request for issuance form, the verification report and certification report are lower than those detailed in the final monitoring report and in the submitted spreadsheet because only the figures in the request for issuance form, the verification report and certification report are rounded off for conservativeness, as required by TÜV SÜD. The rounding off was made conservatively, by rounding down the baseline emissions and rounding up the project emissions and the leakage. Therefore, the spreadsheet and the final monitoring report have been corrected including the conservative rounding off of the emission reductions. Attached is the corrected final monitoring report "**Final monitoring report Maitenlahue and La Manga.doc**" and the corrected spreadsheets "**(2) Documento calculo reduccion de emisiones Maitenlahue May_Dic 2005.xls**", "**(3) Documento calculo reduccion de emisiones Maitenlahue Ene_Oct 2006.xls**", "**(1) Documento calculo**

reduccion de emisiones La Manga Sep_Dic 2005.xls" and "**(6) Documento calculo reduccion de emisiones La Manga Ene_Oct 2006.xls**".

Response by TÜV SÜD:

TÜV SÜD confirms the receipt of the spreadsheet with the conservative round off calculations of emission reductions. The request for CERs is now consistent with the Request for issuance of the Monitoring Report, the spreadsheet and the Verification Report.

3.5.2 Findings

None.

3.5.3 Conclusion

The project complies with the requirements.

Periodic Verification Findings

3.6 Completeness of Monitoring

3.6.1 Discussion

The reporting procedures reflect the monitoring plan completely. All parameter were determined as prescribed. No changes to the monitoring plan are required for the monitoring period affected by this verification. A Forward Action Request has been defined in order to assess during next verification works (See FAR 1 in Annex 1, Table 4).

3.6.2 Findings

Forward Action Request No. 1

It will be necessary to demonstrate that changes made to the final treatment stage (soil application will be replaced by composting) after the monitoring period covered by this verification (May 2005 to October 2006) is compatible with the validated PDD and it should not reduce the features of additionality of the Project activity.

3.6.3 Conclusion

The project complies with the requirements. In the next verification FAR No. 1 will be verified.

3.7 Accuracy of Emission Reduction Calculations

3.7.1 Discussion

Due to the approved methodology there is no need to make corrections for data uncertainty. But data have to be obtained with high accuracy. Key parameters are Animal Population, Average Weight of Pigs, Manure flow to the aerobic post treatment, 5 days Biochemical Oxygen Demand (BOD) in storage lagoon after aerobic treatment, Total Nitrogen content in second phase plant effluent and Temperature of manure in second phase plant effluent.

3.7.2 Findings

None.

3.7.3 Conclusion

The project complies with the requirements.

3.8 Quality of Evidence to Determine Emission Reductions

3.8.1 Discussion

Spot checks were made by comparing raw data with integrated information at Longovilo headquarters. It has been seen that data sets received concerning monthly consolidated data is reproducible by raw data, being consistent. All excel files used to deliver consolidated figures have been investigated excessively. Data is transferred with a macro without possibilities to modify them.

3.8.2 Findings

None.

3.8.3 Conclusion

The project complies with the requirements.

3.9 Management System and Quality Assurance

3.9.1 Discussion

Calibration sheets for all weighing equipment used for agro-industrial activities by Agrosuper are available on site. They are stored on the premises have such installations.

No further calibration activities are required for this CDM activity.

Maintenance of metering systems and operation of waste manure treatment systems is contracted to an external service provider having clear advice/duties to use the forms and procedures developed for quality and data management purposes.

Agrosuper has developed a documented procedure entitled: "Procedimiento para sistema de registros MDL; rev. 5", which is an integral part of the certified management system (ISO 9001, ISO14001). Mr. Carlos Andrés Vives and Mrs. Paola Gutiérrez (not working yet on AGROSUPER Ltda. Their duties are assumed by Mr. José Manuel San Martín today) are the only persons having access to the file system containing raw data and consolidated data. Only after consolidation data is available for further users on different folders.

The rights for the file system are protected by IT solutions requiring the correct use of passwords.

The system is designed to give exclusively access to file systems for specifically for each user through the system administrator.

Production data is processed and maintained by a database system able to allocate rights for writing and reading for each record to each type of user separately. The CDM team only has the right to read data and to export data to excel files.

The IT system is based on standard multi-user server systems and MS-office solutions. Moreover the IT system from AGROSUPER Ltda. is certified ITIL by EXIN. ITIL (Information Technology Infrastructure Library) is a framework of best practice approaches intended to facilitate

the delivery of high quality information technology (IT) services. ITIL outlines an extensive set of management procedures that are intended to support businesses in achieving both high financial quality and value in IT operations.

3.9.2 Findings

None.

3.9.3 Conclusion

The project complies with the requirements.

4 PROJECT SCORECARD

The conclusions on this scorecard are based on the revised monitoring report.

Risk Areas		Conclusions			Summary of findings and comments
		Baseline Emissions	Project Emissions	Emission Reductions	
Completeness	Source coverage/ boundary definition	✓	✓	✓	All relevant sources are covered by the monitoring plan and the boundaries of the project are defined correctly and transparently.
Accuracy	Physical Measurement and Analysis	✓	✓	✓	State-of-the-art technology is applied in an appropriate manner.
	Data calculations	✓	✓	✓	Emission reductions are calculated correctly.
	Data management & reporting	✓	✓	✓	An eligible data management system is in place. Potential for improvement is indicated by the stated FARs.
Consistency	Changes in the project	✓	✓	✓	Results are consistent to underlying raw data.

5 VERIFICATION STATEMENT

TÜV SÜD Industrie Service GmbH has performed a verification of the registered CDM project: "Advanced swine manure treatment in Maitenlahue and La Manga" in Chile. The verification is based on requirements of the UN Framework Convention on Climate Change (UNFCCC). In this context, the relevant documents are the "Marrakech Accords".

The management of Agricola Super Limitada is responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions on the basis set out within the project Monitoring and Verification Plan indicated in the final PDD version dated November 2005. The development and maintenance of records and reporting procedures in accordance with that plan, including the calculation and determination of GHG emission reductions from the project is the responsibility of the management of the project.

The verifier confirms that the project is implemented as planned and described in validated and registered project design documents. Installed equipment being essential for generating emission reduction runs reliably and is calibrated appropriately. The monitoring system is in place and the project is ready to generate GHG emission reductions.

The verifier can confirm that the GHG emission reduction for the whole monitoring period is calculated without material misstatements. Even though our opinion relates to the project's GHG emissions and resulting GHG emissions reductions reported and related to the valid and registered project baseline and monitoring, and its associated documents. Based on the information we have seen and evaluated we confirm the following statement:

Reporting period: From 01-02-2005 to 31-10-2006.

Verified emission in the above reporting period:

Base Line Emissions :	244,024	t CO_2 eq
Project Emissions (incl. lekage) :	15,376	t CO_2 eq
Emission reductions:	228,648	t CO_2 eq

Munich, 2007-08-16

Werner Betzenbichler

Certification Body "Climate and Energy"

Munich, 2007-08-16

Javier Castro

Assessment Team Leader

Annex 1: Verification Protocol

1 INITIAL VERIFICATION CHECKLIST

OBJECTIVE	Ref.	COMMENTS	Conclusion
1. Opening Session			
1.1. Introduction to audits	4	The intention and the target of the audit were illustrated to the participants of the audit. The following persons were attending the introduction session: Mr. Víctor Abarca TÜV SÜD, Local GHG Auditor Mr. Iván Bugueño TÜV SÜD, GHG Trainee Auditor Mr. Carlos Andrés Vives Agrosuper, Corporate Affairs Manager Mr. José Manuel San Martín Agrosuper, CDM Supervisor Mrs. Andrea Rudnick POCH Ambiental, CDM Specialist Mrs. Luz Farah POCH Ambiental, CDM Specialist Mr. Ernesto Muñoz Agrosuper, IT Business Manager Mr. Alexis Pino Agrosuper, Manager Biodigester La Estrella Mr. Mauro Guerrero Aguas y Riles, Water Treatment Plant Administrator Mr. Rodrigo Gomez Agrosuper ,Water Treatment Manager.	☑
1.2. Clarification on open access	4	The verification team got open access to all required plans, data, records, drawings and to all relevant facilities.	☑
1.3. Involvement of other project participants	1, 4	No other participants are considered as stated on the PDD.	☑
2. Open issues indicated in validation report			
2.1. Registration	4, 6	The project has been registered under the CDM on September 09, 2006 under the reference number 00458.	☑

OBJECTIVE	Ref.	COMMENTS	Conclu-sion
2.2. Open issue forwarded to the verification process	2, 4, 5	All Issues are solved during validation process	☑
3. Implementation of the pro-ject			
3.1. Physical components	1, 3, 4, 5	The project has been implemented as defined in the PDD and there is no change in the major equipments. Equipment is delivered from several countries including a high share of technology transfer. The project begins its operation on March 26th, 2004	☑
3.2. Project boundaries	1, 4, 5	The project boundaries are as defined in the PDD.	☑
3.3. Monitoring and metering systems	1, 3, 4, 5	The MR provides a list of all parameter to be monitored either by accounting input data or by using technical metering by equipment. This list is in line with the monitor-ing plan provided by the PDD of the registered project and already evaluated during the validation process. All required equipment and procedures are implemented in an appropriate manner using state of the art technology or reference to standardized analysis procedures. But no comprehensive list is yet available providing information for metered parameter on type of equipment, accuracy, physical or chemical princi-ples and calibration requirements.	☑
3.4. Data uncertainty	1, 3, 4, 5, 8 11 13 14 15 16	Any adjustment of calculations by data uncertainty is not required by the underlying approved methodology. Nonetheless it is self-evident that highest accuracy is re-quired under reasonable economical conditions. The following lists the result of an evaluation of all uncertainties as identified for the first monitoring period: Animal Population: Determination of inlet and outlet of all barns which are operated in batch mode, i.e. filling of empty barns of one “farm” in approx. one week, feeding of finishers over several months and dispatch to slaughterhouses within few days. Detailed counting is done during every rotation by two parties (delivering farm and receiving farm or slaughterhouse). Daily stock is corrected every day by discounting	☑

OBJECTIVE	Ref.	COMMENTS	Conclusion
		dead animals in order to evaluate the as operation factor. All data are manually written in forms having several copies. A routine procedure allows copies of manually written data to be transported from all farms associated to Maitenlahue and La Manga to Longovilo Food Plant or Rancagua Headquarters, where data are transferred to the computer system. Average Weight of Pigs: Average weight of fixed sets of pigs (and therefore the whole population of a "farm") is determined at inlet and outlet using calibrated weighing installations of Agrosuper. A growing tendency curve is correcting differences to a linear weight increase. As long as mortality shows no significant variation in time this is acceptable to be used for determining the average weight. All data is maintained and processed by the same system as mentioned above. Manure flow to the aerobic post treatment: Total inlet flow is monitored from a flow meter installed before the activated sludge. 5 days Biochemical Oxygen Demand (BOD) in storage lagoon after aerobic treatment: Between each treatment stage of the manure waste management system, the biochemical oxygen demand BOD is measured during monitoring activities. Total Nitrogen content in second phase plant effluent: Between each treatment stage of the manure waste management system, the nitrogen content N is measured during monitoring activities. Temperature of manure in second phase plant effluent: Between each treatment stage of the manure waste management system, the temperature T is measured during monitoring activities.	
3.5. Calibration and quality assurance	4, 5	Wherever required calibration procedures are correctly applied by Agrosuper by ordering Third Parties to deliver this service. Records are kept in the files and can be provided completely on request. All necessary maintenance and quality assurance measures are performed as laid down by the quality management system. The system itself is undergoing a continuous improvement process.	☑

OBJECTIVE	Ref.	COMMENTS	Conclu-sion
3.6. Data acquisition and data processing systems	4, 5, 9, 10	As shown by a chart included in the quality management manual there are several separate paths of data collection. Data on livestock indicators are maintained by the production units independently from any CDM activity. Paper records are checked by several persons and are transferred manually to a database used for management of agro-industrial activities. As this data is again used in daily operations by the same staff members in several departments filling input tables, there is high certainty that any inconsistent data would be identified. The CDM project team is only able to download such data for later processing in own files, but has no permit (electronically prohibited) to make any inputs or changes in that database. Operation data and records of laboratory analyses are kept in electronic and paper format by Agroforestal Corneche (member of the same company group). The CDM project team is responsible to consolidate all data required for emission reduction calculations. Calculations are done by the use of Excel spreadsheets. Only two persons have access to original spreadsheets, whereas more staff members have the right to read such data any copy it for own purposes. All corrective changes by data within monthly files are explained by comments inserted to the cell of the spreadsheet concerned. Data corrections are only made in form of setting a full day valid for emissions reductions or not. In the later case no reductions will be claimed. Data quality is assured using good data management procedures.	☑
3.7. Reporting procedures	3, 4	On basis of monthly consolidated data the CDM team is responsible to provide emissions reduction reports to the management level. The submitted monitoring report forming the base of this verification was mainly done by the same routine summarizing consolidated monthly data over the whole monitoring period. As no required by EB on formats have been provided examples of other projects already having a public available report were used to prepare a template. Reports will have legally binding signature either by the manager of Agrosuper (serving as focal point for all communi-	☑

OBJECTIVE	Ref.	COMMENTS	Conclu-sion
		cation of this CDM project) or by representatives all project participants or a person authorized to sign such reports. As the certifier takes over liability for all verified emission reductions it is required to have an indication of a person to be contacted in case of any disputes.	
3.8. Documented instructions	4, 5, 9	Agrosuper has developed a documented procedure entitled: "Procedimiento para sistema de registros MDL; rev. 5", which is an integral part of the certified management system (ISO9001, ISO14001). All agro-industrial activities including the monitoring of such data are also treated by the same system. All such documents are available at the barn operator offices. For maintenance of the manure treatment system checklists and protocols have been developed and are filled daily. No management system as such is available for the operation which has been contracted to "Aguas y Riles". This company intends to run an own ISO 9001 certification in 2006. Manuals of all equipment as prepared by the manufacturers are available at all treatment utilities.	☑
3.9. Qualification and training	4, 5, 14	The recent team members working with data relevant for the determination of emission reductions is qualified and trained as shown during the on-site inspections. Although only two persons are having access to the CDM register itself, some more persons have been trained in its use for back-up reasons. No specialized laboratory analysis is needed. Personnel of "Aguas y Riles" in charge of this tasks showed adequate qualification and training. The additional task of ANAM to supervise the sample taking activities of "Aguas y Riles" for this measurements is safeguarding the high quality when performing these sensitive procedures.	☑
3.10. Responsibilities	4, 5, 9	Agrosuper has developed a documented procedure entitled: "Procedimiento para sistema de registros MDL; rev. 5", which is an integral part of the certified management system (ISO9001, ISO14001). This document includes an organizational chart presenting the responsibilities. It has been proven on-site that all indicated responsi-	☑

OBJECTIVE	Ref.	COMMENTS	Conclu-sion
		bilities are implemented as described. The responsibility for compiling and consolidating data as well as for preparing the monitoring report is given to the corporate environmental manager, Mr. Carlos Andrés Vives, who also serves as contact point for the CDM activity as stated by the final PDD version. For the preparation of the report Agrosuper contracted consultancy service to Urquidi, Riesco & Compañia, Mr. Sergio Vives, who has already been involved in the project’s development and registration process. For evaluation the results of data requiring chemical analysis, Agrosuper contracted a further consultancy company, POCH, which was already involved in the PDD development, too. The installation and operation of all waste manure systems is supervised by Agroforestal Corneche, a further member of the Agrosuper Group. This company ordered an independent service company, “Aguas y Riles”, to perform the maintenance works of installations covered by the registered CDM activities. This is done on having installed on full time basis numerous employees only running these activities in 3 shifts per work day.	
3.11. Troubleshooting procedures	3, 4, 5, 9	Concerning the operation of agro-industrial activities as well as of the waste manure treatment activities maintenance schedules are available including documentation of all problems and repair work occurred. Concerning data treatment in case of problems there is a separate chapter included in the “Procedimiento para sistema de registros MDL; rev. 5”. The procedures do not allow manual correction of data but only logic tests by control parameter setting days of operation being valid or not. In the second case no emission reduction is being claimed for such days leading to a most conservative determination of emission reductions in cases of unclear situations. During on-site audits such events during the monitoring report have been demonstrated and discussed.	☑
4. Internal Data			

OBJECTIVE	Ref.	COMMENTS	Conclusion
4.1. Type and sources of internal data	1, 3, 4, 5	The following internal parameters need to be obtained according to the monitoring plan of the registered final PDD: Animal Population Average Weight of Pigs Manure flow to the aerobic post treatment 5 days Biochemical Oxygen Demand (BOD) in storage lagoon after aerobic treatment Total Nitrogen content in second phase plant effluent Temperature of manure in second phase plant effluent	☑
4.2. Data collection	1, 3, 4, 5	The following methods are applied: Animal Population: All data are manually written in forms having several copies. A routine procedure allows copies of manually written data to be transported from all farms associated to Maitenlahue and La Manga to Longovilo Food Plant or Rancagua Headquarters, where data are transferred to the computer system. Average Weight of Pigs: Average weight of fixed sets of pigs (and therefore the whole population of a “farm”) is determined at inlet and outlet using calibrated weighing installations of Agrosuper. All data is maintained and processed by the same system as mentioned above. Manure flow to the aerobic post treatment: Total inlet flow is monitored from a flow meter installed before the activated sludge. 5 days Biochemical Oxygen Demand (BOD) in storage lagoon after aerobic treatment: Between each treatment stage of the manure waste management system, the biochemical oxygen demand BOD is measured during monitoring activities.	☑

OBJECTIVE	Ref.	COMMENTS	Conclu-sion
		Total Nitrogen content in second phase plant effluent: Between each treatment stage of the manure waste management system, the nitrogen content N is measured during monitoring activities. Temperature of manure in second phase plant effluent: Between each treatment stage of the manure waste management system, the temperature T is measured during monitoring activities.	
4.3. Quality assurance	1, 3, 4, 5, 8	The following quality assurance measures are applied: Animal Population: Detailed counting is done during every rotation by two parties (delivering farm and receiving farm or slaughterhouse). Daily stock is corrected every day by discounting dead animals in order to evaluate the as operation factor. System permits cross check of data. Average Weight of Pigs: Average weight of fixed sets of pigs (and therefore the whole population of a “farm”) is determined at inlet and outlet using calibrated weighing installations of Agrosuper. All data is maintained and processed by the same system as mentioned above. Manure flow to the aerobic post treatment: Total inlet flow is monitored from a flow meter installed before the activated sludge. Data collected with electronic devices.. 5 days Biochemical Oxygen Demand (BOD) in storage lagoon after aerobic treatment: Between each treatment stage of the manure waste management system, the biochemical oxygen demand BOD is measured during monitoring activities. Certified Laboratory equipment and operators are considered to this activity. Total Nitrogen content in second phase plant effluent: Between each treatment stage of the manure waste management system, the nitrogen content N is measured during monitoring activities. Certified Laboratory equipment and operators are consid-	☑

OBJECTIVE	Ref.	COMMENTS	Conclusion
		ered to this activity. Temperature of manure in second phase plant effluent: Between each treatment stage of the manure waste management system, the temperature T is measured during monitoring activities.	
4.4. Significance and reporting risks	1, 3, 4, 5	Concerning materiality of data input and reporting risks the assessment was leading to the following results: Animal Population: The dates without or with growing or decreasing populations are correctly reflected by the datasets also showing zero populations during two rotation phases. Any hypothetical, additional animal leading to higher emission reductions in principle would result in a lower average weight of animal therefore balancing this calculation error. Hence no significant reporting risk can be determined although this factor has a material impact on the result of the emission reduction calculation. Average Weight of Pigs: All that data is have important impact on the economical success of the agro-industrial activities and therefore maintained very carefully. This factor has also a material impact on the result of the emission reduction calculation. But no significant reporting risk can be determined as long as the agro-industrial activities are not disturbed in larger extent by animal diseases leading to high mortality rates. Manure flow to the aerobic post treatment:: This data is used for logic decision of setting emission reduction calculations valid or not. Significant risk could only occur in case of intended manipulation of data sets. As data is kept on several sites any unrecorded manipulation would require extensive logistic efforts to delete all traces. 5 days Biochemical Oxygen Demand (BOD) in storage lagoon after aerobic treatment: This data is used for logic decision of setting emission reduction calcula-	☑

OBJECTIVE	Ref.	COMMENTS	Conclusion
		tions valid or not. Significant risk could only occur in case of intended manipulation of data sets. As data is kept on several sites any unrecorded manipulation would require extensive logistic efforts to delete all traces. Total Nitrogen content in second phase plant effluent: This data is used for logic decision of setting emission reduction calculations valid or not. Significant risk could only occur in case of intended manipulation of data sets. As data is kept on several sites any unrecorded manipulation would require extensive logistic efforts to delete all traces. Temperature of manure in second phase plant effluent: This data is used for logic decision of setting emission reduction calculations valid or not. Significant risk could only occur in case of intended manipulation of data sets. As data is kept on several sites any unrecorded manipulation would require extensive logistic efforts to delete all traces.	
5. External Data			
5.1. Type and sources of external data	1, 3, 6, 17, 18	According to the monitoring plan the following data is taken from external literature sources (IPCC; see baseline section of PDD): lobal Warming Potential of Methane Global Warming Potential of Nitrous Oxide Methane density at 20°C and 1 atm pressure Methane Conversion Factor for Manure Treatment Activities Maximum Methane Production Capacity B_0 for a defined livestock population Volatile Solid Excretion of a defined livestock population Default Average Swine Weight (uncorrected) of a defined livestock population Default N_2O Emission Factor for the first treatment stage	☑

OBJECTIVE	Ref.	COMMENTS	Conclu-sion
		Conversion Factor for Nitrous Oxide to Nitrogen Default Nitrogen Excretion per Head of a defined livestock population Default Average Nitrogen Excretion (NEX) of a defined livestock population There is no requirement to include data from other Third Parties into the monitoring procedures.	
5.2. Access to external data	17, 18	All such data is publicly available.	☑
5.3. Quality assurance	3, 4, 9	By internal audits the correct transfer from data to excel spreadsheets has been checked.	☑
5.4. Significance and reporting risks	4, 5	There might be a material misstatement in case of having wrong literature data used by the spreadsheet calculations.	☑
6. Environmental and Social Indicators			
6.1. Implementation of measures	1, 2	No environmental and social indicators are defined in the monitoring plan. Hence the question is not applicable.	☑
6.2. Monitoring equipment	1, 2	See chapter 6.1.	☑
6.3. Quality assurance procedures	1, 2	See chapter 6.1.	☑
6.4. External data	1, 2	See chapter 6.1.	☑
7. Management and Operational System			
7.1. Documentation	4, 5, 9	Agrosuper has developed a documented procedure entitled: “Procedimiento para sistema de registros MDL; rev. 5”, which is an integral part of the certified management system (ISO9001, ISO14001). The certified management system covers all ag-	☑

OBJECTIVE	Ref.	COMMENTS	Conclu-sion
		ro-industrial activities of Agrosuper and hence also acquisition and documentation of all information on the livestock population. QMS documentation is available at all offices and sites addressed by the procedures and manuals.	
7.2. Qualification and training	4, 5, 9	Management procedures address the requirements on training and qualification of personnel. The staff recently fulfilling the different work steps shows the required competences and capabilities. Documentation on specific training courses is available.	☑
7.3. Allocation of responsibilities	4, 5, 9	Responsibilities are clearly referred to by the documented procedure indicated above. This can also be confirmed for the agro-industrial activities delivering relevant data input. The subcontracted maintenance provider, “Aguas y Riles” is intending to have an own certified ISO9001 system available in 2006. Nonetheless they are using, as required by the service contracts, the quality assurance documents as provided by Agrosuper since the project’s starting date.	☑
7.4. Emergency procedures	4, 5, 9	Emergency procedures on the treatment of implausible data are documented. In case information can not proof a proper operation of the manure treatment systems no emission reductions are claim for such days. This approach offers a conservative treatment of all such incidents.	☑
7.5. Data archiving	4, 5, 9	This aspect is also included in the “Procedimiento para sistema de registros MDL; rev. 5”. All underlying raw data since start have been available at the computer systems of Agrosuper.	☑
7.6. Monitoring report	4, 5, 9	The “Procedimiento para sistema de registros MDL; rev. 5” provides for the generation of consolidated data on monthly basis delivering results on emissions reductions and since the beginning served as mean of communication between the four project-participation. The monitoring report does include figures of baseline emissions and project emis-	☑

OBJECTIVE	Ref.	COMMENTS	Conclusion
		sions although all such figures are available by the underlying data records	
7.7. Internal audits and management review	4, 5, 9	Agrosuper has developed a documented procedure entitled: “Procedimiento para sistema de registros MDL; rev. 5”, which is an integral part of the certified management system (ISO9001, ISO14001). This procedure covers the aspect of internal audits for activities concerning the CDM activity. The overall management system covers the issue of management review for all activities as required for system certification.	☑

1 PERIODIC VERIFICATION CHECKLIST

Table 1: Data Management System/Controls

Expectations for GHG data management system/controls	Score	Verifiers Comments (including *Forward Action Requests* or *Corrective Action Requests*)
1. Defined organizational structure, responsibilities and competencies		
Position and roles	Full	The responsibility for compiling and consolidating data as well as for preparing the monitoring report is given to the corporate environmental manager, Mr. Carlos Andrés Vives, who also serves as contact point for the CDM activity as stated by the final PDD version. Continuous data processing as performed and controlled for this period by Mrs. Paola Gutiérrez (not working yet) and replaced today by Mr. José Manuel San Martin, the second person having exclusively access to the CDM data system. For the preparation of the monitoring report Agrosuper contracted consultancy service to Uriquidi, Riesco & Compañia, Mr. Sergio Vives, who has already been involved in the project's development and registration process. The installation and operation of all waste manure systems is supervised by Agroforestal Corneche, a further member of the Agrosuper Group under the responsibility of Mr. Manuel Jiménez. This company ordered an independent service company, "Aguas y Riles", to perform the maintenance works of installations covered by the registered CDM activities. In general, a thorough control of the whole operation from the point of view of the positions and roles could be demonstrated.
Responsibilities	Full	The overall responsibility of the project is with Mr. Carlos Andrés Vives (Corporate Affairs Manager). The responsibilities of all other persons dealing with information and data required to prepare the monitoring report are clearly indicated and ruled by a solid internal quality management system and relevant service contracts respectively. All the persons inter-

Expectations for GHG data management system/controls	Score	Verifiers Comments (including *Forward Action Requests* or *Corrective Action Requests*)
		viewed with responsibilities on the monitoring plan have a very professional profile, as demonstrated by their technical competences and availability not only to explain operational details, but also to recognize open questions during verification activities.
Competencies needed	Full	All competences and capabilities are covered by the persons working directly on the CDM project activity (e.g. the agro-industrial activities are considered to be outside the project boundary). There is no doubt about the technical level of competence among the personnel interviewed.
2. Conformance with monitoring plan		
Reporting procedures	Full	The data management system and all reporting procedures reflect the monitoring plan completely. The monitoring report consist of a brief document containing an introduction, a table with the general status of the project activity, a statement on implementation degree, and the list of parameters that have been measured according to the methodology AM0006, followed by tables with the results of the period (baseline and project emissions) on a monthly basis. The Monitoring Report is supported by a CD containing excel files with all data and calculations.
Necessary Changes	Full	As Agrosuper is only working with the same category of livestock (finishers) within their CDM activities, as already indicated by the PDD, it was assumed for the first periodic verification that there is no necessity to further indicate the category(-ies) of livestock population within the monitoring report. Changes in manure treatment stages as declared in the PDD, due to the change of tecnology (from anaerobic treatment and methane generation/flaring in other projects to advanced aerobic treatment/activated sludge phases) and land application/composting of sludge are being introduced. **Forward Action Request No. 1** It will be necessary to demonstrate that changes made to the final treatment stage (soil application will be replaced by composting) after the monitoring period covered by this verification (February 2005 to October 2006) is compatible with the validated PDD and it

Expectations for GHG data management system/controls	Score	Verifiers Comments (including *Forward Action Requests* or *Corrective Action Requests*)
		should not reduce the features of additionality of the Project activity.
3. Application of GHG determination methods		
Methods used	Full	The calculation procedures reflect the monitoring plan completely. All algorithms as given by AM0006, which are required to calculate the emission reductions, are correctly applied by Excel spreadsheets. The choice of the two different options as provided by the methodology is implemented as stated by the PDD. For each month consolidated emission reduction figures are delivered. For reporting issues monthly emission reductions are linked or copied to separate Excel files summarizing the emission reductions as derived above.
Information/process flow	Full	Input data is kept in retraceable form in multiple paper copies as well as a computer data base (production figures). The calculation spreadsheet is linked to exported excel files of that database not allowing any overwriting to this raw data. All other data coming from the waste manure operation are collected thoroughly by specifically developed paper forms, which are available in copies at the data management staff as well as on the treatment facility. This information is inserted to the excel files manually. Implausible data is re-checked interactively and documented by the comment function of MS Excel.
Data transfer	Full	Besides the information flow indicated above no further data transfer (e.g. by on-line connection to meters or external data sources) is required. During verification, all transfer mistakes were avoided. All other data sets were checked on consistency. No further errors could be detected.
Data trails	Full	In principle there is a consistent system concerning the reference to data trails and the administration right concerning reading and writing of data. Spot samples of data were taken from the barns during onsite visit and values could be confirmed without inconsistencies in files used for the monitoring procedure.

Expectations for GHG data management system/controls	Score	Verifiers Comments (including *Forward Action Requests* or *Corrective Action Requests*)
4. Identification and maintenance of key process parameters		
Identification of key parameters	Full	The significance and reporting risk of key parameters are clearly identified. As this project is working properly from their initial start up, all parameters are well developed and their origin is clearly traceable in all conditions. Moreover, a good cross check of spot data, performed in the on-site audit, permits the audit team have a clear view of this key parameters. Evidence was shown on the audit.
Calibration/maintenance	Full	All calibration sheets for all weighing equipment used for agro-industrial activities by Agrosuper are available on site. They are stored on the premises using such installations. It is important to note that swine weight is a parameter that is considered for swine production purposes in any case, thus controls on equipment maintenance and calibration was always very important for the swine production. A calibration of the flow meter required for determining the emission reductions by the aerobic treatment system has not been necessary during the monitoring period, as this system went into operation in 2005 only, relying on the original calibration of the manufacturer. No further calibration activities are required for this CDM activity. Maintenance of metering systems and operation of waste manure treatment systems is contracted to an external service provider having clear advice/duties to use the forms and procedures developed for quality and data management purposes.
5. GHG Calculations		
Use of estimates and default data	Full	The use of default data parameter was discussed in chapter 5 of the initial verification checklist. In this verification period, emissions due to electric energy consumption of the project was calculated using an emission factor value of an already validated PDD, as mentioned in the Monitoring Report, even though the subtracted amounts of ERs are negligible. All default data used are listed with reference to their sources in the docu-

Expectations for GHG data management system/controls	Score	Verifiers Comments (including *Forward Action Requests* or *Corrective Action Requests*)
		ments (files) supporting the Monitoring Report.
Guidance on checks and reviews	Full	Agrosuper has developed a documented procedure entitled: "Procedimiento para sistema de registros MDL; rev. 5", which is an integral part of the certified management system (ISO9001, ISO14001). This procedure covers the aspect of internal audits for activities concerning the CDM activity. The overall management system covers the issue of management review for all activities as required for system certification. This is applied correctly in this verification.
Internal validation and verification	Full	Internal checks are provided by the CDM project manager, Mr. Carlos Andrés Vives when rceiving monthly consolidated data prepared by Mrs. Paola Gutiérrez for this period. As commented on Section 1, Mrs. Gutiérrez did not work yet in AGROSUPER and their duties are taken by Mr. José Manuel San Martín today for the next verifications.
Data protection measures	Full	Mr. Carlos Andrés Vives and Mrs. Paola Gutiérrez (Mr. José Manuel San Martín yet) are the only persons having access to the file system containing raw data and consolidated data. Only after consolidation data is available for further users on different folders. The files are protected by IT solutions requiring the use of passwords.
IT systems	Full	The IT system is based on standard multi-user server systems and MS-office solutions. It designed to give exclusively access to file systems for specifically for each user through the system administrator. Moreover the IT system is under ITIL certification. Evidences were shown to the audit team (certificates). That means a correctly management of data for the project activity. Production data is processed and maintained by a database system able to allocate rights for writing and reading for each record to each type of user separately. The CDM team only has the right to read data and to export data to excel files.

Table 2: GHG calculation procedures and management control testing

Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks
Potential reporting risks based on an assessment of the emission estimation procedures can be expected to occur in the following fields of action: 1. raw data collection 2. calculation methods, Key source data applicable to the project assessed are hereby: • Metering records • Laboratory/analytical data • Accounting records. Appropriate calibration and maintenance of equipment resulting in a high accuracy of data supplied should be in place. It is hereby needed to focus on those risks that impact the accuracy, completeness and consistency of the reported data. Risks are weakness in the GHG calculation systems and may include: ➢ manual transfer of data/manual calculations, ➢ accuracy due to technological limitations	Regarding the potential reporting risks identified in the left column the following mitigation measures have been observed during the document review and the on site mission: Raw data collection: As data from agro-industrial production is also required for controlling the swine business, high quality data are delivered for the purposes of the CDM project activity as well. Data collected from the waste manure management system are specifically relevant for the CDM activity. According to the findings of the first periodic verifications, a core risk was seen in the possibility that even no or almost no emission reduction would occur in case of not having the combusting equipment (flare) in operation. All data and measures providing sufficient evidence that methane was flared during the time emission reductions which are claimed for are of decisive importance in the context of verification. The management control procedures address this aspect by delivering routines to perform plausibility checks. Quality control of analytical data should have a clear focus on sample taking activities and a reference to standards, official guidelines and/or accredited labora-	The maintenance records and its proper fillings for the flare and for the aerobic treatment activities have to be scrutinized in detail on-site. The use of excel tools in the calculation requires further assessment. It needs to be assessed whether data coming from the production software can be used without any restrictions (e.g. monthly average of population versus batch population averages).

Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks
	tories. This is correctly implemented by the management control procedures Calculation methods: The use of excel files is requiring a detailed check of correct transfer of algorithms into this format and a carefully treatment of all "copy and paste" actions to avoid any overwriting of cells. These action is avoided using a macro from the raw data capture system, which permits only a transference of data from the implemented system to an excel sheet without making "copy and paste" actions. Raw data will maintain its incorruptibility. Using averages for populations and animal weight, the algorithms applied have to cover the whole monitoring period, i.e. periods of having reduced or even no population when changing batches should be found in correctly reduced monthly averages. Similar aspects have to be discussed when calculation emissions reductions when having documented failures of the systems operations. A proper use of correct default data form external data sources is necessary. Checks on the correct transfer from literature have to be made. Calibration and Maintenance: Spot checks have been made in order to get proofs for the realization of calibration measures as required.	

Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks
	The maintenance protocols for flare system and aerobic treatment installation are internally checked by the CDM team supervising the contracted service provider "Aguas y Riles". The external laboratory in charge of physical and chemical analysis is being recertified under ISO 17025. No data inconsistencies have been detected this time. Accuracy: Especially the weight of sludge is of limited accuracy. The management control should provide cost-efficient and reliable procedures for this parameter. Internal Quality Checks: There is no documentation available whether quality checks have been performed. This approach requires still more detailed investigation to detect any problem cases.	

Table 3: Detailed audit testing of residual risk areas and random testing

Areas of residual risks	**Additional verification testing performed**	**Conclusions and Areas Requiring Improvement (including *Forward Action Requests* and *Corrective Action Requests*)**
The maintenance records and its proper fillings for the flare and for the aerobic treatment activities have to be scrutinized in detail on-site.	Spot checks have been made on-site verifying the continuous operation of the flare as well as of the aerobic treatment plant. Furthermore it has been investigated by spot checks whether data from manually written forms has been correctly transferred to the data system. The type, functionality and eligibility of safety equipment (self-ignition and safety-valve), ensuring that no unintended release of methane will occur, has been inspected on-site.	No inconsistencies could be detected for this aspect. The continuous operation of the methane combustion and the aerobic treatment plant can be confirmed.
The use of excel tools in the calculation requires further assessment.	All excel files used to deliver consolidated figures have been investigated excessively. The ways how new data are inserted for new months to be calculated have been discussed.	No inconsistencies could be detected for this fact.

Table 4: Compilation of open issues

Corrective and Forward Action Requests by audit team	Summary of project owner response	Audit team conclusion
Forward Action Request No. 1 For the next periodic verification it will be necessary to demonstrate that changes made to the final treatment stage (soil application will be replaced by composting) after the monitoring period covered by this verification (February 2005 to October 2006) is compatible with the validated PDD.	During verification, project proponent informs that no change for the PDD should be considered. This implies that the operation of compsting is only for internal purposes. Nonetheless this issue should be clearly demonstrated by calculation of this operation.	This issue will have to be scrutinized in detail during next verification.

Annex 2: Information Reference List

Reference No.	Document or Type of Information
1	Final Project Design Document for CDM project “Advanced swine manure treatment in Maitenlahue and La Manga”, as available at cdm.unfccc.int
2	Validation Report No. 2005-1107 for CDM project “Advanced swine manure treatment in Maitenlahue and La Manga” issued by Det Norske Veritas, as available at cdm.unfccc.int
3	Monitoring Report “Advanced swine manure treatment in Maitenlahue and La Manga - Reference no. UNFCCC 0458” covering the period February01, 2005 until October 31, 2006, submitted March 2007
4	On-site interviews at the premises of Agrosuper in Rancagua conducted on March 15, 2007 by auditing team of TÜV SÜD Verification team: Javier Castro TÜV SÜD, GHG Project Manager Víctor Abarca TÜV SÜD, Local GHG auditor Iván Bugueño TÜV SÜD. GHG trainee auditor Interviewed persons: Mr. Carlos Andrés Vives Agrosuper, Corporate Affairs Manager Mr. José Manuel San Martín Agrosuper, CDM Supervisor Mrs. Andrea Rudnick POCH Ambiental, CDM Specialist Mrs. Luz Farah POCH Ambiental, CDM Specialist Mr. Ernesto Muñoz Agrosuper, IT Business Manager Mr. Alexis Pino Agrosuper, Manager Biodigester La Estrella Mr. Mauro Guerrero Aguas y Riles, Water Treatment Plant Administrator Mr. Rodrigo Gomez Agrosuper ,Water Treatment Manager.
5	UNFCCC homepage http://www.unfccc.int including the CDM section cdm.unfccc.int
6	Approved baseline and monitoring methodology AM0006
7	Certificate of accreditation due to NCh-ISO 17025.Of2001 for LABORATORIO ANALISIS AMBIENTALES S.A. (ANAM) issued by INN-Chile on June 30, 2003

Reference No.	Document or Type of Information
8	"Procedimiento para sistema de registros MDL" rev. 5; Quality management procedure concerning data management of the CDM project as part of the certified QMS, dated 10.10.05
9	Multiple, interactive generated reports (as required on-line by the audit team) on historic data generated by the production management database software
10	Technical data sheet of installed flow meter type DANFOSS, Magflo MAG5000
11	Samples of laboratory analyses reports prepared by ANAM and submitted by the operator
12	Manual of CO_2 metering device.
13	Participation list and printed presentations of training seminar provided for Aquas y Riles maintenance team
14	Samples of daily records book of bio-digester and aerobic treatment system
15	Samples of freight documents concerning the dispatch of sludge from the aerobic treatment system
16	Samples of manually documented daily records of swine population from farms
17	Samples of manually documented records of total weights per unit of coming and going batches of pigs at farms of the project.
18	Calibration Report issued by standardization body concerning one of the weighing systems used to determine weights of Agrosuper's internal animal transportations
19	Complete data records of consolidated emission reduction calculations covering the whole monitoring period.
20	1996 Revised IPCC Guidelines.
21	IPCC Good Practice Guidance and Uncertainty Management 2000.